SUSTAINABLE REMEDIATION FORUM UK MEETING

MEETING NOTES

18th November 2008

LONDON

Attending:

Anglo American	Gareth Llewellyn
Arup	Mike Quint
Atkins Global	Natalyn Ala
Buro Happold Ltd	Dr Gary Graveling
Cardiff Uni	Michael Harbottle
CIRIA	Joanne Kwan
CL:AIRE	Jane Garrett
CL:AIRE	Nicola Harries
CL:AIRE	John Henstock
CLARRC, University of Edinburgh	Colin Cunningham
Cobbetts	John Moritz
Cornelsen	Quentin Hulm
DEC	Guy Pomphrey
Delta Simons	Dr Cheryl Davies
DoENI	Theresa Kearney
Dupont	David Ellis * (by Phone)
Dupont	Markus Ackermann
English Partnerships	Richard Boyle
Environment Agency	Brian Bone
Environmental Geotechnics	Stephan Jefferis
ENVIRON	Mark Travers
ERM	Alan Thomas
ESSI Contracting	Louise Cartwright
Golders	Adrian Needham
Grontmij	Mike Wilyman
Jacobs	Stéfan Le Roy
London Borough of Newham	Nick Marks
MOD	Raymond Dickinson
MWH	Susan Digges La Touche
National Grid Properties	Frank Evans
Parsons Brinckerhoff	David Birks
R3	Paul Bardos
RAW Remediation	Martin Richell
RSK	Peter Witherington
SAGTA	Doug Laidler
Shell	David Reinke
Shell	Philippa Scott
Shell	Jonathan Smith
Sirius	Genevieve Boshoff
Soilfix Limited	George Evans
Tamdown Regeneration	Steve Jackson
Taylor Woodrow	Ian Heasman
University of Strathclyde	Bob Kalin
Uni of Teesside	Richard Lord
Urban Vision	Simon Talbot
URS	Mark Stevenson
Worley Parsons	Stuart Arch
WSP	Dr Sarah MacKay

Welcome

Jane Garrett (JG) (Chief Executive of CL:AIRE) gave a warm welcome on behalf of CL:AIRE to everybody especially our overseas visitors joining by telephone and thanked them for giving up their time today. She explained that SuRF UK is an important initiative for CL:AIRE and thanked English Partnerships for providing the funding to allow us to do this. She also thanked the Steering Group for all their hard work, as the progress that will be shared today is due to many hours of their commitment. She went onto say that the meeting had a very broad audience of policy makers, regulators, consultants and contractors, researchers, and site owners. There was great interest in people attending and we had to turn people away. SuRF UK is aiming to assist the brownfield sector to seize the opportunity and develop a framework that all will use and demonstrate to other sectors how collectively we have developed an effective robust framework to allow the assessment of sustainability of soil and groundwater remediation.

She handed over to Gareth Llewellyn the chair for the day.

Format for the Day, Rules of Engagement and Commitment

Gareth Llewellyn (GL) described the objectives for the day and how the day would proceed in line with the agenda. There would be a series of presentations and then syndicate group exercises in the afternoon.

GL explained that there was a good cross section of people present from practitioners, academics, NGOs and government, and many of the individuals had been to earlier meetings that CL:AIRE had organised. CL:AIRE had specifically arranged the attendees into five different colour groups in order for syndicate groups to work in smaller groups and to cross fertilise ideas.

GL explained that the meeting would be held under Chatham House Rules, that there should be a spirit of sharing but people should be respectful of commercial concerns. Everything discussed should be as transparent as possible and that people should be able to ask obvious and simple questions. It was also stated that any input and views given at the meeting was individuals input and not that of their companies. All information about this meeting and subsequent meetings will be put up onto the CL:AIRE website and any queries relating to SuRF UK should be co-ordinated through Nicola Harries at CL:AIRE.

Presentations

A series of presentations were given which are included in Appendix 3. They included:

1. Nicola Harries (NH) of CL:AIRE presented on “Progress from last meeting”
2. Richard Boyle (RB) of English Partnerships on Consultation Feedback
3. Jonathan Smith (JS) of Shell Global Solutions on “Draft Framework Development”
4. Paul Bardos (PB) of r^3 Environmental presented on “NICOLE Sustainable Development forum”
5. David Ellis of Dupont presented on “SURF USA – Progress so far”.
6. Paul Bardos of r^3 Environmental presented on “Origin of and proposal for Indicator Sets”

Discussion and feedback provided after the presentations

There was extensive discussion after the presentations and further feedback was also provided after the event. This is all summarized below:

It was felt that the use of the term KPIs will lead to confusion and is an inappropriate term instead of sustainability indicator. KPIs can be misused in local and central government, providing additional evidence which is why use of this term should be avoided, as well as being incorrect.

It was agreed that the framework should concentrate on sustainable remediation i.e. the two aspects of remediation strategy and technology selection, and not extend into the realm of sustainable development. Remediation is, in reality, a minor aspect of most developments, although it certainly contributes to sustainable development, and SuRF UK should concentrate on assessing the sustainability of remediation rather than taking on too broad a remit at this stage.

If SuRF UK can develop a framework and then standard indicators for making assessments of the sustainability of remediation options in a rational, consistent, reasonably comprehensive, equitable and transparent manner, then that will be an excellent achievement. The framework can then be expanded in the future if desired. The

framework will have to be prepared in the context of regional and local planning considerations, but the focus at present should be on the "bottom end" - remediation strategy and technology selection.

To make sustainability assessments for a remediation option, each indicator applicable to the site (some may be inapplicable) can be attributed with a graded score e.g. -2, -1, 0, 1, 2 for highly negative to highly positive sustainability. Some guidance on how to score should be given for each indicator. Then each indicator should be assigned a weighting which will differ on a case by case basis, with the range of weighting being kept tight, say 1 – 3, to ensure that weighting itself does not skew results too much. Then the scores for each of the three pillars of sustainability can be added to give 3 numbers to form a qualitative, tier 1 screening for each remediation approach or option. These numbers can then be used to compare the viable remediation options and a most sustainable (or least unsustainable) option can be identified.

Extending qualitative assessments to quantitative is much more complex. Assigning real, defendable numbers to obtain quantitative assessments for fuel use, carbon footprint, emissions, and material consumption is reasonably easy but trying to assign values for many social and some environmental indicators will be very difficult. I encourage SuRF UK to complete a qualitative framework and tool before trying to go quantitative.

The indicators should be global in application, rather than being UK focused (i.e. related to UK legislation. They should be more fundamental than national legislation. Use indicators from the Global Reporting Initiative and the FIDIC - International Federation of Consulting Engineers (2004) Project Sustainability Management: Guidelines. This assures worldwide applicability.

It was felt that a balance between Environmental, Social and Financial was unrealistic and that Environmental would have a greater emphasis.

There was a question as to what the incentives would be for companies/organisations to undertake a voluntary sustainability assessment? Why would a company spend more money without obvious gains, particularly if money is being provided by the public sector. How could a consultant demonstrate value for money?

It is very important to define boundaries. It is possible to define boundaries that suit your process, therefore you may be accused of an underlying "greenwash".

There was discussion that there maybe enough incentive for companies wanting to be seen to be doing the "right" thing as they want better environmental credentials. There are now internal drivers within companies who have voluntarily developed Environmental Management Systems and Corporate Social Responsibility credentials as they are working more and more in global markets that require them. The big companies are leading the way and requiring companies that they work with to also have such systems in place.

Important to look at other practices ie BREEM, CEEQUAL.

Need to engage with a broader stakeholder group and not just contaminated land/remediation practitioners.

If voluntary, how would you ensure that new developments will follow the framework? Key to get it into the planning guidance but this has only recently been updated.

There was misunderstanding whether the framework works are policy level or technology level.

Does it need to demonstrate sustainability at each stage? What is considered unsustainable?

It was felt that a common checklist for sustainability considerations would be useful. Policy orientated indicator sets seem to be more appropriate at "higher" / core / regional levels of decision making. Effects driven sets are better for remedial selection.

Case studies need to be put forward to tryout the framework on.

It would be useful to have a framework to benchmark against at the environmental/SD performance appraisal stage i.e. CEEQUAL, BREEAM, DREAM (MOD in house tool). Credits can then be give for achieving/exceeding the benchmark.

The framework must be simple not complex, graspable by everyone not just specialists; about outward looking principles not necessarily only inward looking technical detail and it will be more about cultural change rather than technical process.

Sustainability is both 'fuzzy' and 'subjective' – regardless of how many detailed technical processes are in place there is never going to be an absolute agreement about what is the most sustainable solution; economists will think in one way, environmentalists in another and social scientists in a third. Therefore in simple terms it is about communication and flexible decision making, taking on broader agendas not just your own narrow agenda, for example, regulators understanding the relationship between cost and benefit; neighbours understanding the broader benefits of a project and not just worrying about local disruption and developers understanding the impacts of their work through the supply chain, on the environment, and locally, not only looking at profit margins.

There was reservation is in relation to core and non-core aspects. It was felt that the Steering Group is uniquely well qualified to deal with technology selection, sustainable risk based criteria selection, and how site conditions can impact site specific master planning. However it is crucial to work with the planning community to lead on remediation and strategic planning,

CONCLUSIONS OF THE DISCUSSION

It was agreed that it was important to engage with the planning sector. There is already a number of planning guidance mentioning sustainability and it is a good time to try and influence any new guidance when updated. It was recommended to contact the Town and Country Planning Association and Royal Town Planning Institute.

There was considerable support for the draft framework developed so far, however the attendees felt that the Steering Group should concentrate on developing a framework for measuring sustainability in remediation not regeneration. It was felt that regeneration was too broad and would be difficult to undertake with the current stakeholder group.

It was agreed that the framework consultation would remain open until 5th January 2009.

It was agreed that SuRF UK needs to engage with a broader stakeholder group as the project develops further.

It was agreed that the framework needs to have balanced decision points along the way and a mechanism to return to earlier decisions. The framework will aim to ask intelligent questions, have a consistent checklist of indicators which may or may not be used by the user. It will have identified decision points with links to case studies.

Reference was made to the Global Reporting Initiative which has an internationally recognized set of indicators that businesses use to measure sustainability within their own companies.

It was felt although people will measure social, environmental and economic indicators that environmental and economic would be deemed more important at operational level. It was felt that social indicators were more important at a high strategic policy level.

After the presentations, the audience was asked to work in separate groups.

Syndicate Group Exercise

The attendees were requested to answer the following questions working in five different groups. Details are provided in Appendix 1:

- Do you agree that at anyone of the points at which a sustainability assessment could be made, a consistent set of indicators is needed to be considered in order for a sustainability analysis? If not, how do you get around the issue of consistency?

- In brainstorming practical indicators, do you find yourselves being drawn to policy-orientated or effect-orientated indicators or some combined approach?

- What are the relative strengths and weaknesses of using policy-orientated or effect-orientated indicators, and what are the circumstances that would favour one approach over another, or some kind of combined approach?

- Which indicators are coming to the fore at the key sustainability indicators?

- What means of measurement or data sources do you find yourselves considering in deciding whether any one indicator is readily measurable or not?

Each group was then asked to list down the different parameters that should be measured under the 3 headlines of Economic, Environmental and Social. These are listed in Appendix 2:

SUMMARY

GL concluded the afternoon by confirming that CL:AIRE will be uploading the presentations and notes of this meeting and to request if anyone has further comments to make to please forward to Nicola Harries. He thanked everybody for their time.

CLOSE

APPENDIX 1 – SYNDICATE GROUP EXCERCISE

BLUE GROUP

- ***Do you agree that at anyone of the points at which a sustainability assessment could be made, a consistent set of indicators is needed to be considered in order for a sustainability analysis? If not, how do you get around the issue of consistency?***

Yes consistent – but tiered approach - but how does the tier selection process take place.
- Consistent list
- Important to have extensive list at start
- Consistent at ever level
- Alternative is much more open process but perspective flow chart – get right stakeholders.

Timescale – flow chart down for policy which will take time
Run case studies is important. Use full indicators to see what emerges as important.

- ***In brainstorming practical indicators, do you find yourselves being drawn to policy-orientated or effect-orientated indicators or some combined approach?***

Effect orientated is what we discussed reflected mix of team, policy sits outside of the room.
Does technical override policy decisions – in some circumstances.
Cost is a key driver – particularly in current climate but obviously whole point of sustainability is broader – but does economic cycle dominate.

- ***What are the relative strengths and weaknesses of using policy-orientated or effect-orientated indicators, and what are the circumstances that would favour one approach over another, or some kind of combined approach?***

Timescale – policy orientated allow planning over longer timescales, whereas effect orientated – project level.
We can influence policy higher – if involved early enough in the process. Relative merit of each may depend where you are in the process.

- ***Which indicators are coming to the fore at the key sustainability indicators?***

Environmental and Economic but not social (within our group). Social may be more important at policy level.

ADDITIONAL NOTES
Project level – can put numeric levels into readily measurable indicators. Property values – measurement of social?
Land registry values (after event) – background trends.
Ask local authorities for published data sets on general complaints to Environmental Health regarding nuisance/orders for example.

RED GROUP

- ***Do you agree that at anyone of the points at which a sustainability assessment could be made, a consistent set of indicators is needed to be considered in order for a sustainability analysis? If not, how do you get around the issue of consistency?***

No but it does get sort out issues of consistency.
Confused about interaction between core and non core objectives.
Focus on non core objectives.
Need planners in the forum.
Policy indicators dropping down with effects indicators coming up
Many indicators already available and therefore can be borrowed.
Indicators need to be objective and when drawn together measurable and auditable

- ***In brainstorming practical indicators, do you find yourselves being drawn to policy-orientated or effect-orientated indicators or some combined approach?***

Group feels that you should borrow information that is already available. Reference made to ICE journal of Sustainability
Life Cycle Analysis indicator sets ISO14040
FIDIC Global reporting initiatives

- ***What are the relative strengths and weaknesses of using policy-orientated or effect-orientated indicators, and what are the circumstances that would favour one approach over another, or some kind of combined approach?***

Against aggregates as it hides the individual indicators. Use Red, Amber and Green and see the picture. Can use it as a tool for improvement.
Use BREEAM as an example.

ORANGE GROUP

- ***Do you agree that at anyone of the points at which a sustainability assessment could be made, a consistent set of indicators is needed to be considered in order for a sustainability analysis? If not, how do you get around the issue of consistency?***

Tiered approach with broad economic and social indicators will be emphasised at earlier stages (national /regional planning)
- Economic & social indicators will change with stage. Environmental indicators will become more important at remediation stage, which are fairly well defined.

- ***In brainstorming practical indicators, do you find yourselves being drawn to policy-orientated or effect-orientated indicators or some combined approach?***

Mostly emphasis on effect – orientated indicators to stand the test of time because policy can change (eg % of houses to be constructed on brownfield land)
- However some consideration of policy is required when forming indicators.
- Effect – orientated indicators would also be more consistent with respect to EU directives.

- ***What are the relative strengths and weaknesses of using policy-orientated or effect-orientated indicators, and what are the circumstances that would favour one approach over another, or some kind of combined approach?***

Policy can change with respect to time & country & government.
Effect indicators can change with respect to science change.

*** Combined approach with emphasis on effect driven

- ***Which indicators are coming to the fore at the key sustainability indicators?***

Environmental indicators are most obvious.
- Social & economic indicators come forward in early stages, with respect to environmental move at the fore towards the end.

- ***What means of measurement or data sources do you find yourselves considering in deciding whether any one indicator is readily measurable or not?***

Can use linked policies for measuring social.
Environmental indicators are more easily measured.
(Cost measurement/benefit) difficult to measure and compare across all indicators effected.
→ weighting of economic, environmental & social indicators/which are more important
→ integration of indicators with weighting
→ this weighting may change with each site/scheme/project.

Debate/discussion within the group around what the term “remediation” encompasses. Does remediation include regeneration being broader?

YELLOW GROUP

- ***Do you agree that at any one of the points at which a sustainability assessment could be made, a consistent set of indicators is needed in order for a sustainability analysis? If not how do you get around the question of consistency?***

Comments**:** A common pick list is needed for consistency but:

- A problem around the question of scale: possibilities for complex appraisal as well as impacts are limited for small sites
- Who is selecting the indicator and for what reason?
- Consistent set of indicators for what? Remediation or regeneration?
- Long list of indicators could be scoped out in first instance
- There may be absolute fixed requirements e.g. cost, SPOSH
- Must be bottom-up
- Intelligent users needed if sustainability process is complex

- ***In brainstorming practical indicators, do you find yourselves being drawn to policy-oriented or effect oriented indicators or some combined approach?***

- ***What are the relative strengths and weaknesses of using policy-orientated and effect-oriented indicators, and what are the circumstances that would favour one approach over another, or some kind of combined approach?***

Comments**:**

- Both have a role
- Effect indicators are the easy wins, easier science
- Policy indicators could take longer to realise, more complex
- LAs will always have to deliver their set KPIs (policy indicators) above all else (LA funding based on KPIs)
- Some question as to whether these two categories can really be looked at in isolation i.e. policy indictors will be related to real outcomes, and effect indicators do not usually stand in isolation of policies
- UK SURF must move forward in the light of what is sustainable within the current legal framework – the current regulatory system should be a system boundary - indicators must reflect this reality
- Where there is an obvious conflict between sustainability and for example policy or legislation, then such issues should be approached outside the main SURF framework
- The people in the room are remediators not policy makers

- ***What indicators are coming to the fore as the key sustainability indicators?***

Comments**:**

There was a brain dump around indicators on the post-it notes. We had limited time and because of our backgrounds the environmental indicators were better developed than social and economic. There were a large number of indictors identified and we could have probably kept thinking up an ever longer list given time.

- ***What means of measurement or data sources do you find yourselves considering in deciding whether any one indicator is readily measurable or not?***

Comments:

- Effect, economic and environmental indicators will generally be easier to measure
- Policy and social indicators may generally be harder to measure
- Ran out of time to answer this question in more depth

APPENDIX 2- INDICATORS

INDICATOR SETS

ECONOMIC

- Emissions Trading
- Internal Rates of Return
- Investment
- Raising taxes by redeveloping land to productive sites
- Technology Development
- Operating Costs
- Operational Costs
- Politics
- Employment
- Local Wages/Economy
- Inward Investment
- Tax exemptions & relief
- Direct/Indirect costs
- Corporate Reputation/Share Price
- Grants/Fiscal incentives
- Capital
- Land Value– neighbours & development
- Good PR
- Avoidance of liability
- Local Authority reputation
- Profit
- Maintenance Cost
- Finality (financial certainty/closure confidence)
- Cost benefit analysis
- Costs – immediate; lifetime
- Liability – long term; short term
- Carbon trading
-

ENVIRONMENTAL

- Human Health Risk Assessment
- Climate Change - Green House Emissions (carbon); Ozone depletion; flood risk
- Biosphere – protection; improvement; diversity; flora/fauna
- Minimise odour generation
- Minimise dust generation
- Minimise noise generation
- Minimise soil waste
- Maximise soil reuse
- Physical Hazard
- Noise
- Water – resource use; quality; clean-up
- Water – lakes; ponds; water consumption; tidal effects
- Waste Minimisation – Produce material; impact
- Waste Generation
- Energy Consumption/Demand
- Carbon Footprint

- Renewables Generation
- Materials – consumption; production; recovery
- Use of Natural Resources – fuel; aggregates; water
- Transportation
- Visual Landscape – Eye-sore; fit into natural landscape
- Intrusiveness
- Soil – function; land pollution
- Betterment
- Natural Resources – efficient reuse
- Acid rain generation
- Ecology – habitat creation; habitat destruction
- Air Quality
- Reduction of Health Risk
- Recovery of Product
- Emissions to air – by process & by production of materials
- Human Health standards increase or decrease
- Protection of green spaces
- Health and Safety
- Public perception
- Consultation
- Disturbance/Nuisance
- Recovery of Product
- Reduction of landfill
- Road miles created
- Environmental Liability
- Longevity

SOCIAL

- Cost of Process
- Compensation/Damages paid out
- Equipment Used
- Employment - creation or destroy
- Urbanisation – crime reduction; space reduction
- Local amenity/services
- Protection of Human Health
- Ethical
- Future Resource
- Tourism
- Highway safety
- Traffic
- Health and Safety – community & well being
- Training
- Section 106
- Population Impacted
- Community Social Responsibility
- Community Cohesion
- Regeneration
- Property Blight/Uplift
- £26.50 altruistic costs
- Corporate Image/reputation
- Planning Gain

- Disturbance eg traffic
- Transportation (tonnes per mile)
- Crime
- Community Confidence
- Community Acceptance
- Social Disruption (relocation/rehousing)
- Land Options Enhancements
- Stakeholder Stress
- Acceptability
- Social Perception
- Uncertainty
- Green Infrastructure
- Heritage
- Local Aesthetics

APPENDIX 3 - PRESENTATIONS

SUSTAINABLE REMEDIATION FORUM UK (SuRF UK)

PROGRESS FROM LAST MEETING

Nicola Harries

CL:AIRE

RECAP & PROGRESS

- Meeting held in June 2007 – appetite to develop the idea of measuring sustainability in remediation
- Action Plan developed
- Funding secured in January 08 from English Partnerships
- Steering Group set up to drive initiative forward
- Aims & Objectives and Mission Statement developed

PROGRESS

Mission Statement :

To “Develop a framework in order to embed balanced decision making in the selection of the remediation strategy to address land contamination as an integral part of sustainable development”.

Explanatory words:

1) Working mission statement
2) Framework has specific meaning as a word
3) Balanced decision making in terms of Sustainable means Social - Economic - Environmental
4) Land Contamination has no statutory meaning and include decision making on groundwater issues associated with land contamination.
5) Development used in global sense not with narrow meaning of 'Building houses' and includes sustainable land-use (e.g operational refinery)

STEERING GROUP

- CL:AIRE
- English Partnerships
- Industry : Shell Global Solutions & National Grid Property through SAGTA
- Environment Agency
- R^3 Environmental Technology Ltd
- US SURF

PROGRESS

- Second official “Open” SuRF UK meeting
- First (launch) meeting held May 2008 – where 40+ people attended
- Many more people have heard and are interested. 70+ indicated interest in attending this meeting.
- Next meeting February 09

PROGRESS SINCE LAST MEETING

- Steering Group very busy
- Website launched www.claire.co.uk/surfuk
- Website details – Work Plan, aims, objectives, background information, notes from previous meetings and useful links
- Outline Brief of the framework developed and posted on website
- Consultation sent out to 24 representatives who indicated an interest in developing the framework at the last meeting with 21 returns.

PROGRESS

- Only sent to 24 to give the Steering Group some steer that we were moving in the right direction.
- The consultation was very positive, and has provided valuable input to the Steering Group, Richard Boyle to give details of the consultation responses.
- To those who did not receive the consultation and would like to respond, it is still open and will be uploaded onto the SuRFUK website www.claire.co.uk/surfuk for returns by January 5th 09 shortly. Please circulate amongst your colleagues.

PROGRESS

Thank you to all of you who responded in the tight turnaround.

- Atkins
- BP America
- Cardiff University
- CLARRC
- Cobbetts
- Delta Simons
- Environment Protection UK
- Halcrow
- Harrow Estates
- ICI
- MWH
- National Nuclear Laboratory
- Oxford Brookes University
- Parsons Brinckerhoff
- RAW
- Sirius
- Teesside University
- URS x2
- Welsh Assembly Government
- Worley Parsons
- White Young & Green

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OPEN FORUM

- Must deliver tangible outputs at end of March 09
- Transparent process consultation all the way
- Notes & presentations to be uploaded onto the website

PROFILE

- Presentations on SuRF UK at:
  - Battelle 08 **www.battelle.org/environment/er/conferences/**

  CONSOIL 08 **www.consoil.de** Milan, Italy 3 - 6 June 08
    - **Invited speakers from UK & US SURF & Industry Groups**
    - **Panel Discussion**
  - EIC Scotland
  - Brownfield Briefing
  - North East Contaminated Land Forum
  - SAGTA/NICOLE
  - Environment Protection UK
  - NICOLE Working Group

THANK YOU

SuRF
SUSTAINABLE REMEDIATION FORUM UK

Consultation Responses and Pertinent Points

Presented on behalf of **SuRF (UK)**

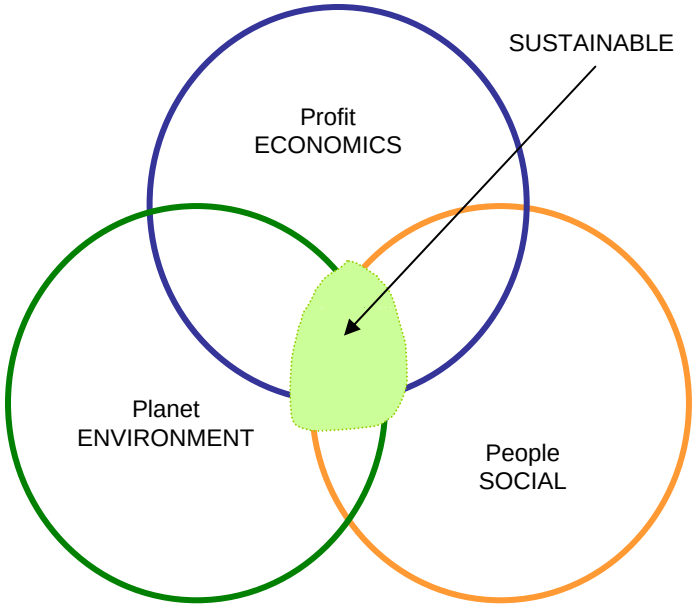
by

Dr Richard Boyle
Brownfield Technical Consultant
English Partnerships

SuRF
SUSTAINABLE REMEDIATION FORUM UK

Contents of Presentation

- Consultation Responses and Pertinent Points
  - Make up of respondents
  - What is sustainable remediation?
  - Agreement with SuRF UK approach?
  - What should SuRF UK Framework cover / how be applied?
  - How should SuRF UK be aligned?
    - Representative comments of each question



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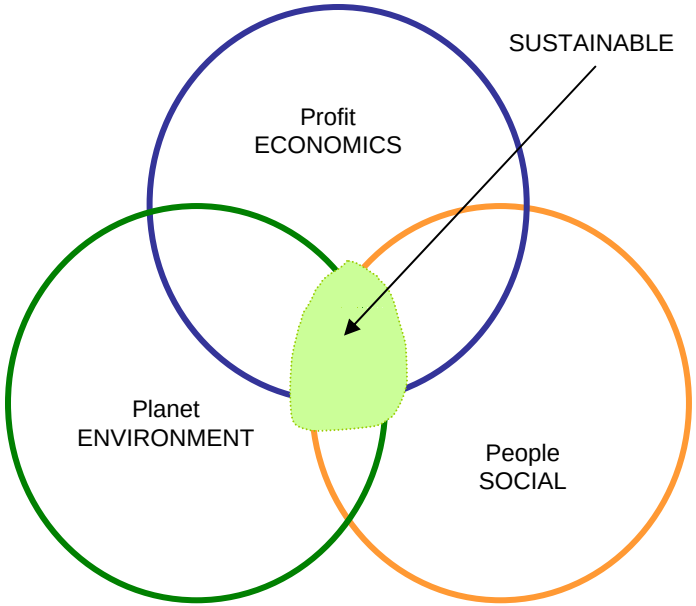
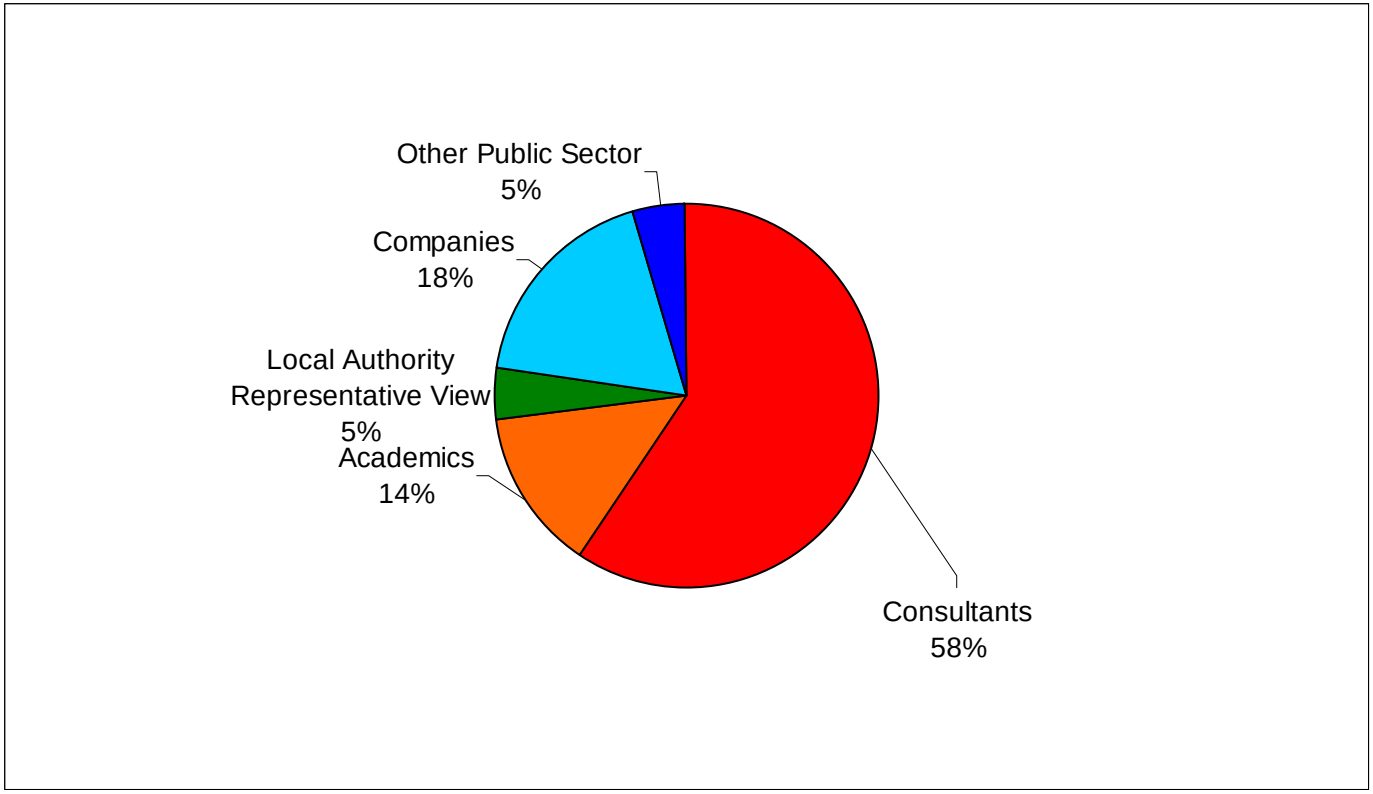
Contents of Presentation

- Make up of respondents



Make Up of Respondents

- 22 respondents to survey
  - Consultants (13), Academics (3), LA Representative View (1), Companies (4), Other Public Sector (1)



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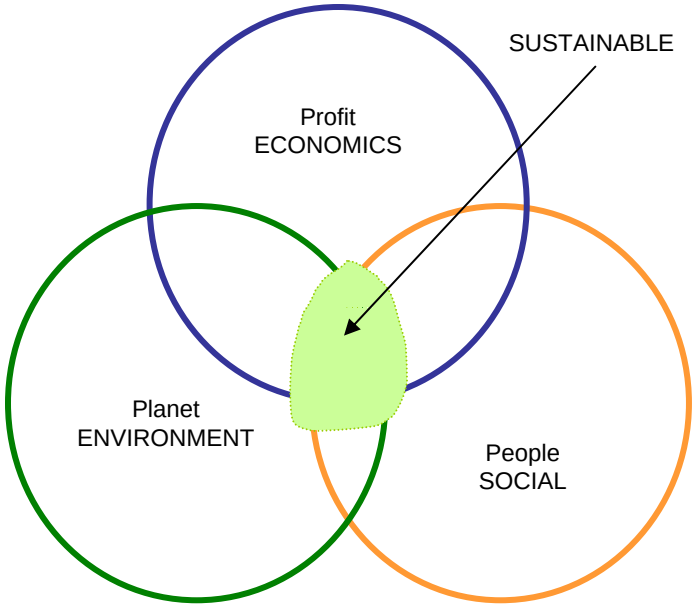
Contents of Presentation

- What is sustainable remediation?



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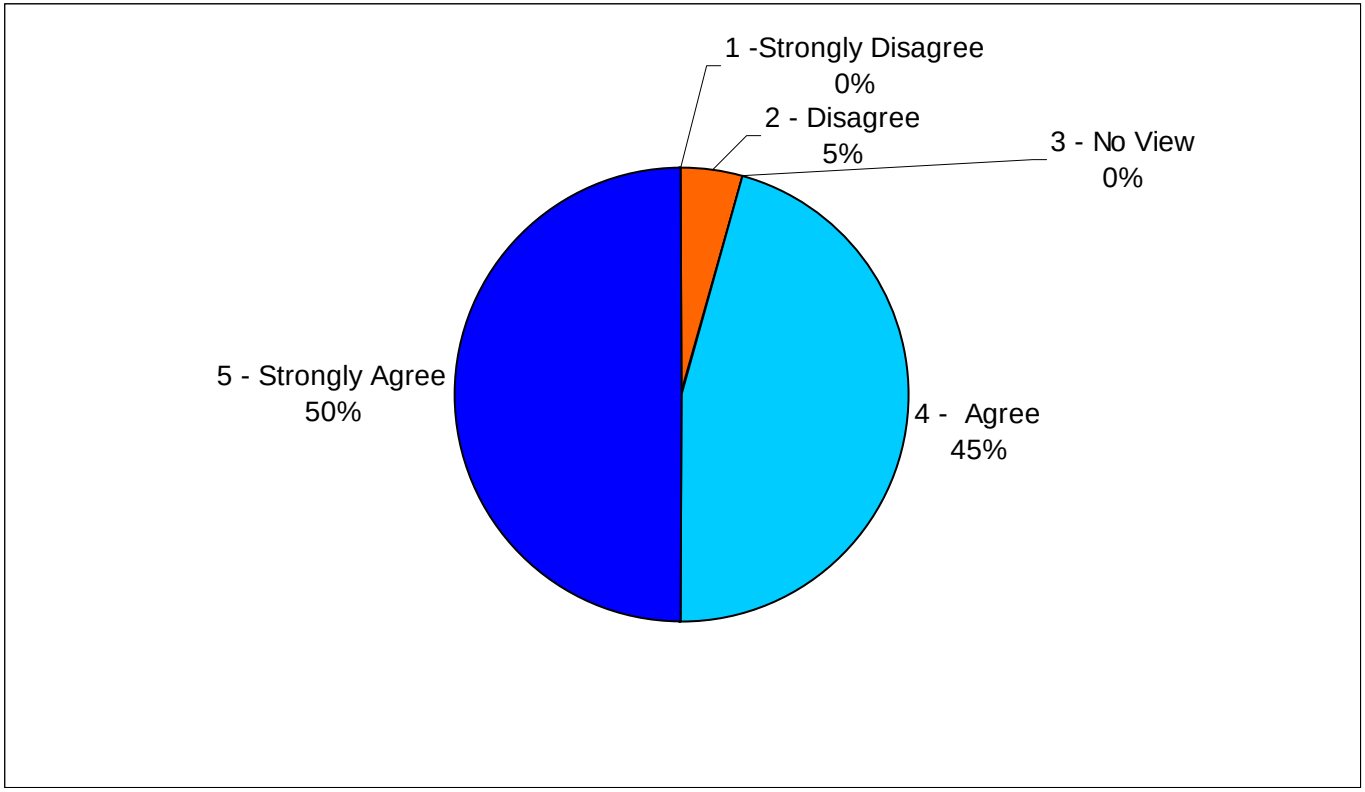
Question 1

- Do you agree that sustainable remediation decision making is about the balance of social, economic and environmental aspects?



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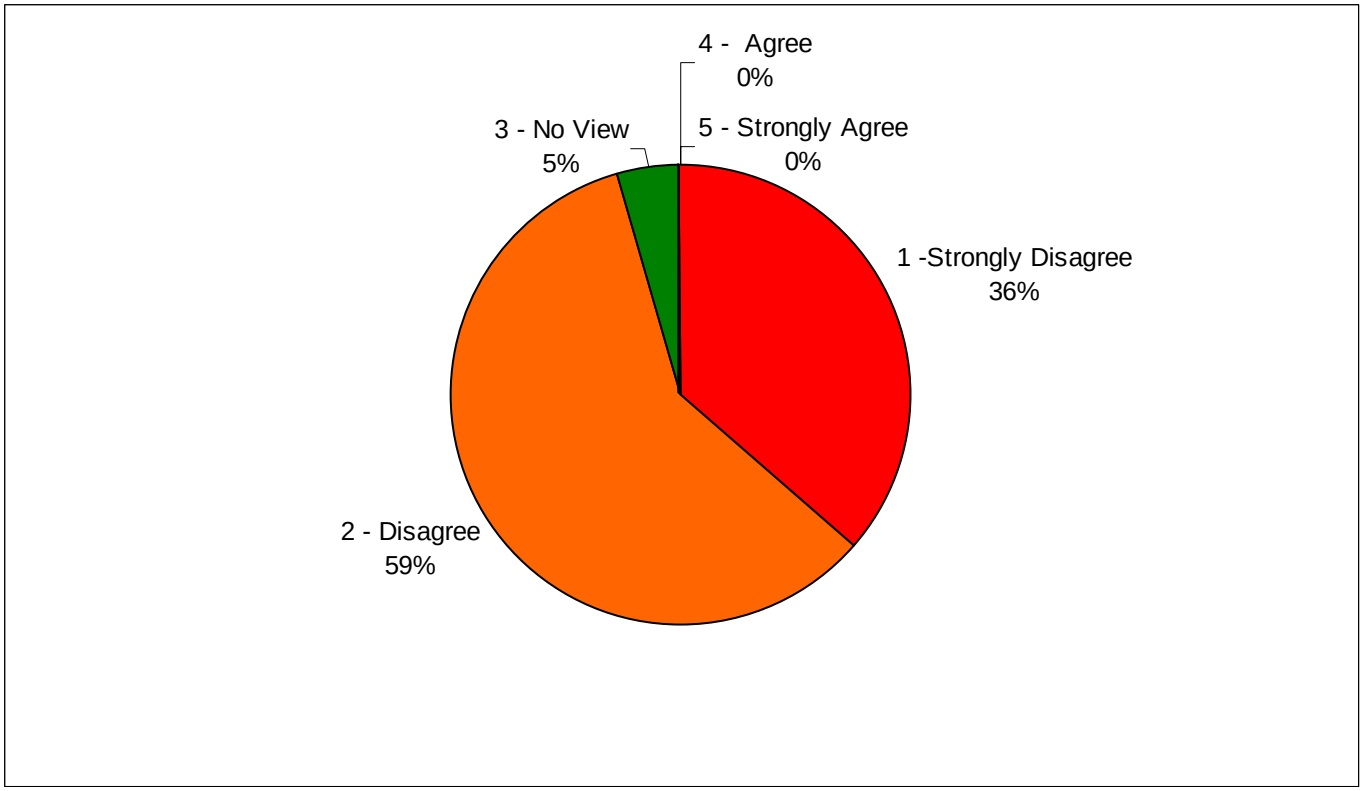
Question 1: Comments

- "Yes, so non-economic factors are considered."
- "… must take account of the wider picture … to balance the needs of the individual and wider society …"
- "We must all work to a common goal and, therefore, a common definition"
  - "… remediation needs to be proportional to the amount of 'effort' needed to reach [clean up] levels …"
  - "… hard to find and 'sustainable development' that will balance the three aspects equally …"
- "… greater weighting towards environmental …"
- "Yes … debate needed on what factors are included to determine / assess balance, rather than the principal of balance in itself."
- "As long as most significant aspect not traded off against other issues."

Question 2

- Or, do you think sustainable remediation should be synonymous with “green remediation” and focus exclusively on measurement and improvement of environmental aspects/impacts?



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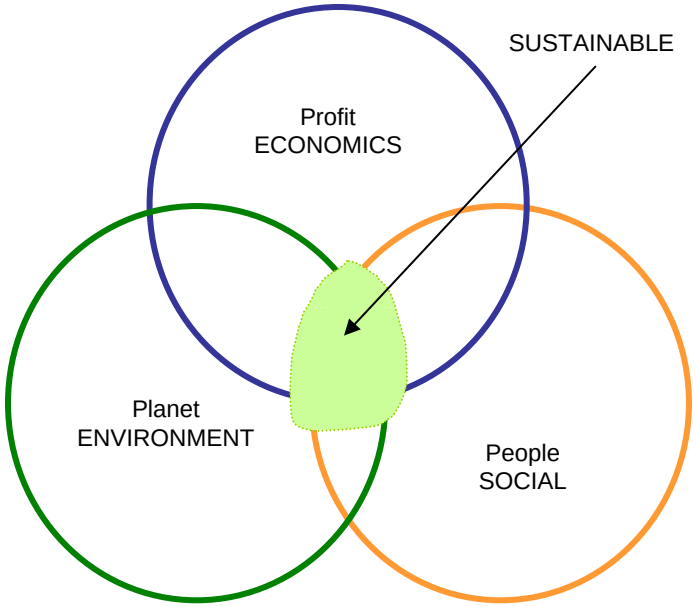
Question 2: Comments

- "… primarily constitutes on one element of sustainability as a whole"
- "… more pragmatic than sustainable remediation, taking into account difficulties of defining sustainable remediation …"
- "… to be consistent with UK policy, sustainable remediation needs to consider economic and social factors …"
  - "…purely 'environmental' considerations cannot be applied in isolation …"
  - "Green Remediation is a 'feel-good' attempt …"
  - "… Green Remediation document is useful, so I did not want to disagree, but …"

Contents of Presentation

- Agreement with SuRF UK approach?



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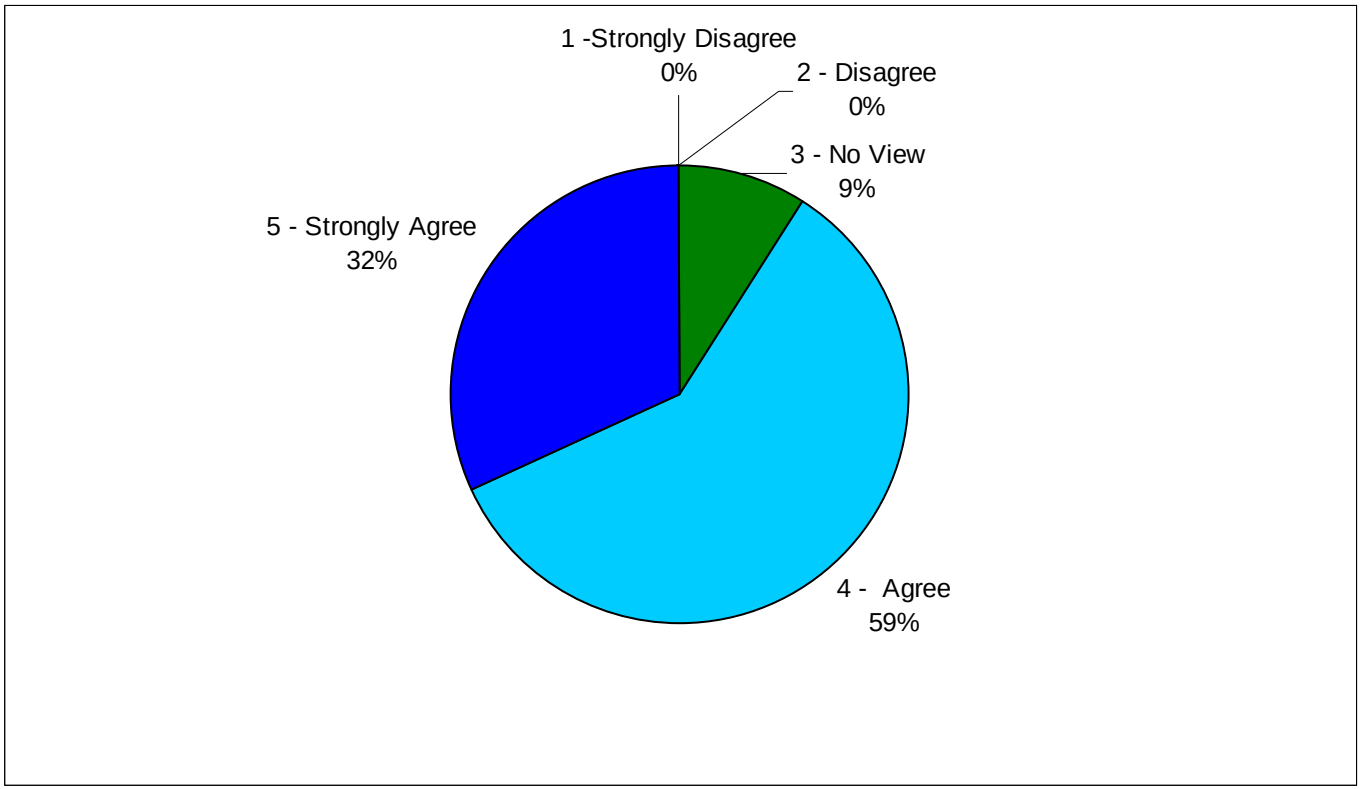
Question 3

- Do you agree with the emphasis of SuRF UK's mission statement?
  - *"To develop a framework in order to embed balanced decision making in the selection of the remediation strategy to address land contamination as an integral part of sustainable development."*



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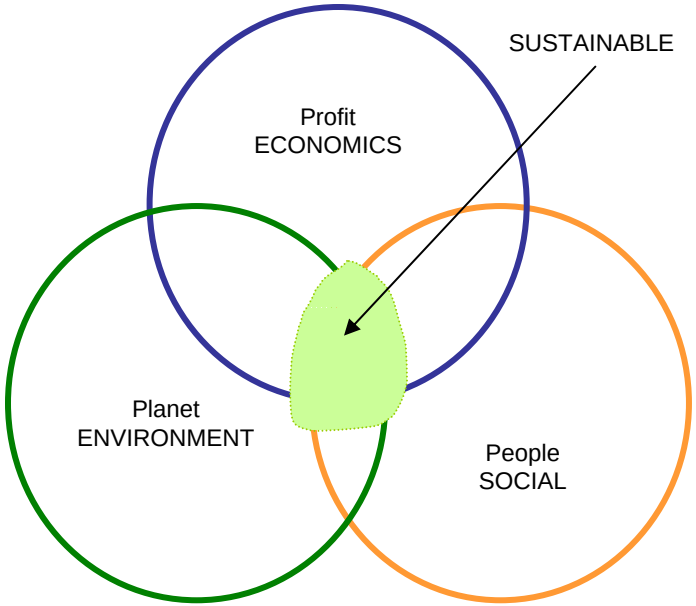
Question 3: Comments

- “Seems to sum things up nicely.”
- “You know it makes sense!”
- “… placed to adapt to different situations …”
- “… framework rather than tool is necessary due to vast and varied potential impacts on each aspect.”
- “… framework enables the tensions to be rebalanced to reflect the scope of an individual remediation project …”
- “… evaluation … up front process, not retrofitted afterwards.”
- “… wider picture is essential …”
  - “yes … but I have reservations … we may not be able to strongly influence anything broader than remediation, particularly in the short term.”

Contents of Presentation

- What should SuRF UK Framework cover / how be applied?



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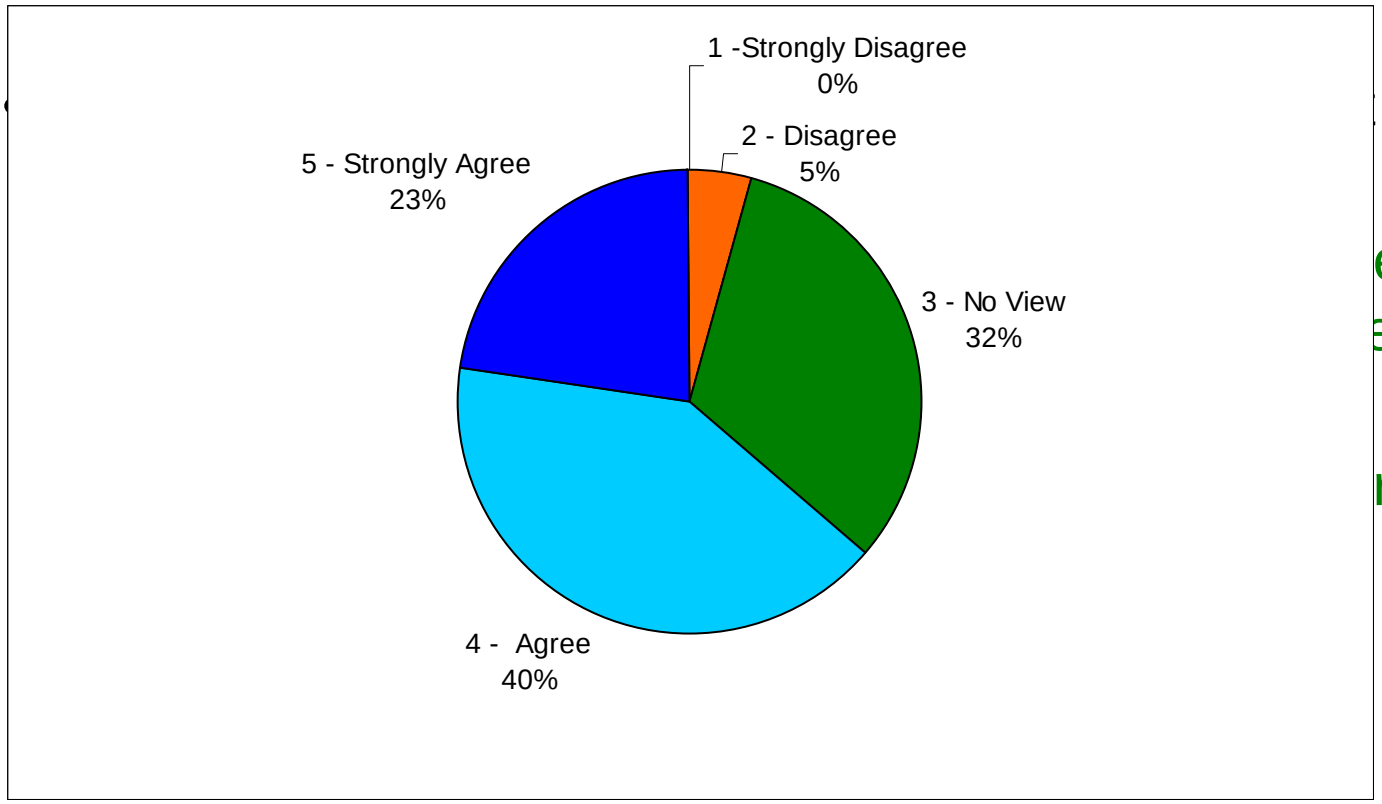
Question 10

- Do you agree the “core” / “non core” concept is a useful model for underpinning UK ideas on the how, when, what and why of assessing sustainable remediation?



sustainability

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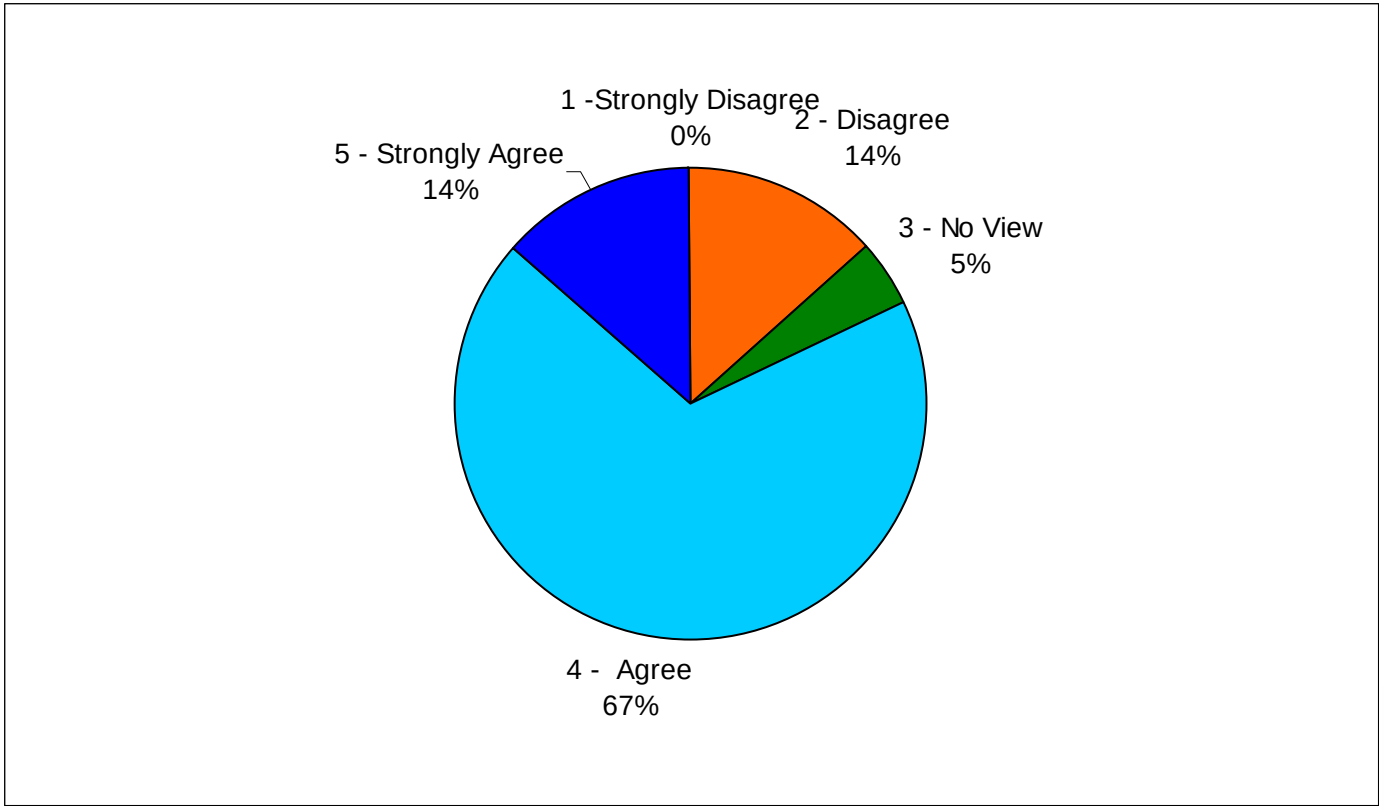
Question 10: Comments

- "… concept is a useful way of differentiating the elements, but … unsure as to how much influence we can have on … 'core' aspects."
- "… we would be significantly restricting the usefulness of the sustainability approach if it did not include evaluation of core aspects."
- "… provides desired flexibility to the assessment …"
  - "… 'non-core' decisions could (and should) outweigh 'core' decisions."

Question 14

- Do you agree there are two main points where sustainability assessments can be made: 1) planning/site strategy development (i.e. core objectives) and 2) remediation (non-core objectives)?



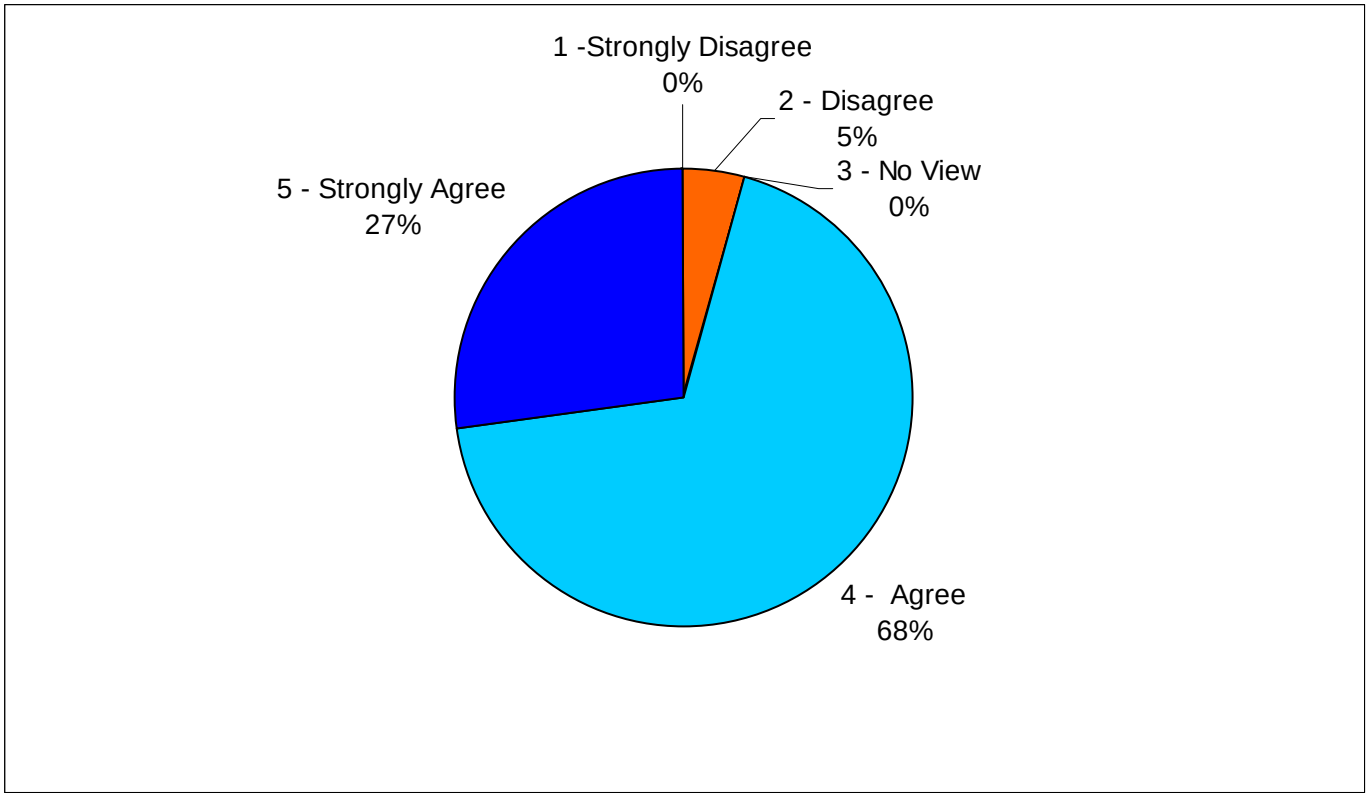
Question 14: Comments

- "… first preferable, second may well be common in practice."
- "… valuable and important decisions made at both stages …"

- "… stage 1) can predetermine stage 2)."
- "… doesn't take the process on … more iterative feedback process …"

Question 7

- Do you agree that the framework should be defined as a process like a flow diagram, which has specific stages, decision-points, and requires decision records?



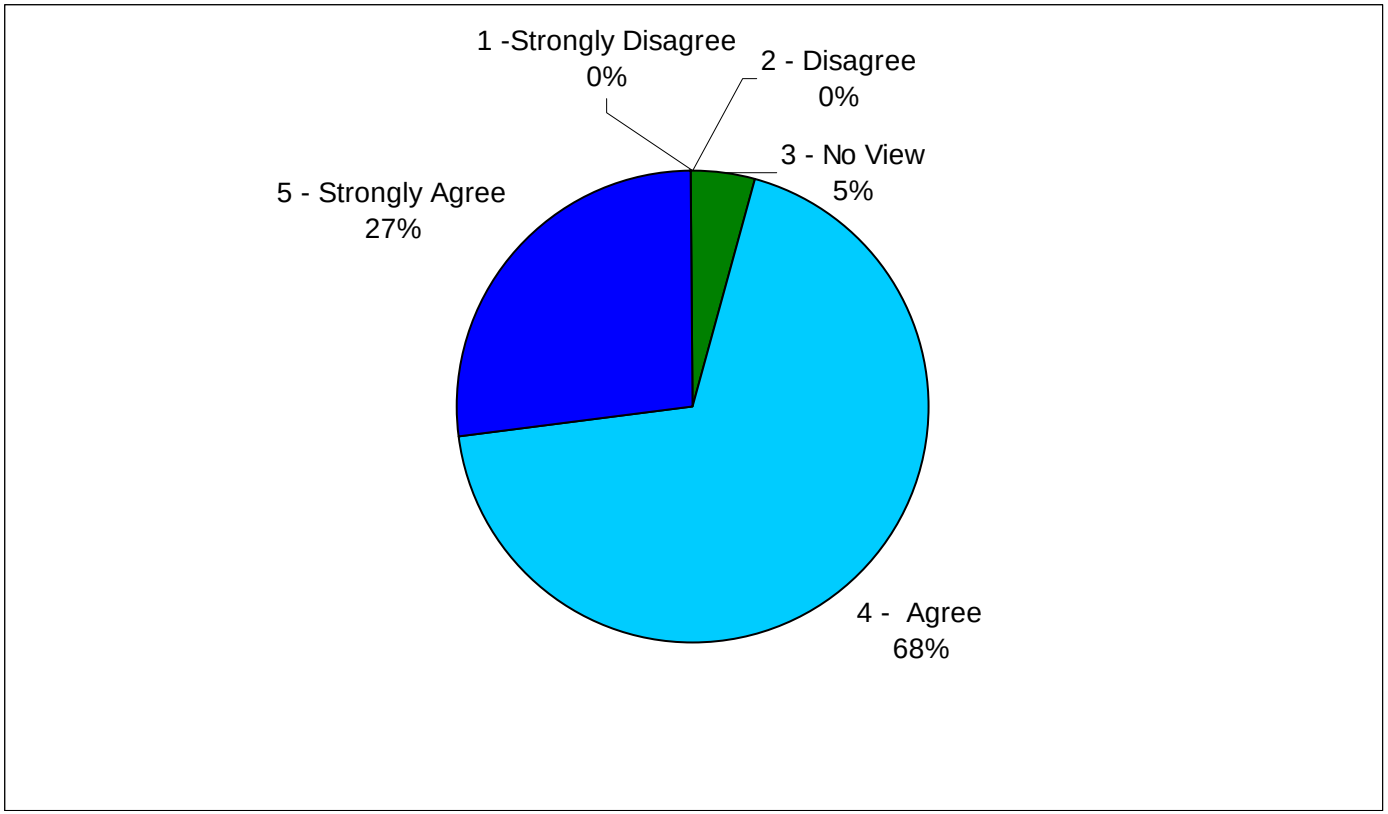
Question 7: Comments

- “Entirely appropriate …”
- “Flexibility and ease of use are essential …”
- “… if it can’t be expressed this way, it probably won’t be adopted!”
  - “Sustainability assessments require wide consultation, which would benefit from this type of process.”

- [Disagree comment.] “Possibly, although this may not always be appropriate … but may be helpful. … outline points where decisions are made … provides some kind of structure.”

Question 17

- Does the idea of a tiered approach to decision-making methodology represent the right way to progress the SuRF UK framework?

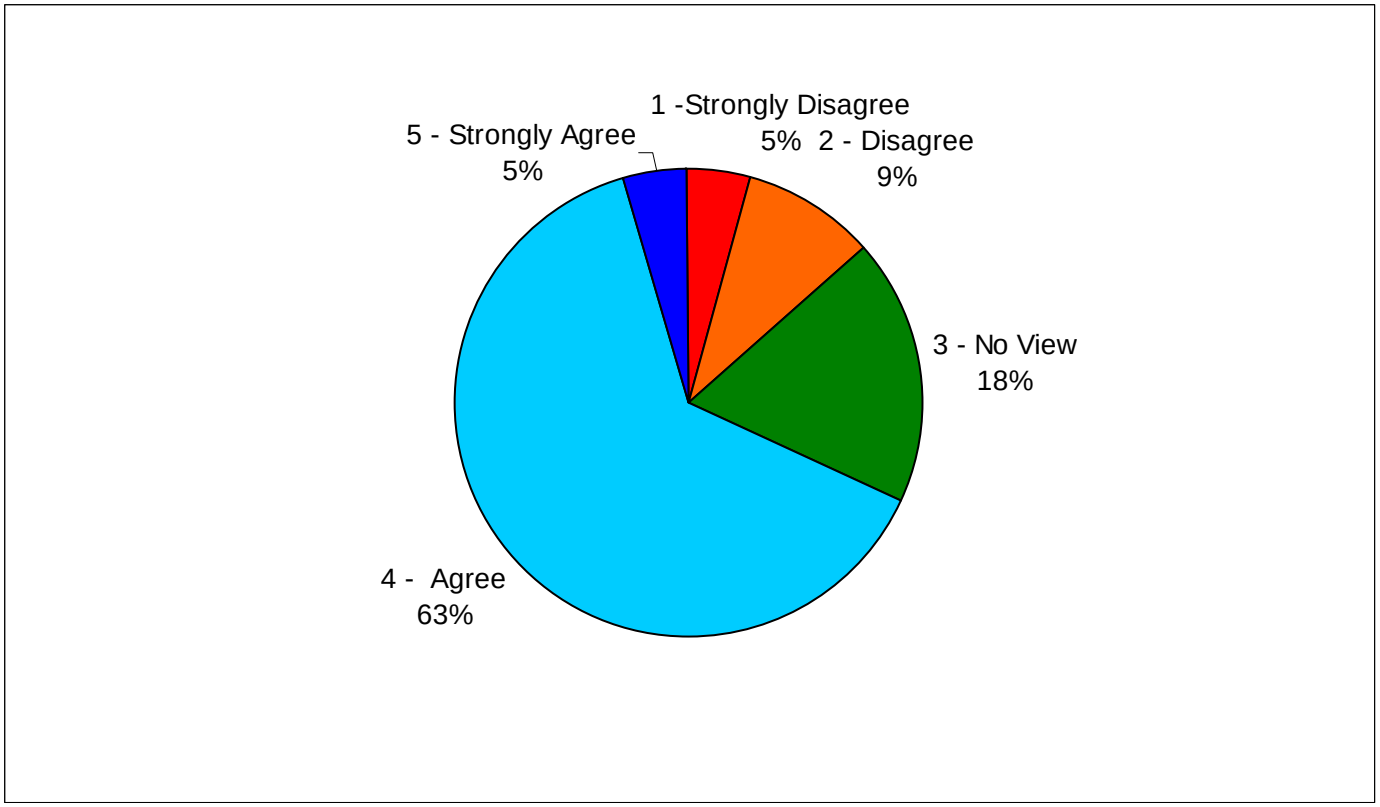


Question 17: Comments

- “Absolutely, in terms of consistency with risk assessment process …”
- “… allows the framework to be scaleable to different sized projects …”
- “… doesn’t make it overly complicated for simple sites.”

Question 12

- Do you agree that the CLR11 process is a framework is consistent with the non-core aspects of sustainable remediation decisions?



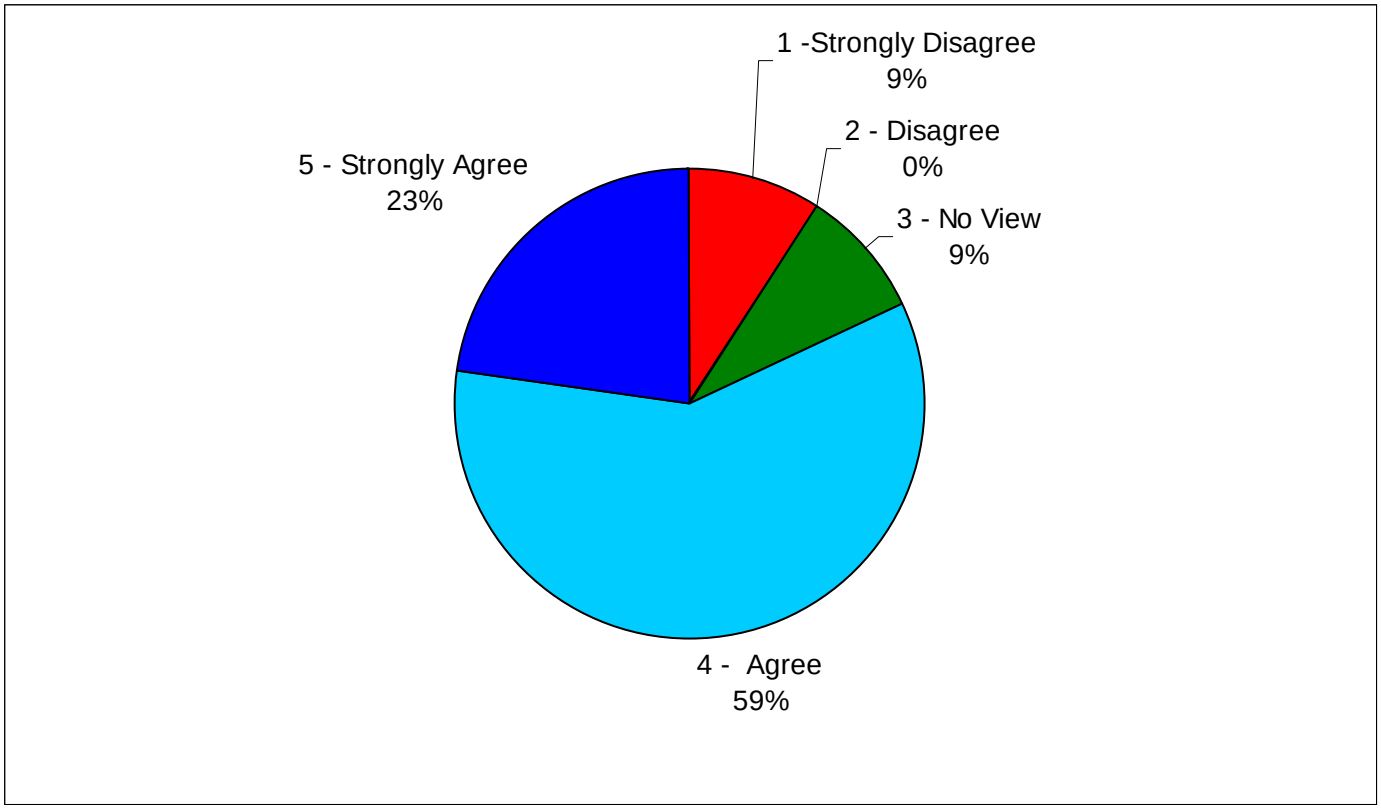
Question 12: Comments

- "… but only relates to 'non-core' … should relate to all stages of land use."
- "… not addressed specifically, the underlying principles have wide application."

- "If SuRF UK framework constructed correctly, CLR11 will be an integral subset …"

Question 13

- If a SURF UK framework is to capture core and non-core aspects, it needs to serve a wider timescale than CLR11. Consequently, is CLR 11 a compatible sub-process within SuRF UK?



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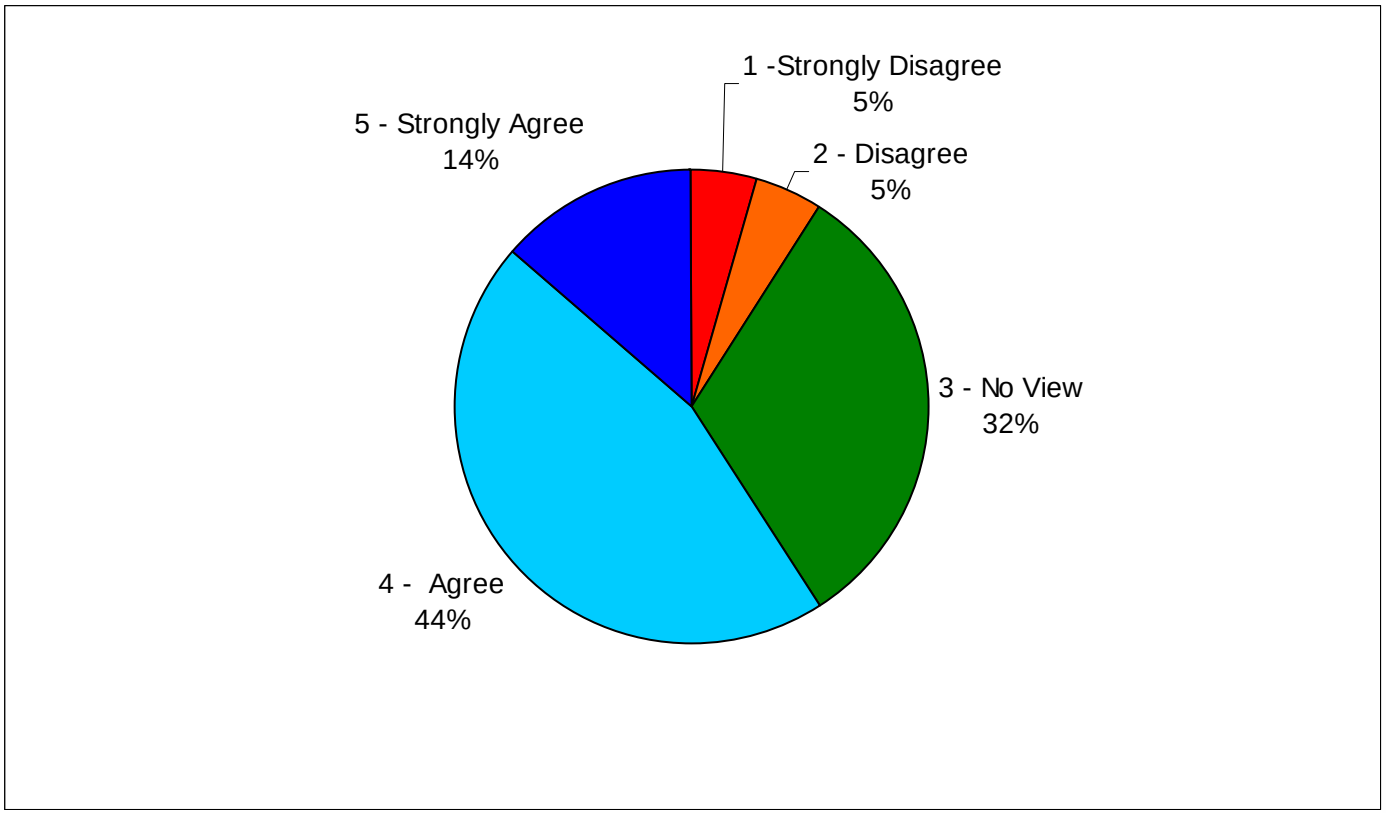
Question 13: Comments

- “Agree, although CLR11 does serve a long timescale by reference to durability and general references to sustainability.”
- “Yes. The lifecycle catered for in SuRF UK … incorporates planning stage as well as remediation stage … proper to regard CLR11 as compatible sub-process.”
- “… essential SuRF UK does not become to wide or too woolly.”

- “… what can we realistically achieve?”

Question 16

- Do you agree that, in terms of understanding sustainable remediation, the “when” is defined by a framework, the “what” are the indicators and the “how” is the tools?



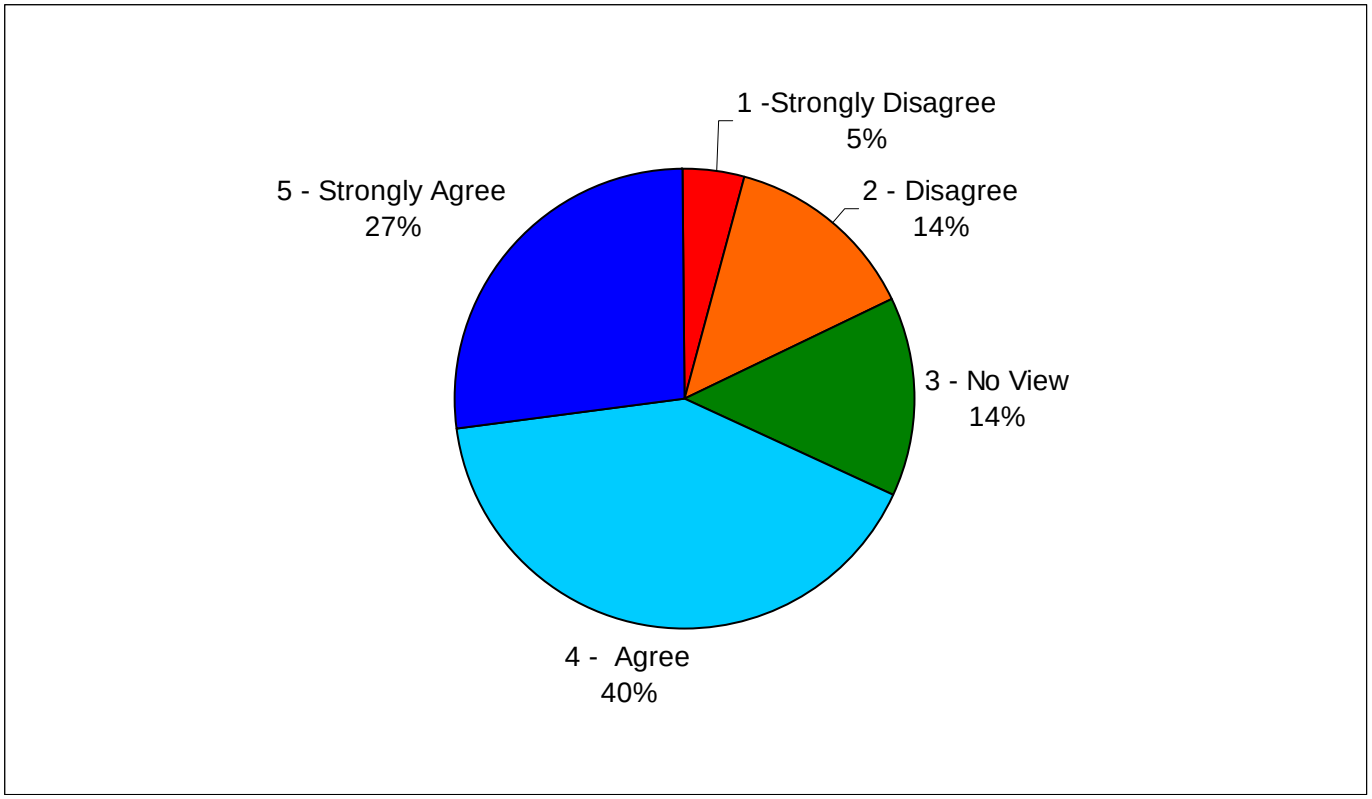
Question 16: Comments

- “Seems to sum it up rather well.”
- “Some overlap between categories, but fit is generally good.”
- “Yes, assuming framework takes form of flow diagram.”

- “Not really clear on the meaning of the question.”

Question 8

- Do you agree that the framework should be in the order of 10 pages long and based around a process or flow diagram?



Question 8: Comments

- "… realistic …"
- "… seems about right …"
- "If too unweildy it won't be used – short and concise."

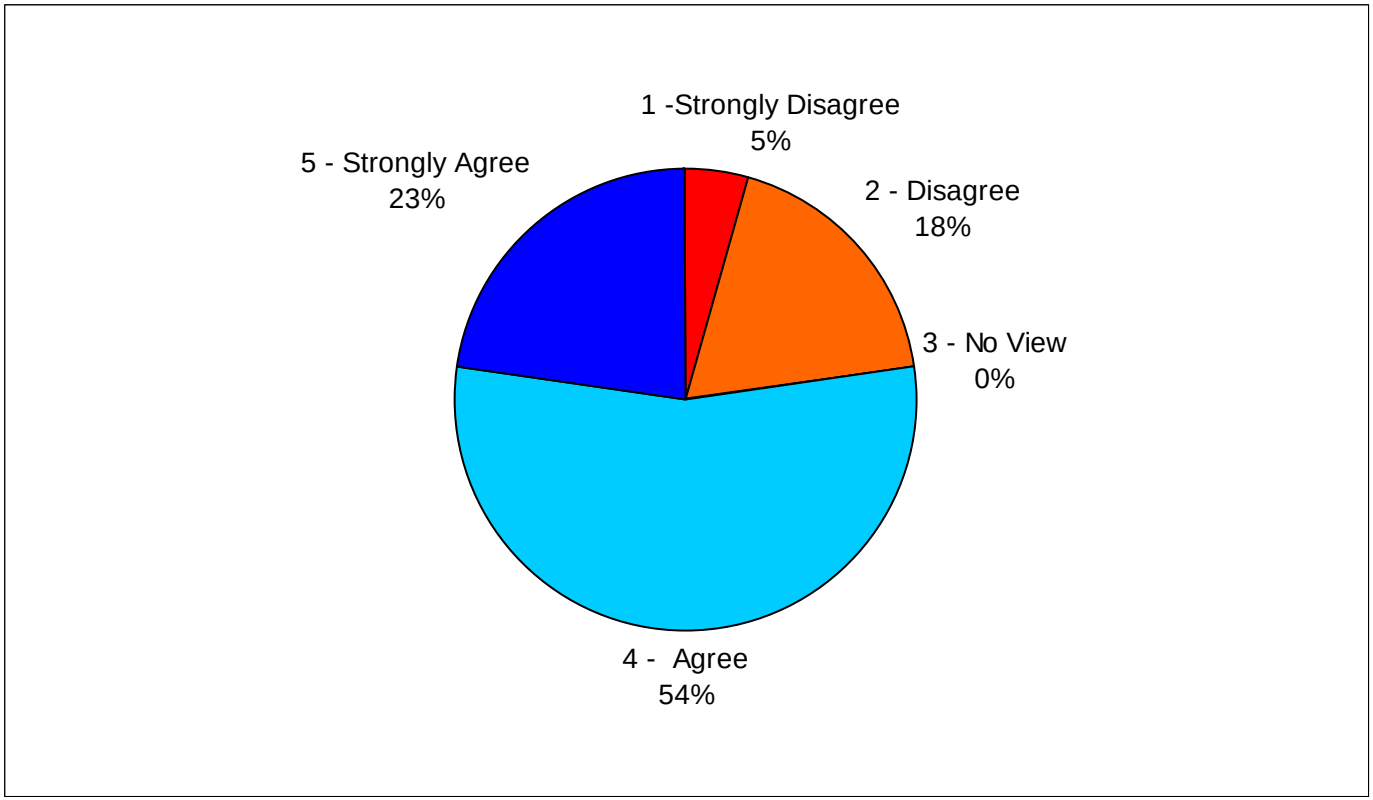
- "Seems too long."

- "Too early to say – lets see what comes out and then take the view."
- "Don't be too restrictive … a one size fits all approach would be too restrictive."
- "… it is what it is …"

- "… supported by flow diagram…"
- "… supported by other more detailed background reports …"

Question 9

- Do you agree that a framework would best serve the sector as a voluntary best practice approach that organisations have the choice to follow?



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Question 9: Comments

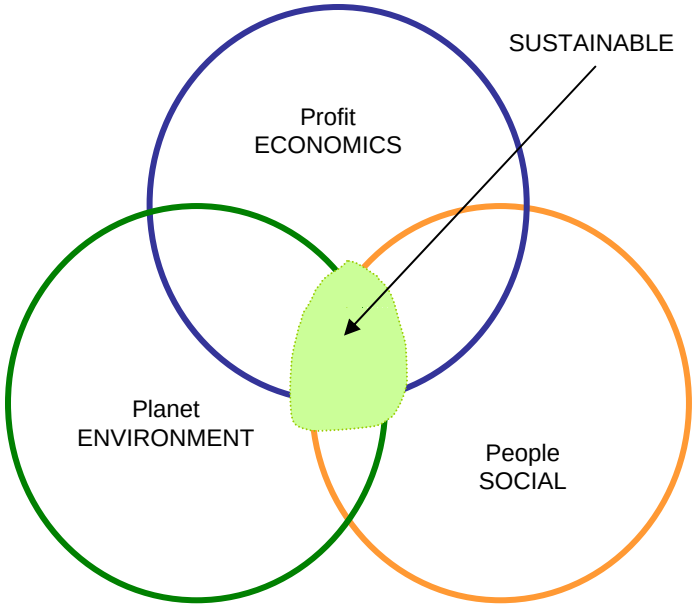
- "It must be voluntary – who will enforce it?"
- "… a 'Code of Practice' to demonstrate best practice."
  - "… it won't be incorporated into contaminated land regime through legislation and, therefore, could be introduced relatively quickly."
  - "… saves people / organisations complaining too much."

- "What would be the incentive? Seems like a lot of hard work …"

- "… like the Definition of Waste CoP … developed by industry and endorsed by the EA."

Contents of Presentation

- How should SuRF UK be aligned?



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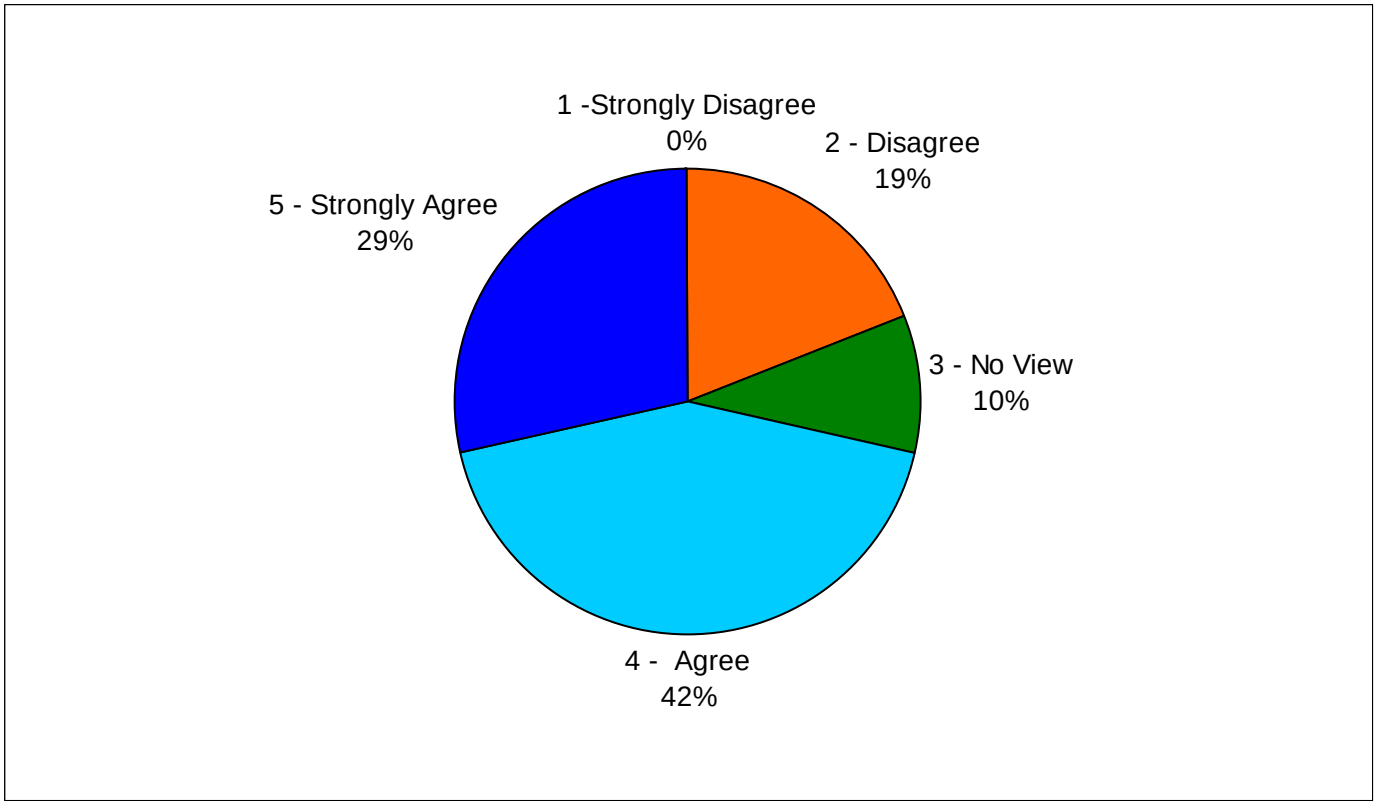
Question 11

- Do you agree that a framework should apply to both brownfield redevelopment and operational land?



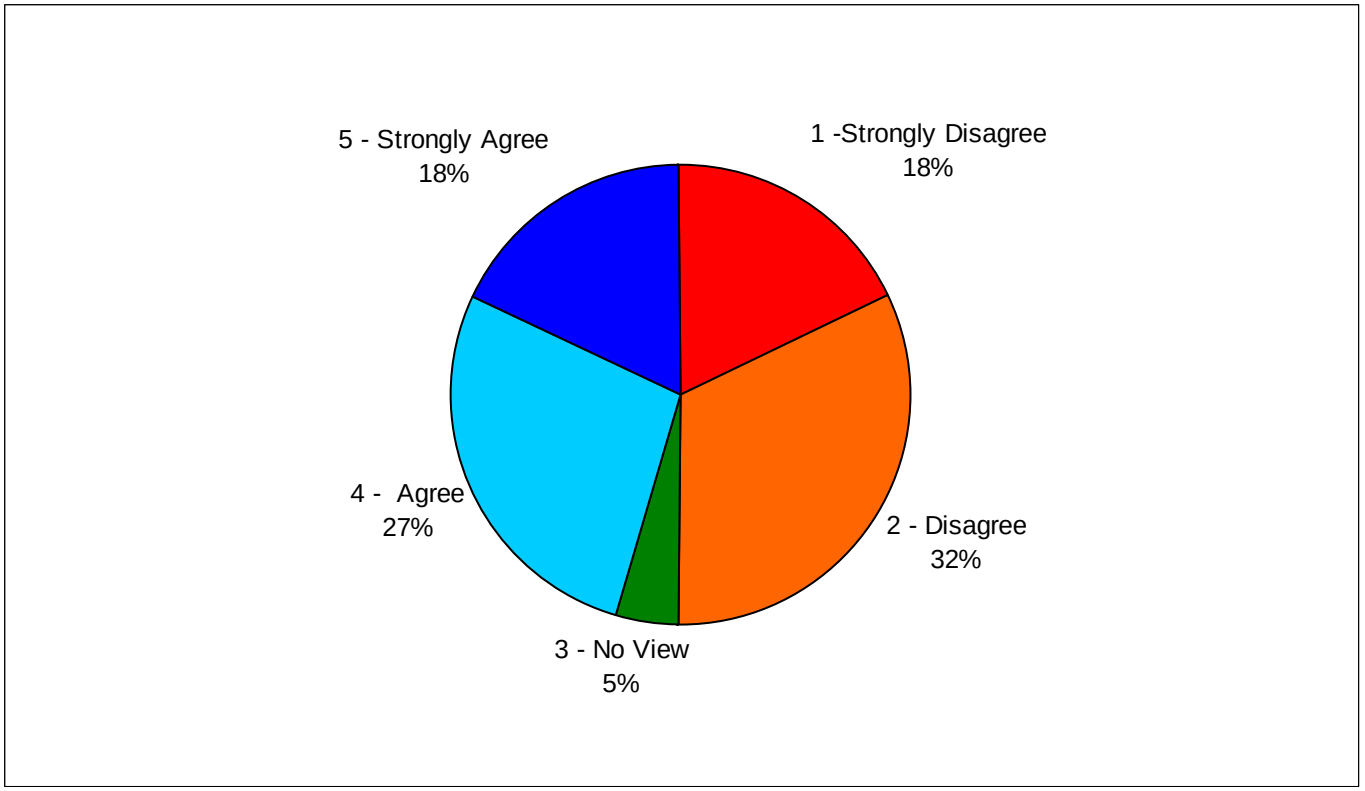
Question 11: Comments

- “We need a consistent approach to remediation decision making …”
- “…sustainability likely to be eroded if it does not apply to all remediation work undertaken.”
- “The benefits of the framework to both types of scenario are obvious.”

- “… limited use in operational land …”
- “… step too far … best assessed through other avenues (e.g. PPC).”

Question 4

- Do you think it is a reasonable assumption to accept that (properly designed and implemented) brownfield redevelopment is fundamentally a ‘sustainable’ activity?



Question 4: Comments

- "It is more sustainable … cf. aluminium can recycling analogy"
- "… logical fit with UK and broader policy …"
  - "Yes, assuming the 'properly designed and implemented' part."
  - "… impossible to answer … without knowing what 'properly designed and managed' means …"

- "… poor strategy could undermine the sustainability of brownfield development …"
- "… simply redeveloping a brownfield site doesn't necessarily mean it is 'sustainable' …"

- "… pre-judges the 'do nothing approach' as negative in terms of sustainability and couples remediation too closely to building communities …"

Question 4: Comments

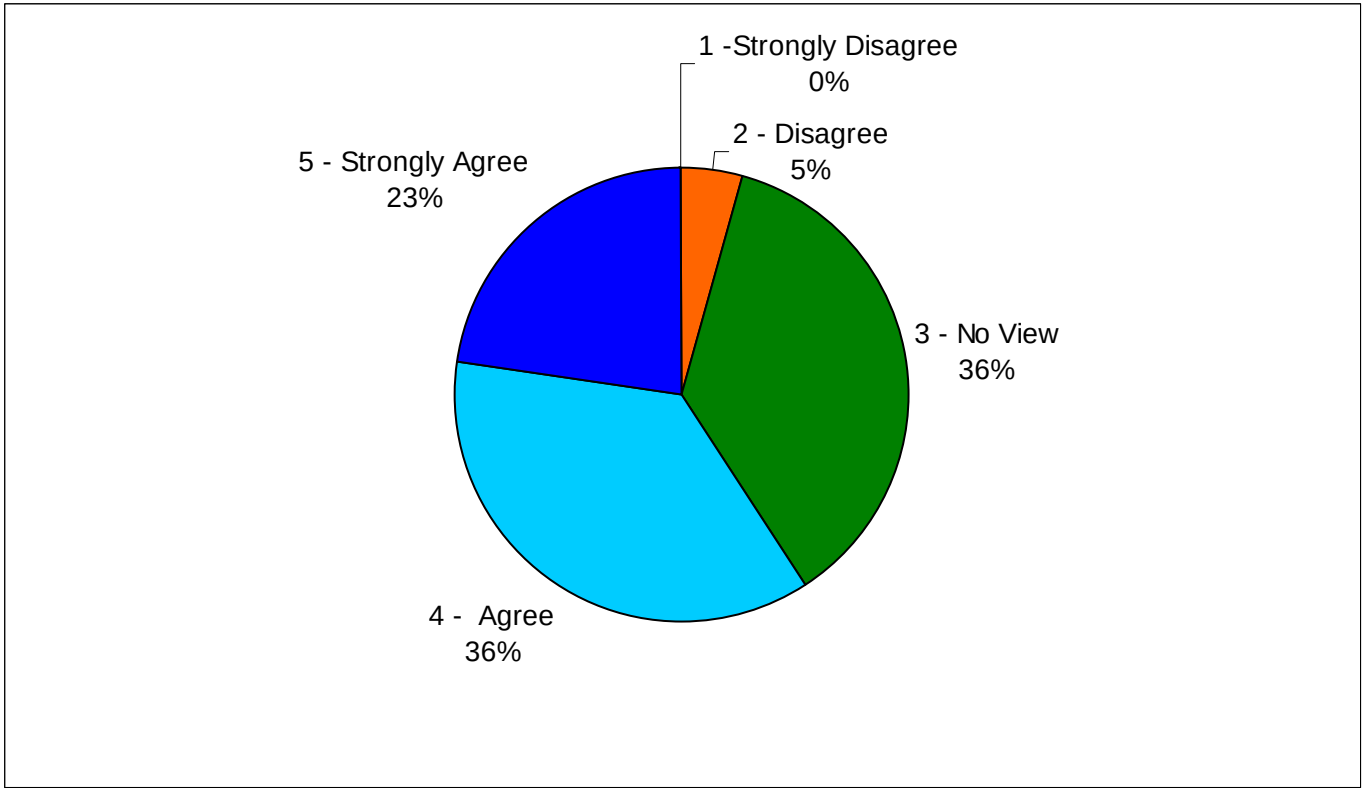
- “Absolutely … however care must be taken regarding the definition of brownfield …”
- “Definition of what constitutes ‘brownfield’ raises some questions here …”

- “No, the origin of the land and whether or not it is ‘sustainable’ are different …”

- “… any thinking brownfield redevelopment is fundamentally a ‘sustainable’ activity is completely flawed!”

Question 5

- Do you agree that a SuRF UK framework should be designed to dovetail with the new Code for Sustainable Homes?



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Question 5: Comments

- “Yes, because they are Government targets”
- “… general alignment enhances stakeholder acceptability, however need to ensure focus is not lost …”

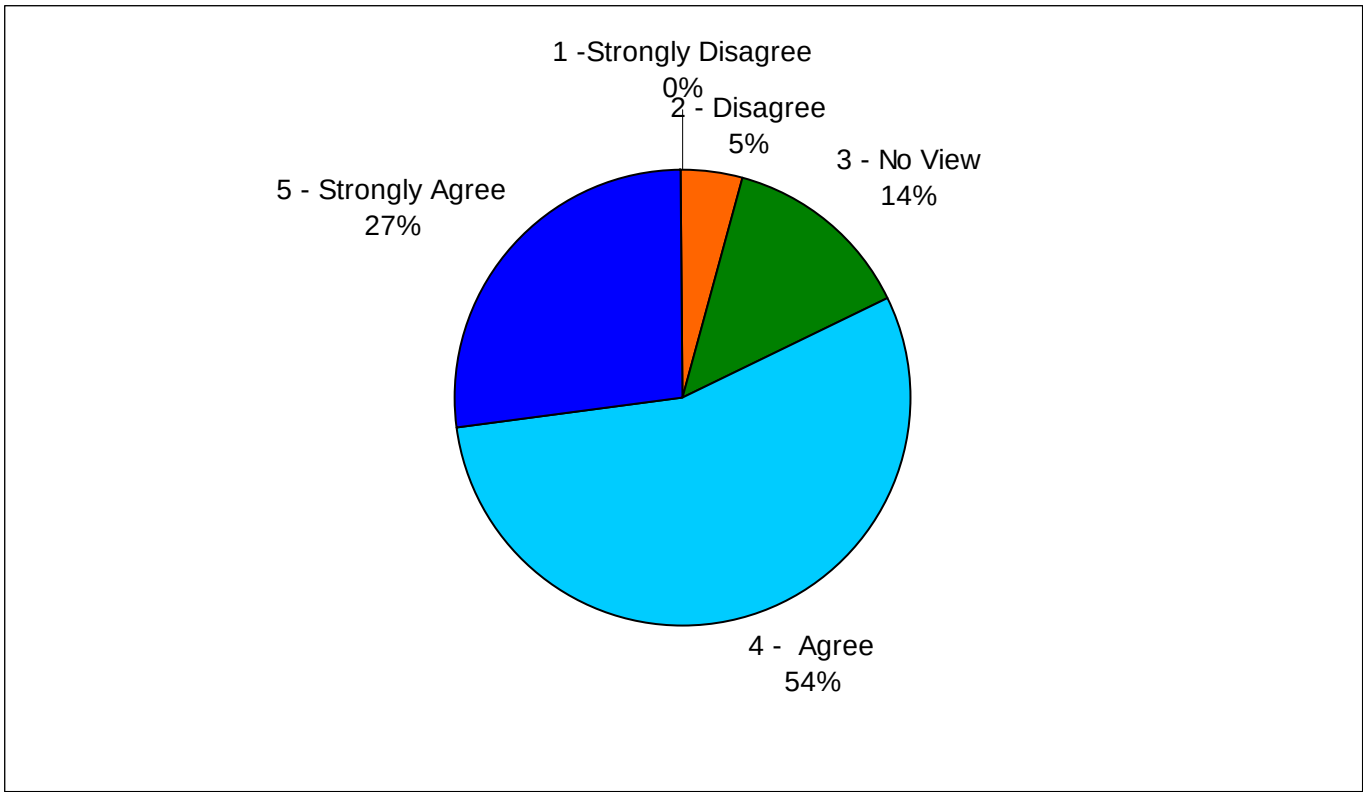
- “… important that SuRF Framework is totally independent … it has a much wider audience.”
- “… developed with this in mind … but subject to independence of approach if or when the situation dictates.”

- “… mainly relates to waste, emissions, and ecology …”

- “It maybe better to say that they should not be contradictory.”

Question 6

- Do you agree that the framework should be aligned with the Town and Country Planning process?
  - (Recognising framework also covers activities outside this)



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Question 6: Comments

- “Yes … planning policy will fundamentally affect development decisions.”
- “Yes, because Local Authorities will be familiar with it.”
- “Yes … obvious links to Part IIA and Environmental Liability Directive.”

- “… one presumes the planning process is, or should be, an exposition of sustainable development.”

- “… would be desirable, with the proviso that the ‘wider issues’ are not forgotten.”
- “… to some extent … but care needed not to try to ‘fit’ land remediation into too many existing frameworks …”
- “… framework also needs to address voluntary remediation.”

General Comments on Responses

- Of all respondents to survey:
  - For most questions there was an over riding view
  - This view was generally as expected
    - Means we are going along the right track
    - Not seen as a pointless of not-worthwhile exercise
- Want more comments
  - Consultation now to wider audience via CL:AIRE website
- Still some way to go though to develop the framework
  - What include?
  - Why include it?
  - And what will it cover?
  - How to align it?

SuRF-UK: A framework for assessing sustainable remediation

Jonathan Smith, Shell Global Solutions

Frank Evans, National Grid Property

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Content

- Recap on objectives and consultation feedback
- Consider some practical starting points
- CLR 11 reminders/context
- Possible SuRF-UK assessment points on framework

Feedback from SuRF-UK Consultation

- Support for Framework principles
  - The look of a framework: flow diagram
  - Core and non-core aspects
  - Operational and Brownfield (redevelopment) land
  - A fit with CLR11, but wider in scope/timescale
  - Tiered approach
  - Able to dovetail with Town & Country Planning regime, Code for Sustainable Homes

Objectives

- Construct a framework to allow assessment of the sustainability of soil and groundwater remediation (risk-management)
  - effective, robust
- Inform more sustainable management of potentially contaminated sites
  - informative, influential
- Build on feedback from recent consultation
  - acceptable to affected parties

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Legislative context

Sustainable development in remediation:

- Env. Act 1995 requires EA to '*contribute to the goal of achieving sustainable development*'
- Env. Prot. Act 1990, Part IIa – Test for reasonableness, best practicable technique (Part IIA Stat. Guidance C51)
- Env. Prot. Act 1990 – regulator required to '*take account of the likely costs and benefits*' in enforcing powers
- EU Water FD – achieve good status unless ..infeasible ..disproportionate cost ..and the preferred solution is considered best balance of social, economic and environmental costs [i.e. sustainable]
- Draft EU Soil F.Dir (Oct 2008)– '*Remediation shall consist of sustainable actions on the soil..*'

Requirements for the framework

- Practical and reasonable
- Applicable at range of scales / planning points
  - spatial planning (regional and site),
  - remedial objective setting,
  - technology selection
- Tiered approach to analysis
  - Qualitative,
  - Quantitative (range of simple to more complex tools)
- Accepted by key stakeholders and consistent with regulatory requirements
  - No desire to reinvent wheels
  - Awareness of SuRF-US where policy and regulatory frames are compatible

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Building on existing work

- Planning Policy statements: PPS1, PPS3
- CLR 11
- Environment Agency guidance:
  - P238, *Assessing the wider environmental value of remediating land contamination: A review*
  - P278 & P279, *Costs and benefits associated with remediation of contaminated groundwater: i) Review and ii) Framework reports*
  - P316, *Cost-Benefit analysis for remediation of land contamination*
- SuRF-US
- SUBRIM, NICOLE, CLARINET,…

SuRF-UK Framework: starting point

- Effective environmental risk-management that contributes to Sus Dev is the optimum strategy
- Remediation activities may help reduce certain environmental risks, but may also generate other environmental, social and economic impacts
- Remediation *per se* need not be sustainable, and poorly considered remediation can cause more detriment than it solves
- A framework is required to help identify the optimal sustainability, having regard to env., econ. & social issues relevant to contamination risk-management

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SuRF-UK Framework: starting point 2

- The framework should be capable of being applied to:
  - Regional land-use policy / strategies
  - Site-specific planning decision
  - Contaminated site risk-management strategies
    - Overall remedial objectives; *S, P* or *R* treatment
  - Remediation technology selection and implementation
- Must be compatible with CLR11 process
- Works with common contractual arrangements

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Common Contracting arrangement

- Roles
  - Client/Landowner
  - Consultant
  - Contractor
  - Regulator enforcement
- Responsibilities
  - Commissioning work
  - Reviewing tenders
  - Remedial Design works
    - Outline
    - Detailed
  - Contracts to remediate
  - Design and Construct contracts

Contracting Options & SURF-UK assessments

Roles (across) **Stage (down)**	1.Client 2.D&C Contractor	1.Client 2. Outline consultant designer 3. D&C Contractor	1. Client 2. Consultant designer 3. Contractor
Outline design	Sustainability assessment at return of D&C tenders	Sustainability assessment on outline designs	Sustainability assessment on detailed design
Detailed Design		Sustainability assessment on tender returns	
Remedial works			Sustainability assessment on tender returns

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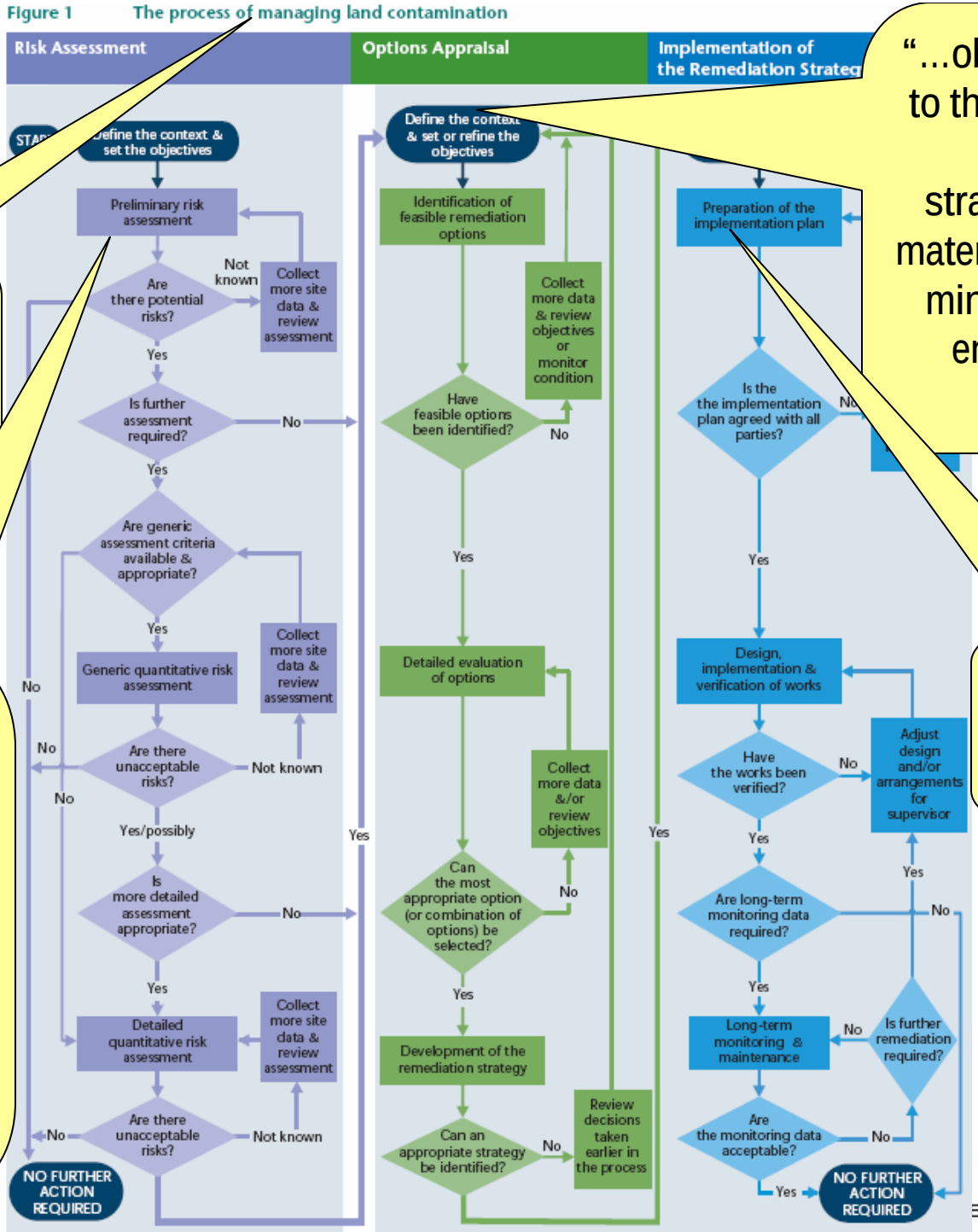
CLR 11

"…deal with risks from contamination in a sustainable way…"

"..cost-benefit assessment is an inherent part of sustainable environmental management… and a requirement of…regulatory regimes.."

"…objectives..linked to the sustainability of the strategy…energy, material resources,… minimise adverse environmental effects.."

"…the design.. should be sustainable…"



CLR 11 Stages Summary

	Risk Assessment	**Options Appraisal**	**Implementation of Strategy**
Starting point	A parcel of land, initial site conceptual model, SI data	Unacceptable risks. Remedial work needed	Preferred remedial strategy identified
End point	Robust conceptual model and risks understood. Remedial work needed or not.	Remedial options reviewed. Preferred strategy identified	Remedial action complete and verified. Possible monitoring
Contracting arrangement	Consultant Design or a D&C stage	Consultant-led or a D&C stage	Tendered and awarded to contractor or last part of D&C contract
SuRF-UK assessment points?	Risk-management strategy setting: Remedial objectives (incl. parameterisation on CSM)	Sustainability assessment of different remedial options: Technology selection (incl. performance & verification monitoring)	

4 possible SURF-UK Assessment Points?

<table>
<tr><td colspan="2">Town & Country Planning Stages

CORE ASPECTS</td><td colspan="3">Remediation: Design and implementation
(CLR11 Stages)

NON-CORE ASPECTS</td><td>Overlap with Code for Sustainable Homes</td></tr>
<tr><td>Regional Spatial Planning
(Core plan)</td><td>Local planning (site-level)</td><td>Risk Assessment</td><td>Options appraisal</td><td>Strategy implementation</td><td>?
Needs further thought</td></tr>
<tr><td rowspan="2">Consider Sustainability when zoning land</td><td rowspan="2">Sust. assessment of land-use options</td><td colspan="2">Sustainability assessment of different remedial strategies:
* Risk-management philosophy
* Site characterisation</td><td></td><td rowspan="2"></td></tr>
<tr><td></td><td colspan="2">Sustainability assessment of different remedial options:
* Technology selection
* Performance and verification</td></tr>
</table>

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Points of Sustainability Assessment?

- Regional spatial planning
- Local site-level planning (land-use)
- Assess remedial options prior to agreeing remedial strategy
  - Remedial objectives, incl. SI to confirm conceptual model
- Review of remedial strategy
  - Technology selection, incl. monitoring and verification implications

Regional spatial planning

- Influence land-use mosaic
- Pollution prevention
  - Locate hazards away from receptors (e.g. population centres, aquifers)
- Policy on residential re-use of brownfields
  - Urban green space
  - Flood risk mitigation
  - Commercial
- Type of client: HCA, RDA, Local planning authority

Local Site-specific planning

- Site-specific decisions
- Optimum land-use selection
- Influence local plans
- Support planning applications
- Client: Planning authority and/or landowner

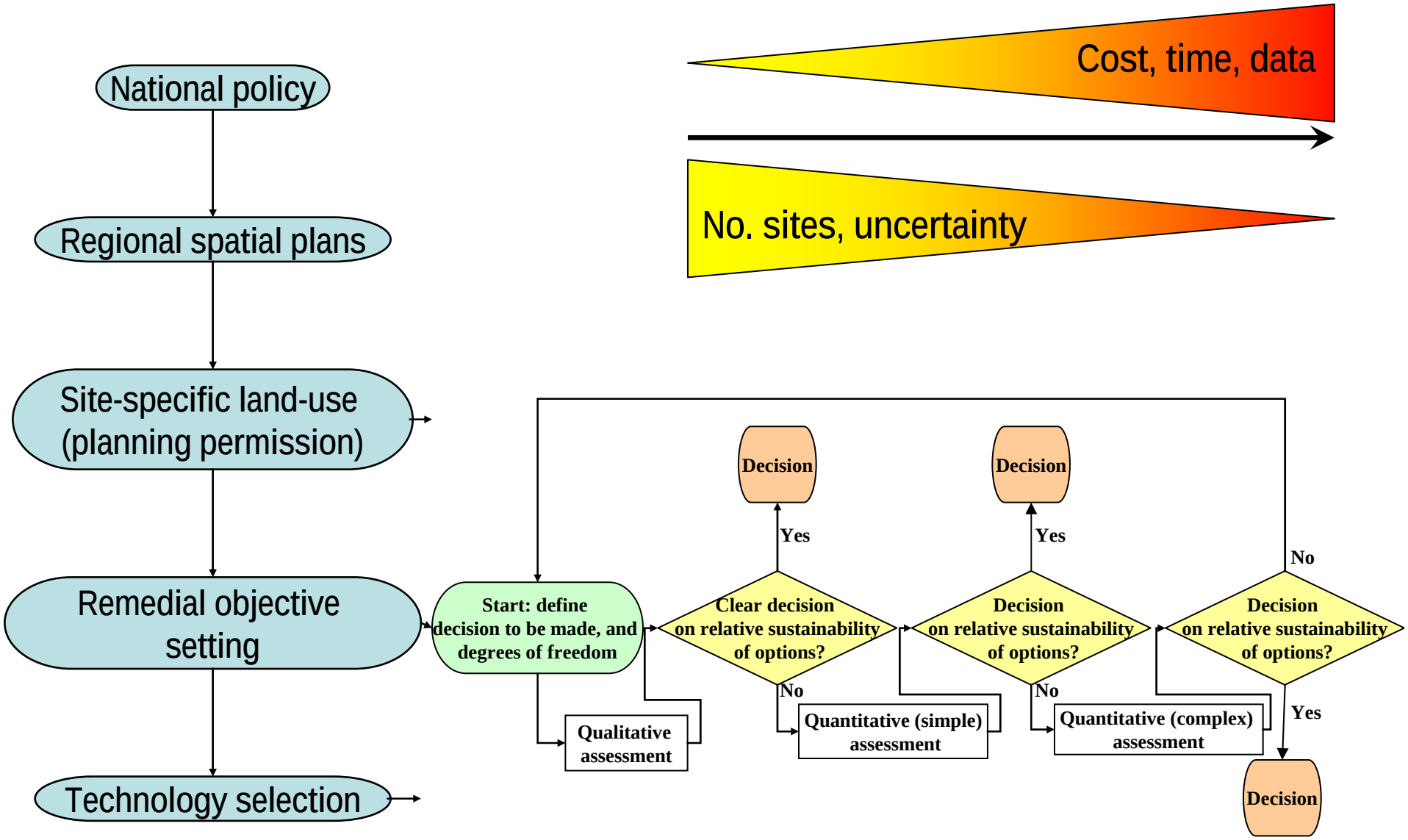
Remedial strategy selection

- Remove source
- Break pathway
- Modify receptor behaviour
- Limit permitted land-use and activity

- Inform site characterisation
  - Focus on the conceptual site model

Technology selection

- Achieve risk management objectives while:
  - Minimising
    - environmental emissions and resource use;
    - Adverse ecological impact
    - Nuisance and disruption to society
    - Financial cost (to industry and/or society)
  - Maximising
    - Secondary environmental benefits
    - Economic and social benefits
- Include ‘remediation operation’ and performance monitoring, verification requirements



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Next steps

- Finalising the framework
  - Timescales
  - Participant review and challenge
- Indicator sets
- How we develop a tiered approach
- Types of tools

Possible discussion issues

- Consultation responses
  - Definition of Sustainable Remediation
    - '..acceptable balance..' may be wrong terminology
    - 'optimal' perhaps better?
  - Should it be a Voluntary Code/Framework?
- Draft framework
  - How many sustainability assessment points?
  - How in practice do we capture early stages if a organisation enters the framework late on?

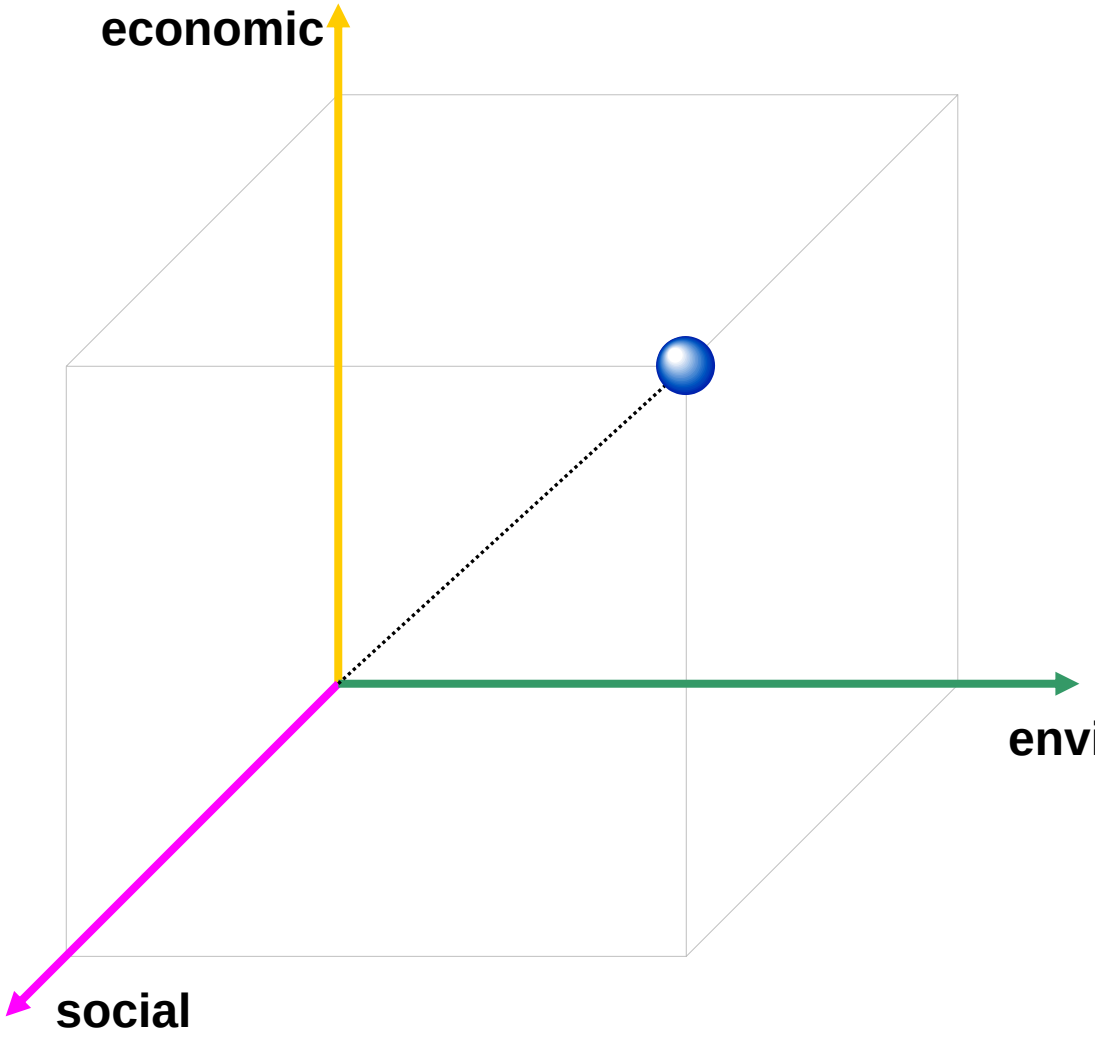
Questions

- How many sustainability assessment points?
- How in practise do we capture early stages if a organisation joins the framework late on (e.g. SURF-UK compliant tender submissions for a contractor)?

NICOLE Working Group on Sustainable Remediation

Johan de Fraye, Olivier Maurer, and Paul Bardos - NICOLE

Sustainability



'Development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (1987, Brundtland)

International Debate

- NICOLE Sustainable Remediation Working Group
- Sustainable Remediation Forum UK
- Sustainable Remediation Forum US
- Green Remediation – US EPA

NICOLE Workshops
- March 2003 (in Barcelona)
- March 2008 (in London) with SAGTA

Summary of NICOLE/ SAGTA Workshop Discussion London – March 2008

- **Any definition of sustainable remediation must allow ability to:**
  - **Make risk based decisions**
  - **Consider (and define) boundaries in time and space**
  - **Ensure a balance of outcomes can be achieved**
  - **Consider land (and water) use as first part of process**
- **Debate**
  - **Technical people tend to like measurable and quantifiable things**
  - **The Brundtland concept is broader**
  - **Some wanted a more limited scope, but how then is the broader definition respected?**
  - **Support for a tiered approach, starting with simple indicator based qualitative tools**
  - **Clear message – "sustainability is more than carbon"**
  - **Should risk management objectives be modifiable in light of sustainability assessments?**
- **Conclusions**
  - **Risk management approach is a given : sustainability criteria needed in both setting the goals and the methods used to achieve them**
  - **Sustainability consideration at different levels – site, brownfield, municipality, region…**
  - **NICOLE should lead the debate across Europe**

NICOLE Working Group on Sustainable Remediation

- The NICOLE Working Group on sustainable remediation was launched on October 8th in Madrid
- 21 organisations joined (including r3) from across Europe: mainly the big service providers, but also some major industry members and Deltares (NL)
  - Membership is still open
- The first meeting set out the agenda for the working group's activities
  - Still early days
- Linkage to other groups (SURF UK, SURF US)
  - Cross panel members
  - Open exchange of ideas and information
  - Informal only at this stage

Next Steps

Activities	Timing	Deliverables
Kick-off meeting:	8-Oct 08	Working definition
Progress meeting (Conf call)	Q 08/Q1 09	Draft definition for review by SG & sustainability and remediation – first discussion document
Progress meeting, Brussels conference	Q1 09	Final definition – review discussion document
Final meeting	Q2/3 09	Sustainability and remediation: what could it mean?

Making a definition

- NICOLE (London Report, www.nicole.org)
  - *sustainable remediation is a "framework in order to embed balanced decision making in the selection of the strategy to address land [and/or water contamination] as an integral part of sustainable land use".*
- Any definition must allow ability to
  - Make risk based decisions
  - Consider [and define] boundaries in time and space
  - Ensure a balance of outcomes can be achieved
  - Consider land [and water] use first as part of the process
- Key elements behind this approach are :
  - The basic decision making rationale behind contaminated land management is a basis in risk assessment. However, the means of achieving risk management must in itself not place unreasonable demands on the environment, economy and society, the three key elements of sustainable development

Obviously Related to SURF UK Approach

- Sustainable Remediation Forum UK
  - *Sustainable remediation can be defined as the practise of demonstrating, in terms of environmental, economic and social indicators, that an acceptable balance exists between the effects of undertaking the remediation activities and the benefits the same activities will deliver*

Brainstorming Outputs from Madrid

Working Group Goals

- Communication: obtaining buy-in from stakeholders
  - Based on convincing arguments and an effective definition for SR
- Balanced approach
  - Risk based decision making, balanced risks, costs and sustainability
- Boundary setting
  - What, when etc
- Guidance, e.g.:
  - Best Available Techniques
- Case studies
  - Collate national examples?
- Encourage a bottom-up principle, having professionals integrating sustainable principles in their routine activities at a project level, to slowly create a sustainable remediation culture

What is Driving the Interest?

- Societal shift in interests with increasing recognition of challenges and provision for the future (generations)
- Liability management in the long term
- Regulatory and policy drivers
  - local, regional, national
- Optimising cost benefit / economics
- Public relations
  - A better corporate image
  - Substantiating arguments that a best solution has been found
  - Finding a Win-Win approach
- Land value considerations and increasing urban pressure

In order of “votes” from WG members

What are the barriers to incorporating sustainability in remediation?

- Communication / education, politics, irrational thinking, lack of understanding, arrogance of scientists, public buy-in (10)
- Liability management and time, long-term (8)
- Regulation, regulators (6)
- Costs, efficiency, “why are we spending more?” (5)
- Complexity, technology (2)

→ there is a role for NICOLE in educating and informing the sustainability debate for contaminated land management

Obstacles to Implementation

- Sustainable remediation implies greater efficiency, but what do we mean by this: ecology, resources, risk etc
- Sustainable remediation implies maximising social benefits, how do we measure this: quality of life, extending opportunity etc
- Sustainable remediation is protective of the present and the future: next generations / next development?
- We need key performance indicators (KPI), how do we agree widely accepted indicators?
  - Implication from the WG that they favour qualitative / semi-quantitative assessments
- At what decision making steps is sustainability considered, and are these the same in all countries?

NICOLE Network Meeting on Sustainable Remediation 3-5th June 2009, Brussels Region

See www.nicole.org for info

Update from the US Sustainable Remediation Forum

David E. Ellis Ph.D.
DuPont Engineering, SURF Chair

November 18, 2008
Version 1.2

Sustainable Remediation Forum

A collaborative forum to develop ability to use sustainable concepts in remedial action decision making

Share perspectives, experiences, site-specific examples

A open public forum

- State and federal agencies: US EPA, California DTSC, DNREC, UK Environment Agency, US DOE, US ACE, NJ DEP, others
- Industry: DuPont, BP, Shell, CN Rail, Chevron, Honeywell, National Grid, GE, United Technologies, WM, others
- Consultants: GeoSyntec, Terra Systems, Earth Tech, Malcolm Pirnie, Locus Tech, WSP, others
- Academics: NJIT, Univ. of Nottingham
- Public stakeholders: CL:AIRE

Chaired and facilitated by DuPont

All are welcome. Meeting records are publicly available, web site under development

Sustainable Remediation Forum (SURF)

Mission Statement:

To establish a framework that incorporates sustainable concepts throughout the remedial action process, that provides long-term protection of human health and the environment, and that achieves public and regulatory acceptance

Sustainable Remediation Principles

Our working concepts:

In fulfilling our obligations to remediate sites to be protective of human health and the environment we will embrace sustainable approaches to remediation that provide a net benefit to the environment.

To the extent possible, these approaches will:

- Minimize or eliminate energy consumption or the consumption of other natural resources
- Reduce or eliminate releases to the environment, especially to the air
- Harness or mimic a natural process
- Result in the reuse or recycling of land or otherwise undesirable materials
- Encourage the use of remediation technologies that permanently destroy contamination

The SURF White Paper

"*Integrating Sustainability Principles, Practices and Metrics into Remediation Projects*"

The purpose of the SURF White Paper is to collect, clarify, and communicate the thoughts and experiences of SURF members on sustainability in remediation.

- **Introduction and Scope - Dave Ellis & Paul Hadley**
- **Current Status of Sustainability in Remediation – Dick Raymond**
- **Sustainability Concepts and Practices in Remediation – Stephanie Fiorenza**
- **A Vision for Sustainability – Paul Favara**
- **Impediments and Barriers – Dave Major**
- **Success Stories – Brandt Butler**
- **Summary, Conclusions, and Recommendations – Dave Ellis & Paul Hadley**

The white paper will be published as a special issue of "***Remediation***"

The Process of Writing SURF's White Paper

SURF 5 - White Paper proposed and general outline agreed upon

A facilitator for each chapter was nominated and SURF members then volunteered by chapter

Detailed chapter outlines and content are developed by group members

Breakout sessions at each SURF meeting, with appropriate cross reviews

Polished chapters submitted November 17th, final round robin review & revisions by January 1, 2009

Edit during January and submit to "Remediation" on February 1, 2009

The SURF Sustainability Survey

Facilitated by Elie Haddad of Locus Technologies and Elizabeth Wells of The San Francisco Water Board

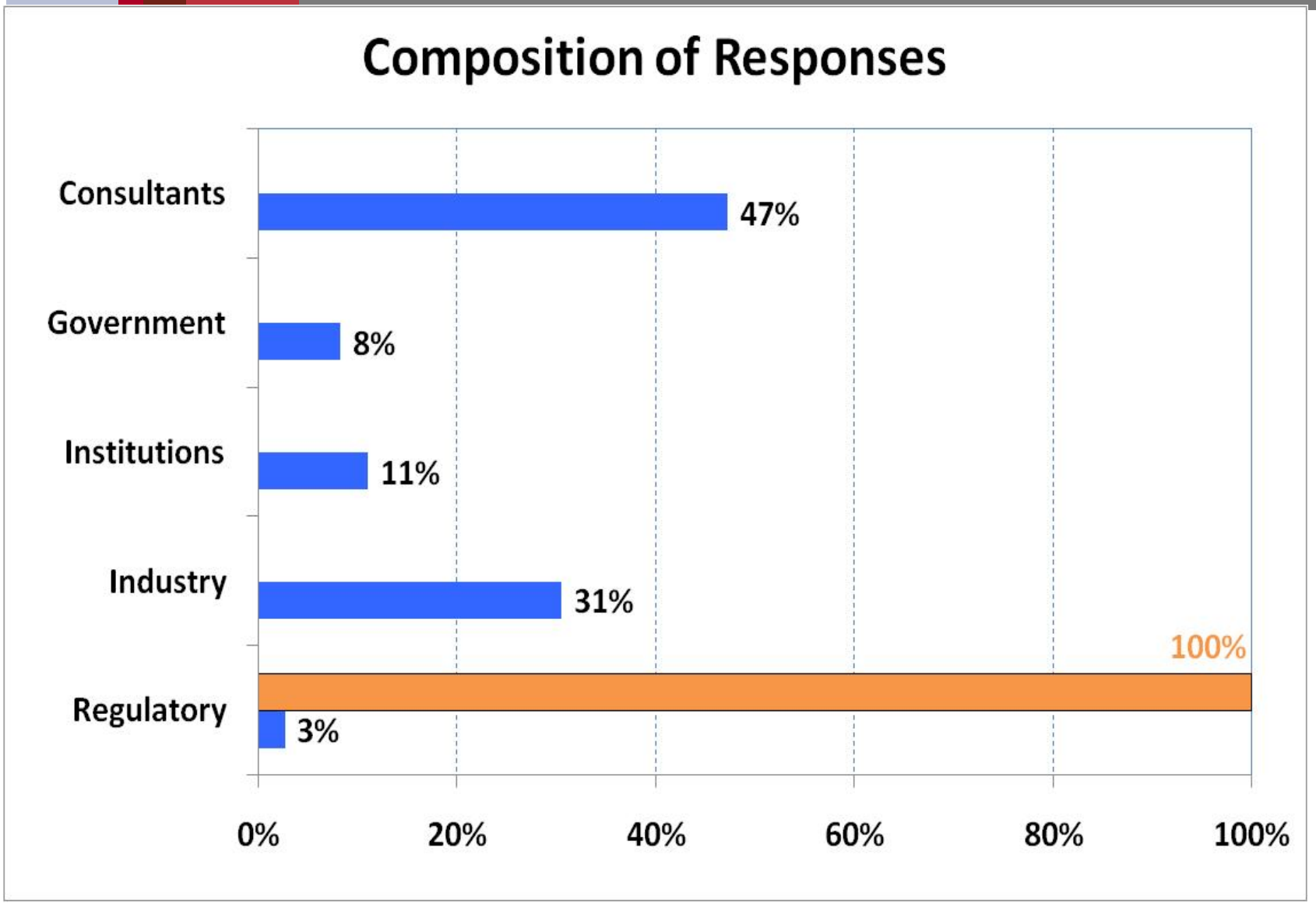
SURF Members

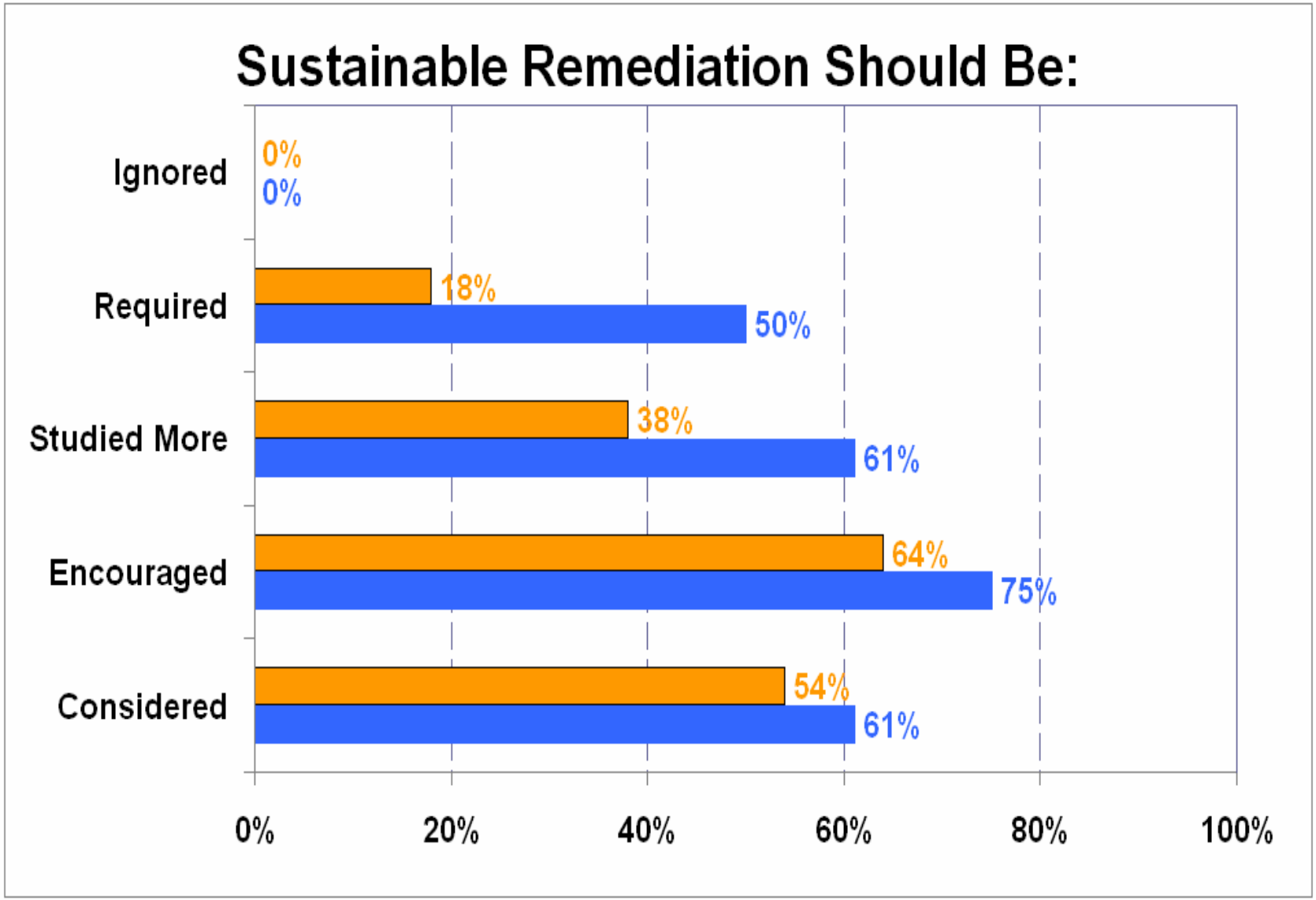
- To help answer questions for the White Paper
- Surveys were provided to SURF members on the emailing list
- 36 responses were received from SURF members

Regulators

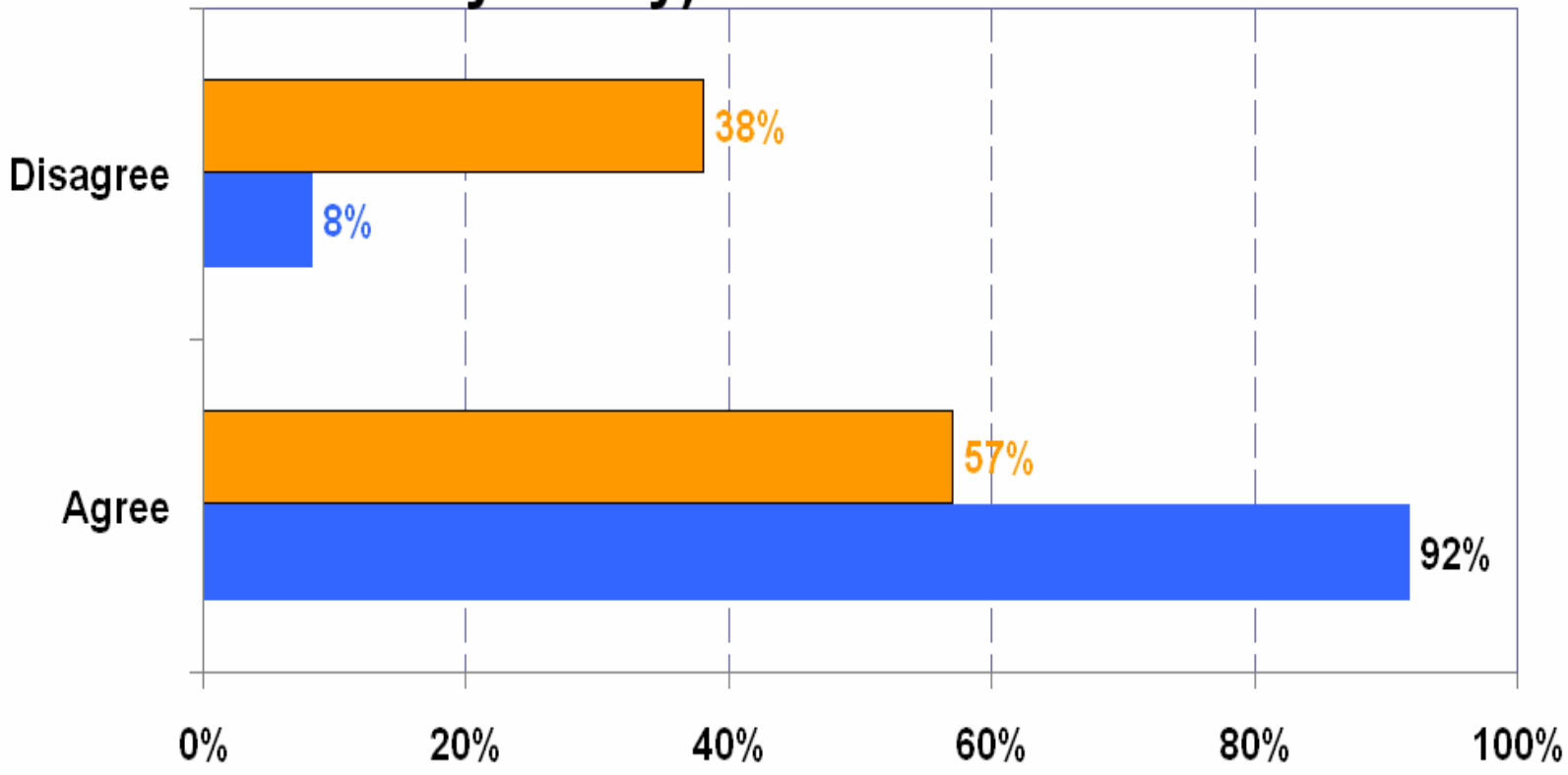
Surveys were sent to >160 regulators (50 US states and Canada) to:

- Help gauge level of knowledge and understanding of sustainable remediation by environmental regulators, and support the “Impediments and Barriers” chapter
- Received 56 full responses
- 38 from 19 different states; 14 Federal; 1 Ontario; 3 anonymous
- Important to note that this was not a scientific survey


Composition of Responses
Consultants
47%
Government
8%
Institutions
11%
Industry
31%
100%
Regulatory
3%
0%
20%
40%
60%
80%
100%
Regulators Survey
SURF Members Survey

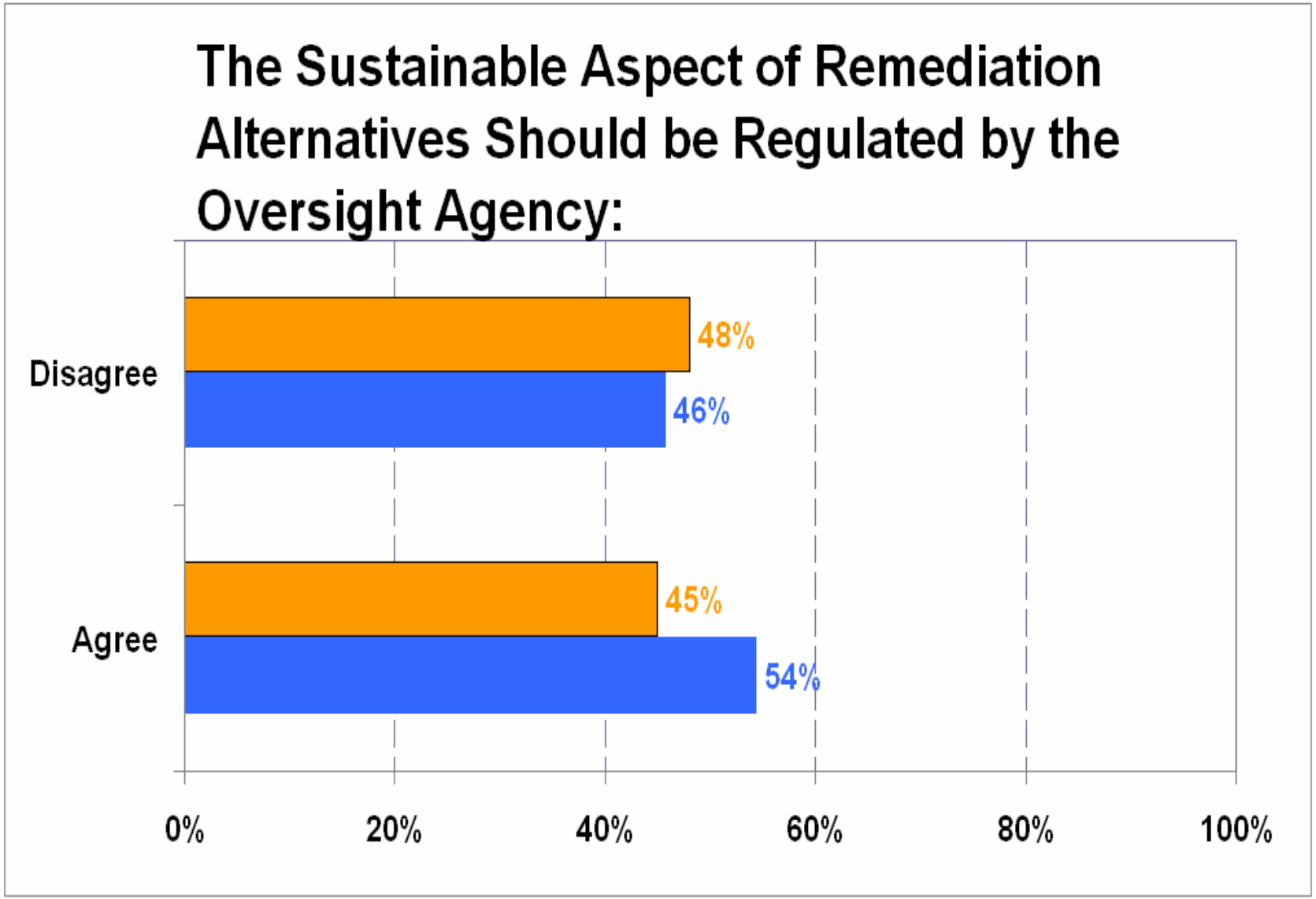

Sustainable Remediation Should Be:
Ignored
Required
Studied More
Encouraged
Considered
0%
0%
18%
50%
38%
61%
64%
75%
54%
61%
0%
20%
40%
60%
80%
100%
Regulators Survey
SURF Members Survey

Sustainability Should Be an Evaluation Criteria for Remediation Assessment (e.g., in a Feasibility Study):



Regulators Survey

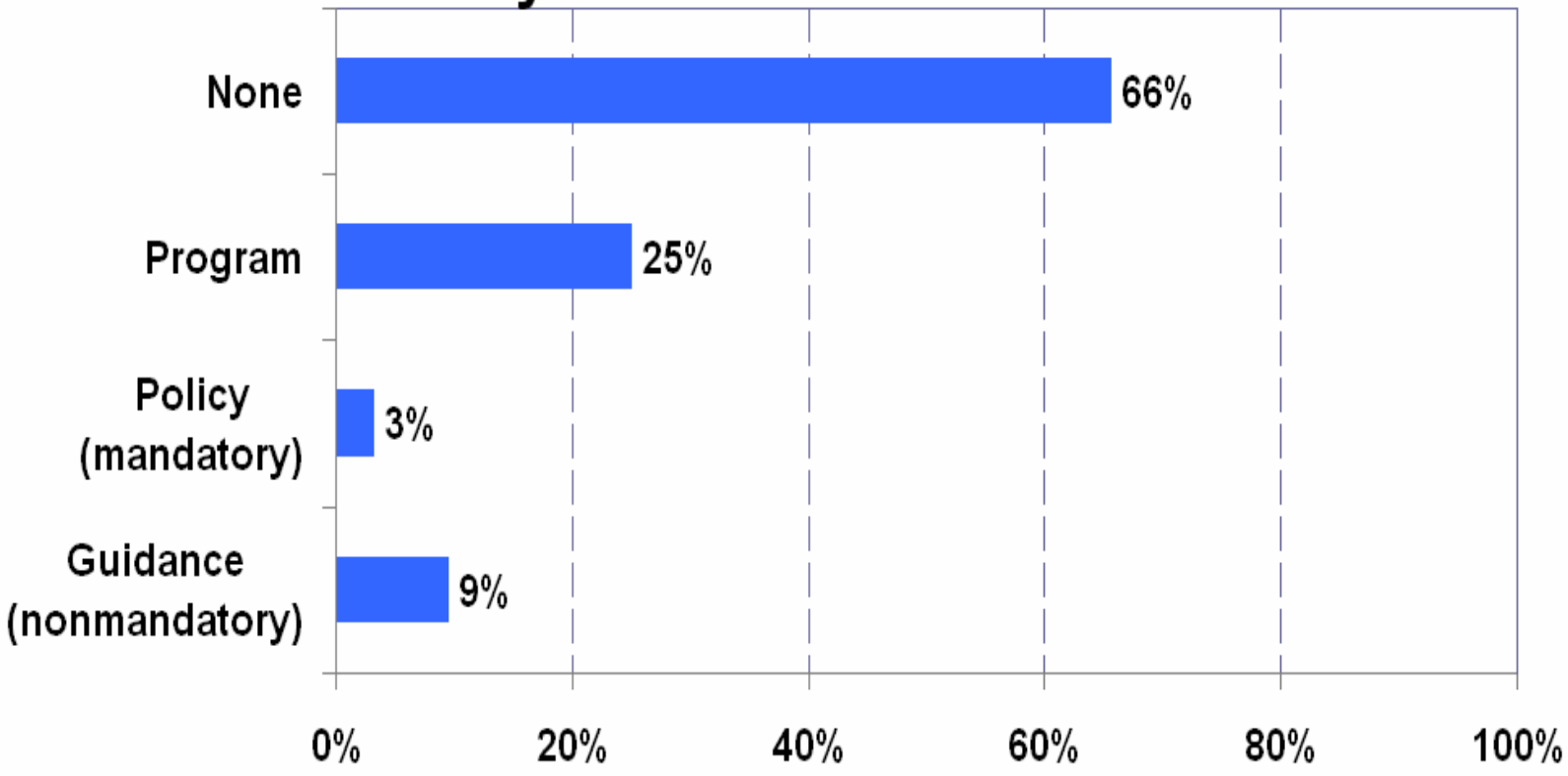
SURF Members Survey


The Sustainable Aspect of Remediation Alternatives Should be Regulated by the Oversight Agency:
Disagree
Agree
48%
46%
45%
54%
0%
20%
40%
60%
80%
100%
Regulators Survey
SURF Members Survey

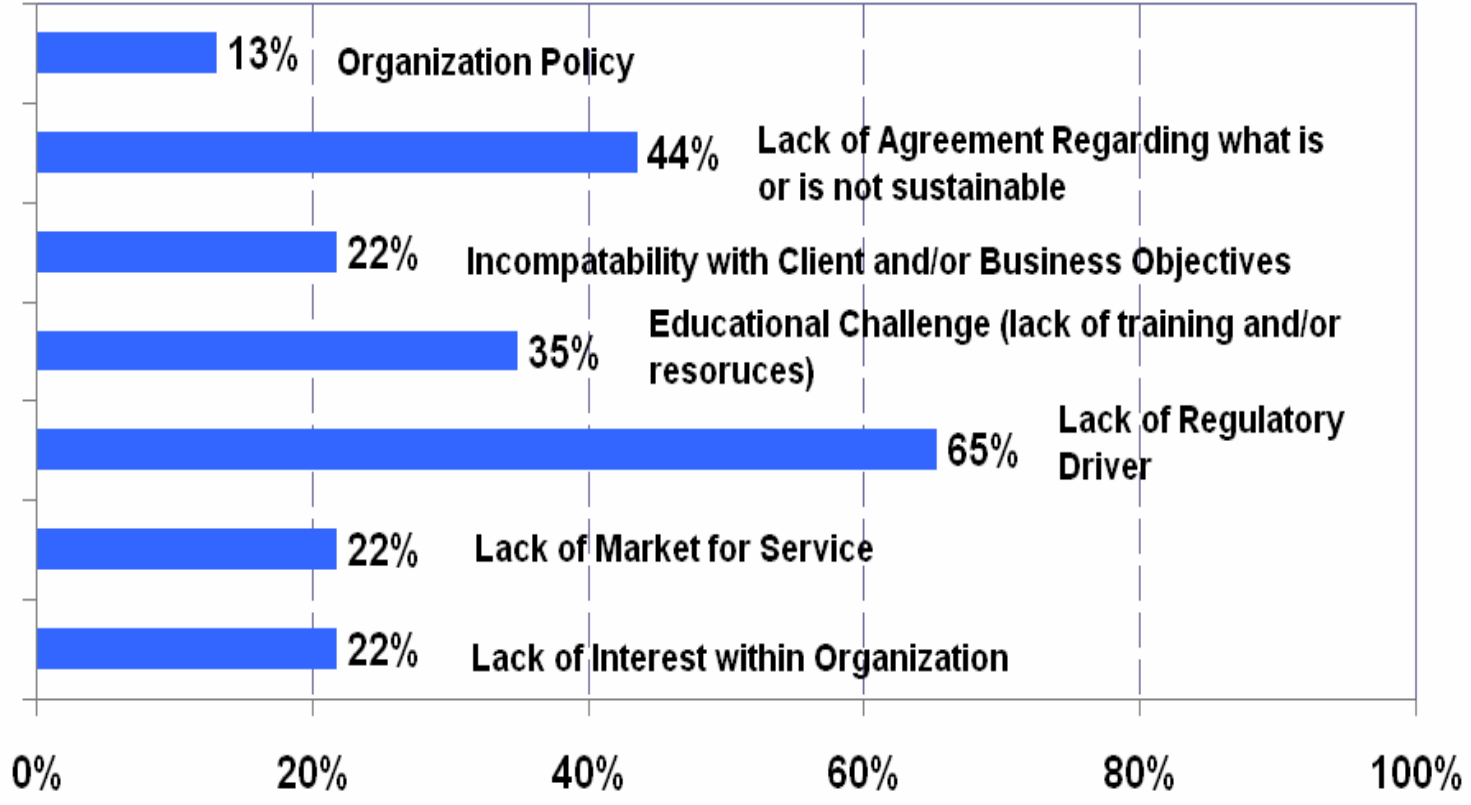
How do you Think Sustainability should be Measured? (SURF members only)

- **Life Cycle Cost Assessment through various environmental, social, and economic indicators (majority of responses)**
- **Concerned about combining sustainability factors into NCP criteria in the form of metrics (one response)**
- **Should start including sustainability as an evaluation criteria in FS (one response)**
- **Involve all stakeholders – One size fits all will not work (one response)**

Does your Organization Have any Guidance, Policy, or Programs that Address Sustainability Practices in Remediation?



What do you Believe is the Most Significant Barrier to Incorporating Sustainable Remediation within your Organization?



Organizational Challenges Posed by SURF Growth

- **Interest in SURF has been increasing rapidly**
- **The last two meetings have not been able to accommodate all the interested people**
- **Organizations differ in their attitude on formal vs. informal collaboration**
- **SURF meeting participants are not uniformly engaged**
- **Paying for venues and services is becoming complex**
- **A committee is chartered to examine organizational possibilities**

DUPONT

SURF Organizational Questions

What is SURF now?

An Adhocracy

- Loosely affiliated group with common interests
- Not officially any kind of organization

What does SURF need or want to be?

Objectives should drive our organizational structure

- Loosely affiliated group with common interests
- Not officially any kind of organization
- It is unclear if we generally agree that we need to become a more formal organization

Organizational Possibilities

- Non-profit organization
- Cooperative Research and Development Agreement (CRADA)
- Joint Research and Development Agreement
- Professional Society
- Research Institute

Potential Future SURF Projects

- **Develop and deliver training**
- **Consensus development of standard LCA methods for remediation**
- **Demonstrate sustainability tools for large and small sites**
- **Support engineering research on remediation impacts and/or support social science research on sustainability**
- **Compile and validate case studies**

Discussion

"The significant problems we face cannot be solved at the same level of thinking we were at when we created them."

Albert Einstein

"If you don't know where you are going, you might end up someplace else"

Yogi Berra

SuRF Launch Meeting – November 18th 2008

An Indicator Hierarchy

Prof Paul Bardos
r3 environmental technology ltd
www.r3environmental.com

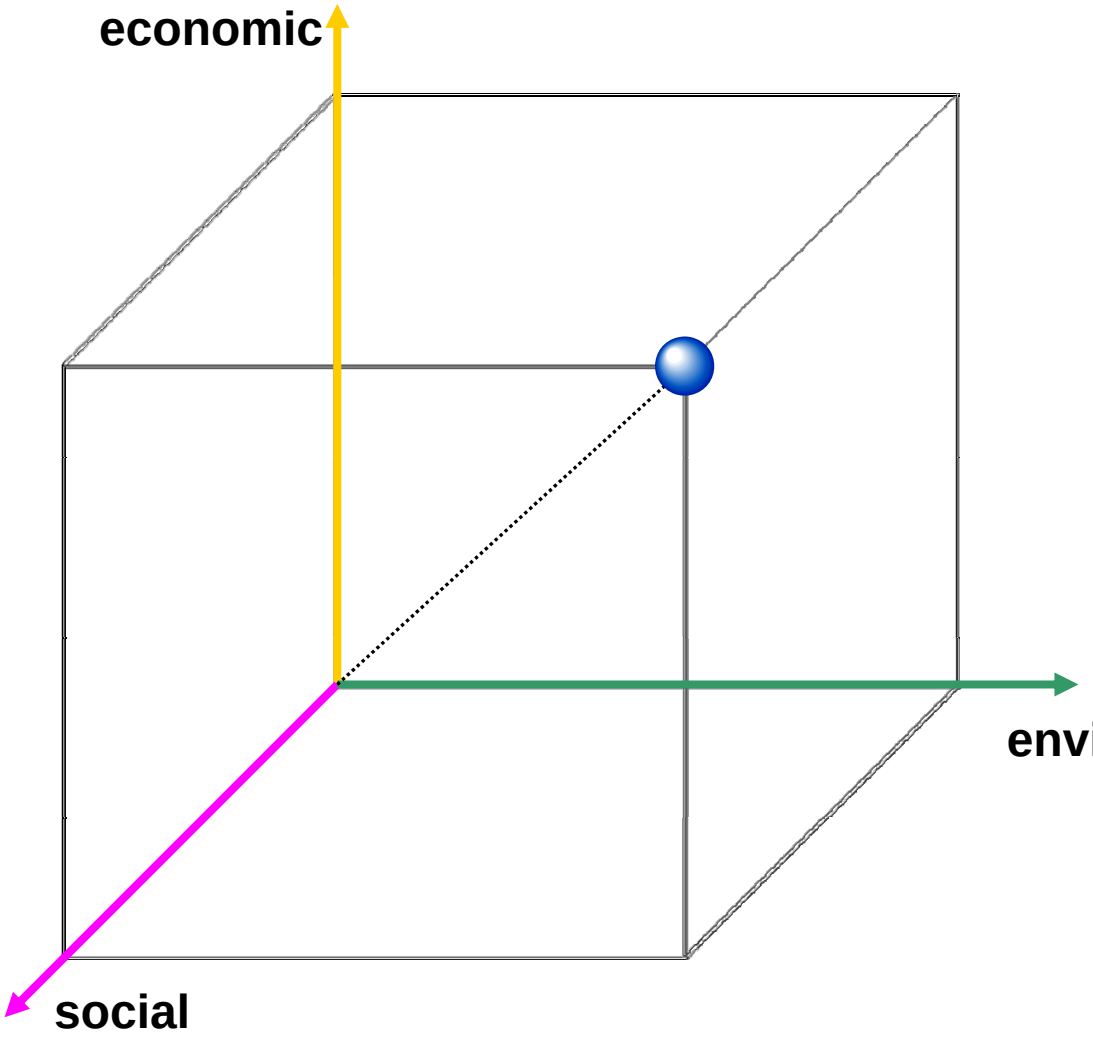
Outline

- Sustainable development definitions
- How is sustainability assessed using indicators
  - Policy orientated
  - Effect orientated
- Structuring indicators as a hierarchy
- Some concluding thoughts
  - Linking to your work this afternoon

SURF UK Approach

- *Sustainable remediation can be defined as the practise of demonstrating, in terms of environmental, economic and social indicators, that an acceptable balance exists between the effects of undertaking the remediation activities and the benefits the same activities will deliver*

Sustainability



'Development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (1987, Brundtland)

How can sustainability be assessed?

- There is no “standard” technique like ISO 14040 for LCA
- Sustainability appraisal tends to be based on assessments of indicators
  - Metrics / assessments of individual factors that contribute to an overall understanding of sustainability
  - E.g. direct costs, greenhouse gas emissions etc
- Some means of aggregating individual assessments of indicators is used to provide an overall understanding
  - Qualitatively
  - Quantitatively
- These two broad approaches to indicators
  - Policy or target orientated
  - Effect driven approach

Targeted approach to indicators (UK egs)

Idea	→	Indicator	→	Target
Avoidance of green field development	→	New houses built on brownfield	→	2008 target of building over 60% of new houses on brownfield
Avoidance of fossil carbon use in fuel	→	Use of biofuel in road transport fuel	→	2013/14 RTFO biofuel target of 5%

The more targets met / the closer to targets we get; the better the sustainability

Many indicator sets for different policy agendas

For example

Framework Indicators (2005)

Indicators “in your pocket” 2008

Scotland indicators for SD (2006)

Wales indicators for SD (2006)

Environmental performance indicators: reporting guidelines for UK business (2006)

Sustainable farming & food (2002+)

Sustainable construction, (2008)

Strategic planning for sustainable waste management (2006)

Sustainability appraisal of regional spatial strategies (2005)

Local development framework core output indicators (2005)

Advantages / disadvantages

- Advantages
  - Specific vision of “sustainability”
  - Political “ownership”, direct linkage with policy goals appeals to planners, regulators, local authorities, public sector funders etc

- Disadvantages
  - Narrow scope (incomplete: focused on particular policy interests and goals)
  - Geographically and time limited
  - Vulnerable to political change
  - Subjective (policy value judgements) and over-simplified
    - Brownfield target for residential housing → garden development; concerns over strategic needs for disused railway land
    - Biofuels target ignored ethical concerns and even science about the true greenhouse impacts of biofuels production (N_2O in particular)

Effects Driven

- “Research” based listing of effects (impacts / benefits) which are important in achieving the overarching goals of sustainable development
- This broad range of effects establishes the indicators of interest

Examples

- Carbon based assessments (one indicator?)
- LCA based assessments (several indicators)
- SURF US performance indicators (several indicators)
  - Based on a “policy” steer, e.g. focus on renewables
  - Shortlist of KPIs
  - But without “targets” per se
- EURODEMO energy efficiency concept (one indicator?)

Advantages / disadvantages

- Advantages
  - Holistic vision of “sustainability”
  - Feasibility of international use, harmonisation and protocols
    - → Better objectivity?
  - Not geographically limited, at least not for geopolitical reasons ????
  - Reduced vulnerability to political changes ???

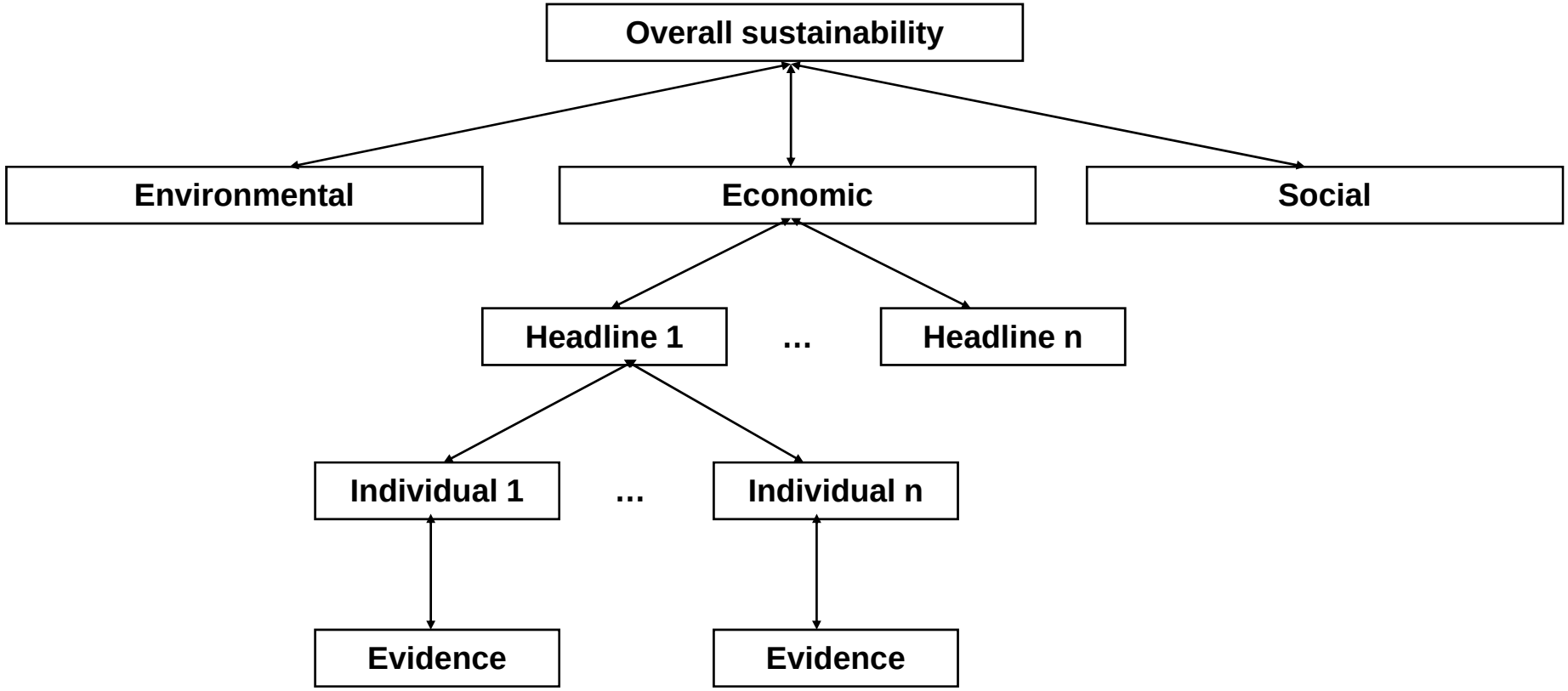
- Disadvantages
  - Not necessarily linked to direct policy drivers / measurables
  - Not necessarily linked to Public Sector organisational goals
  - May be seen as more esoteric???
  - At least in the early stages indicator sets may be seen as not showing a great improvement in objectivity over target / policy orientated approaches

Perhaps an ideal sustainability appraisal approach is able to separately consider both types of indicator set, and may be compare and contrast findings?

Aggregating Indicators

- For qualitative or quantitative approaches, there are several problems a methodology must overcome:
  - Providing a simple decision-making route through a complex series of individual assessments
  - Avoiding double counting of effects
  - Ensuring that each indicator is reliably considered in the same way for each sustainability appraisal (check list)
  - Structuring the aggregation so that like is considered with like and the approach to simplification is logical, straight forward and reproducible
  - Ensuring a clear pathway from evidence to sustainability appraisal (and back)
- Our suggestion:
  - an indicator hierarchy that can be used in a range of quantitative or qualitative tools, e.g. from ranking tools to cost benefit analysis

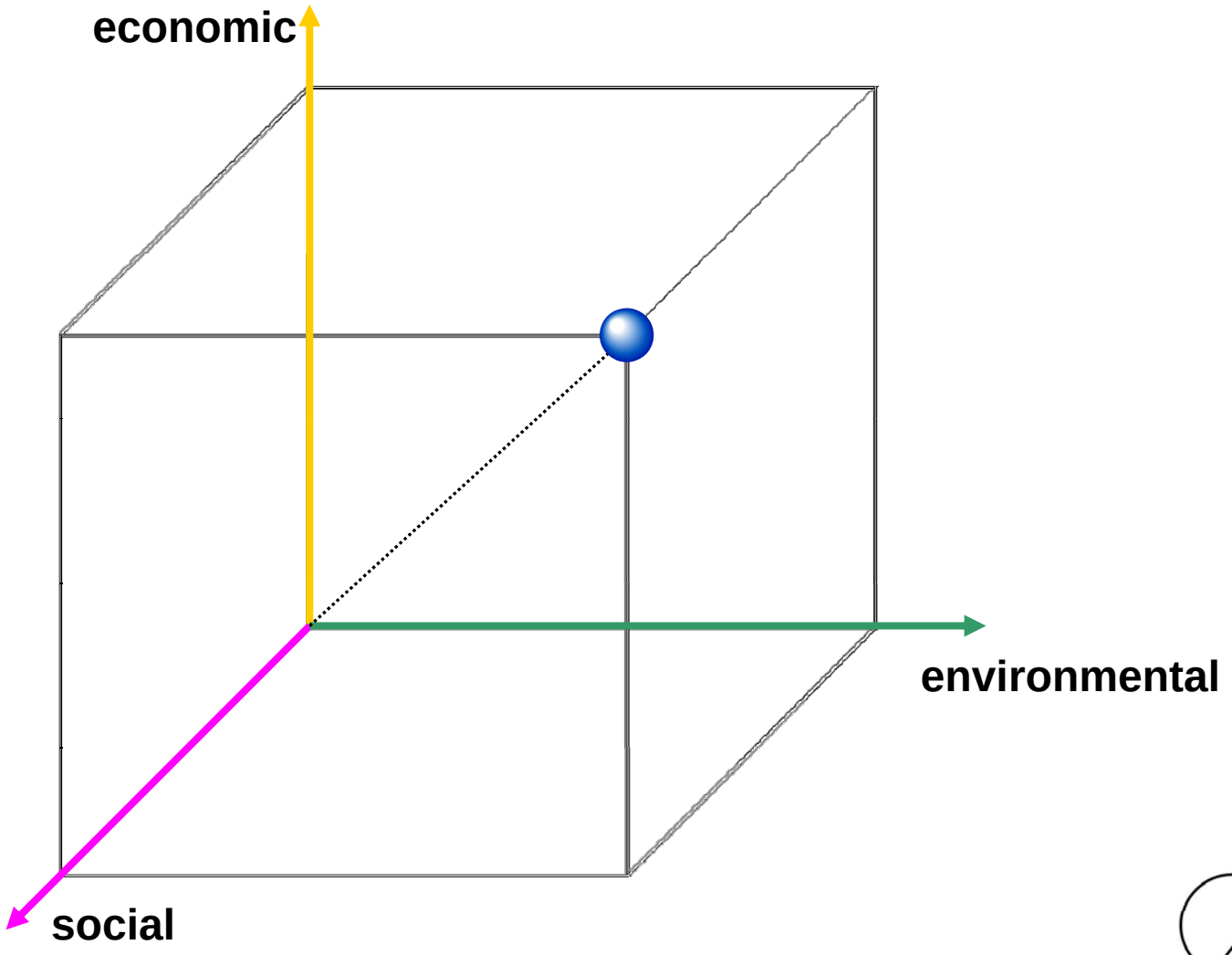
Suggested Indicator Hierarchy

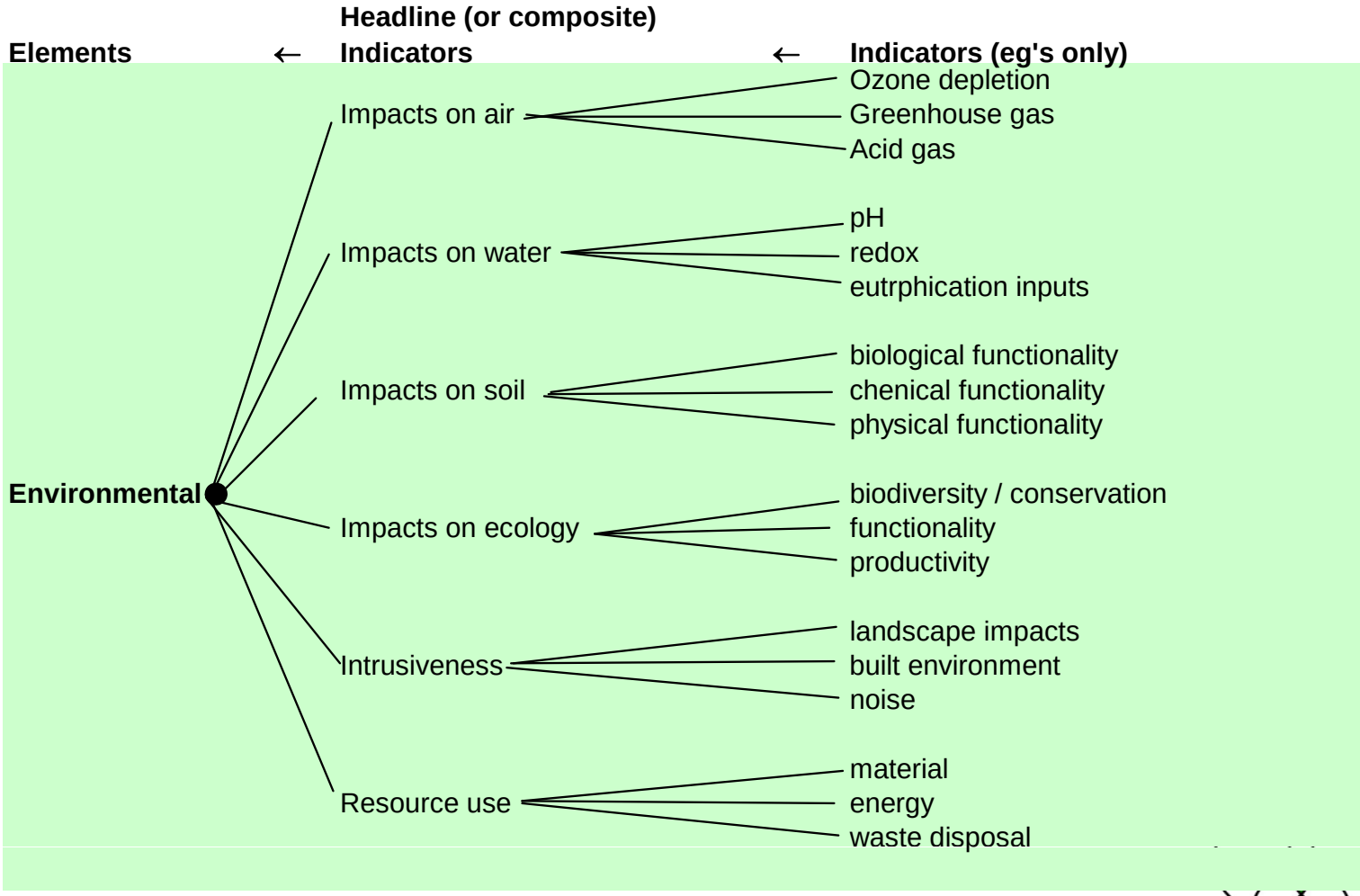


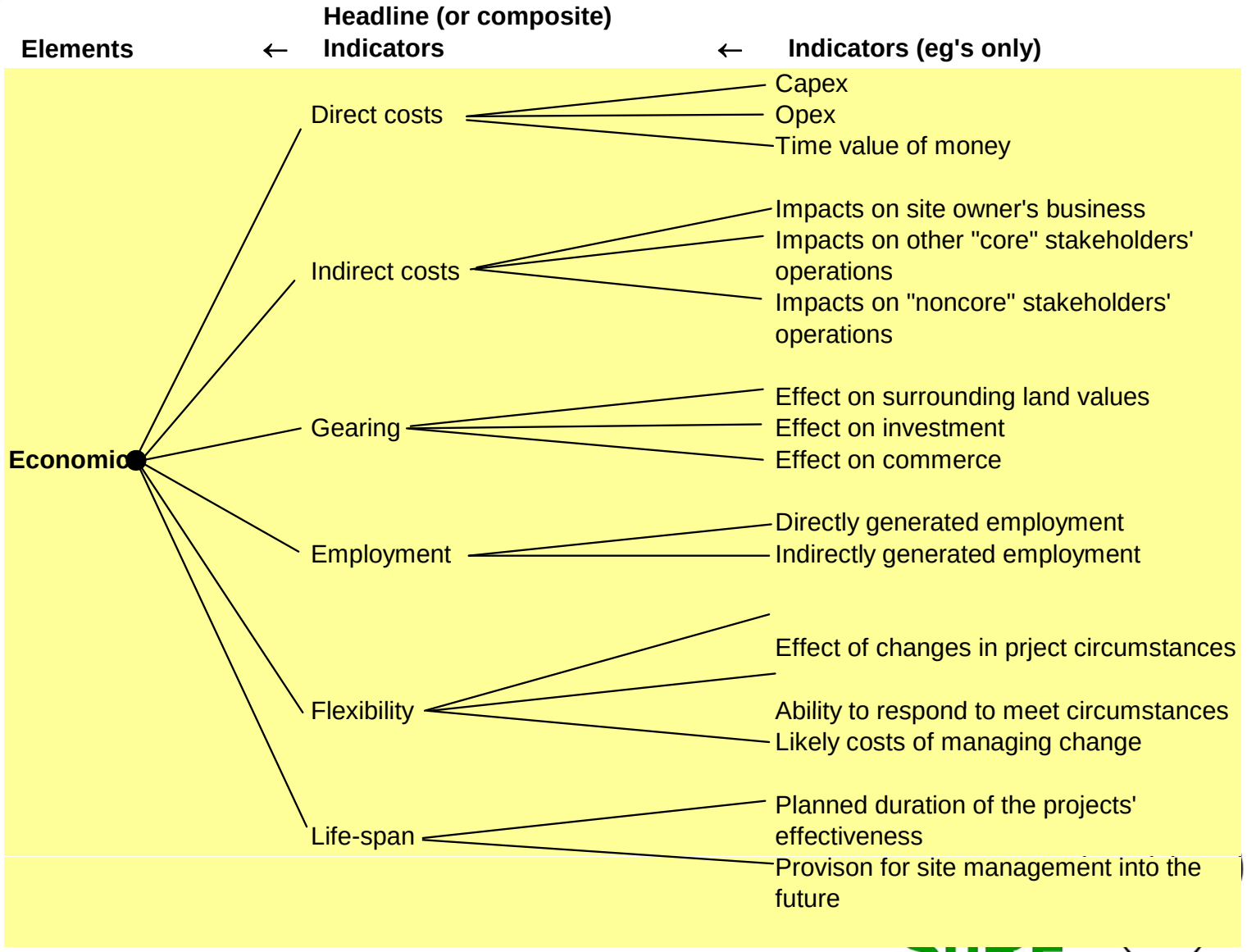
Rationale

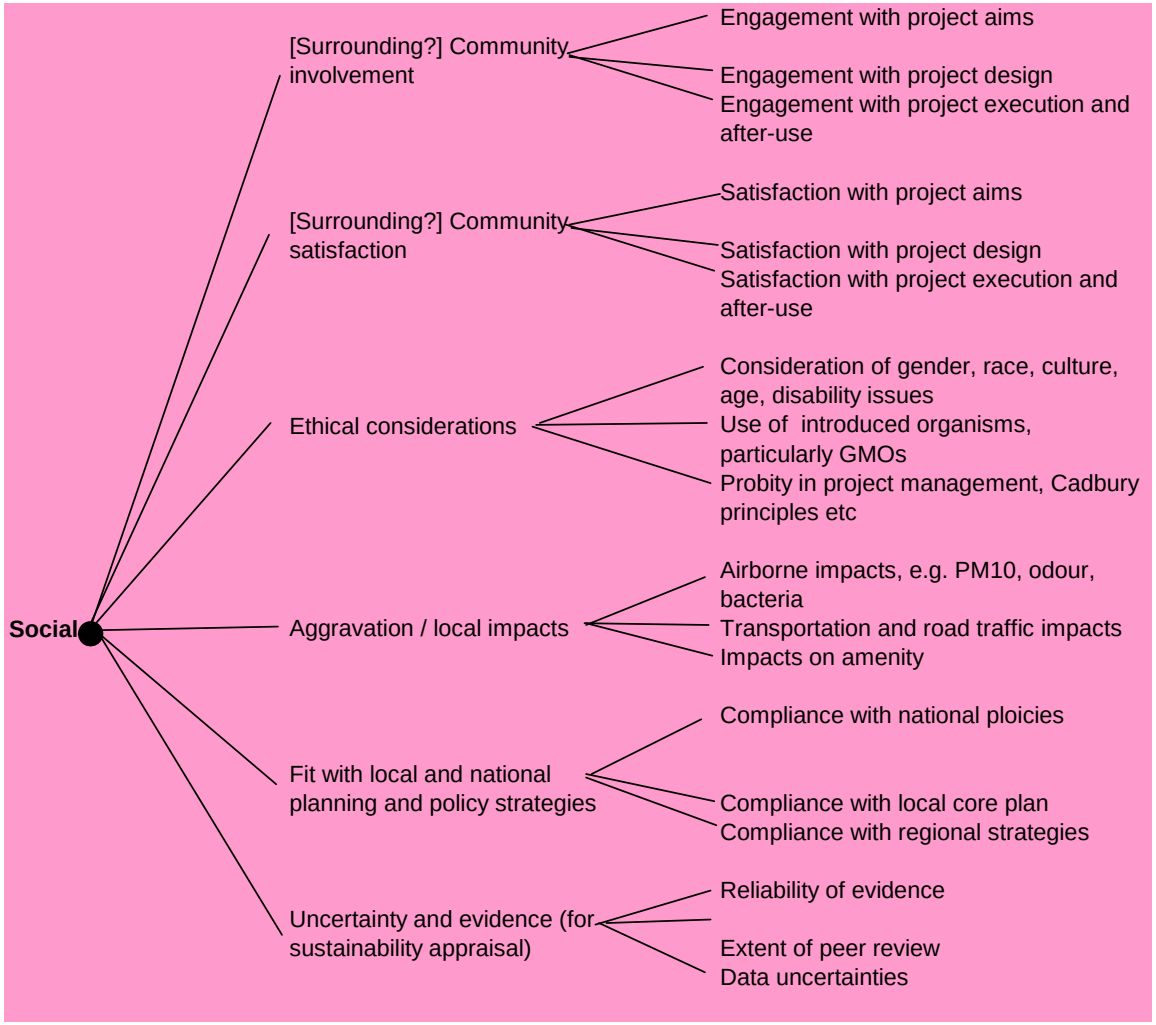
- Providing increasing levels of decision making complexity / simplification
  - From evidence through to a single view of sustainability
- Consistency with the three elements / pillars of sustainable development
  - Environmental, economic and social
- Providing a meaningful intermediate level of aggregation, “headline” indicators which reveal the main factors underpinning each element
  - E.g. main factors underpinning the environmental element sustainability

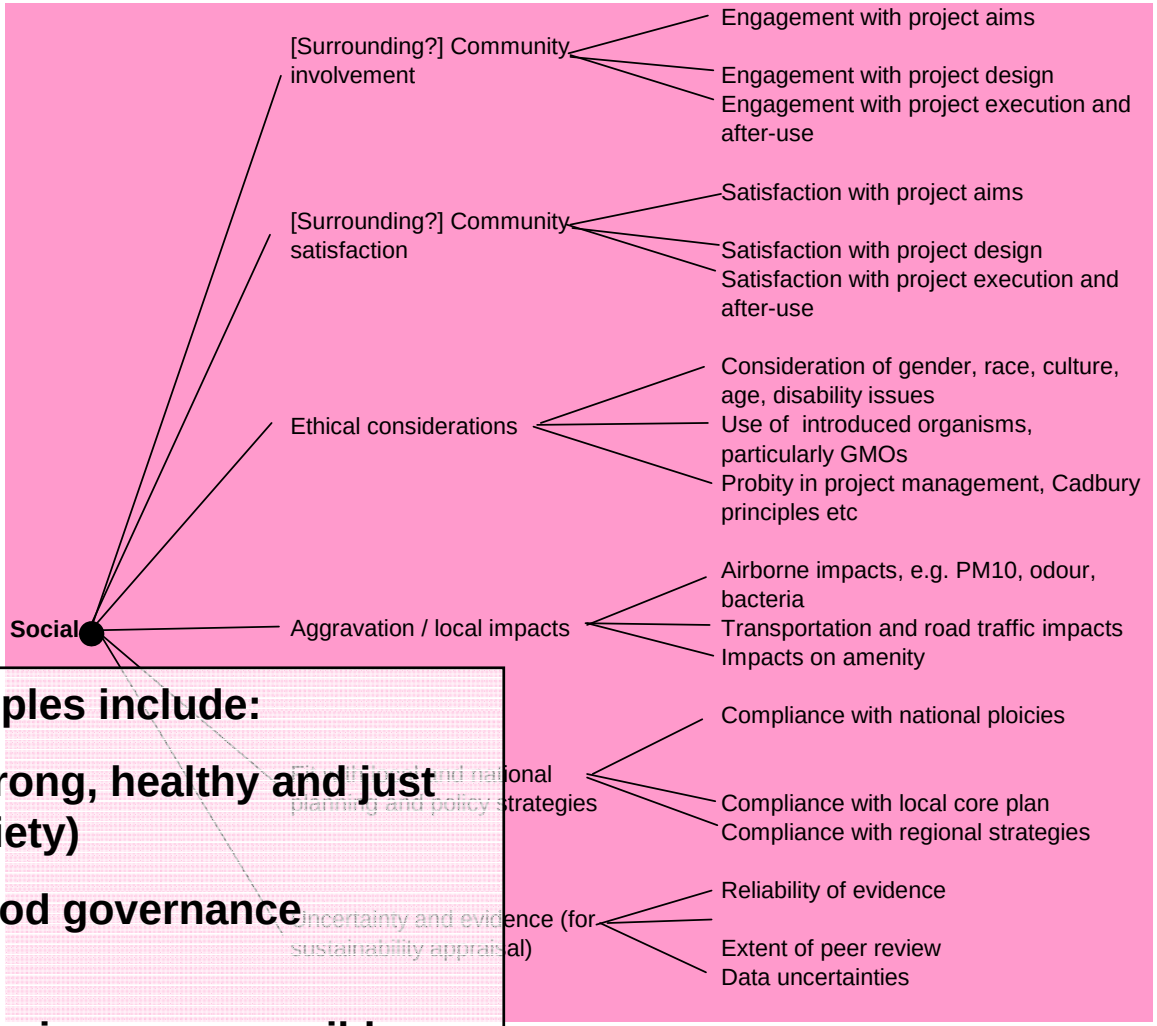
Some personal thoughts on indicators




Elements
Headline (or composite) Indicators
Indicators (eg's only)
Environmental
Impacts on air
Ozone depletion
Greenhouse gas
Acid gas
Impacts on water
pH
redox
eutrphication inputs
Impacts on soil
biological functionality
chenical functionality
physical functionality
Impacts on ecology
biodiversity / conservation
functionality
productivity
Intrusiveness
landscape impacts
built environment
noise
Resource use
material
energy
waste disposal


Elements
Headline (or composite) Indicators
Indicators (eg's only)
Economic
Direct costs
Capex
Opex
Time value of money
Indirect costs
Impacts on site owner's business
Impacts on other "core" stakeholders' operations
Impacts on "noncore" stakeholders' operations
Gearing
Effect on surrounding land values
Effect on investment
Effect on commerce
Employment
Directly generated employment
Indirectly generated employment
Flexibility
Effect of changes in prject circumstances
Ability to respond to meet circumstances
Likely costs of managing change
Life-span
Planned duration of the projects' effectiveness
Provison for site management into the future


Social
[Surrounding?] Community involvement
Engagement with project aims
Engagement with project design
Engagement with project execution and after-use
[Surrounding?] Community satisfaction
Satisfaction with project aims
Satisfaction with project design
Satisfaction with project execution and after-use
Ethical considerations
Consideration of gender, race, culture, age, disability issues
Use of introduced organisms, particularly GMOs
Probity in project management, Cadbury principles etc
Aggravation / local impacts
Airborne impacts, e.g. PM10, odour, bacteria
Transportation and road traffic impacts
Impacts on amenity
Fit with local and national planning and policy strategies
Compliance with national ploicies
Compliance with local core plan
Compliance with regional strategies
Uncertainty and evidence (for sustainability appraisal)
Reliability of evidence
Extent of peer review
Data uncertainties



The UK Principles include:

Ensuring a strong, healthy and just society (society)

Promoting good governance (society)

Using sound science responsibly (society)

The suggestions for headline indicators

Environmental	Economic	Social
Impacts on air **partial** Impacts on water Impacts on soil Impacts on ecology Intrusiveness Resource use **partial**	Direct costs Indirect costs Gearing Employment / human capital Life-span Flexibility	Community involvement Community satisfaction Ethical considerations Aggravation / local impacts Fit with local and national planning and policy strategies Uncertainty and evidence

Some concluding thoughts (1)

- Perhaps policy vs effects orientated indicator sets serve different purposes
  - Meeting targets vs. a sustainability “LCA”
- What coverage?
  - Consistent starting point needed
  - Sustainability appraisal = holistic
  - Dealing with site specific relevance / due consideration
- All indicator sets are likely to be fundamentally flawed in that they can only assess what we know or perceive may be important
- This presentation has not discussed the “tools”, more what they should consider
  - Also undiscussed: the vexed issues of “weighting”, “scoring”, “valuation” etc, it has focussed on the range of sustainability considerations and how these might be structured

Some concluding thoughts (2)

- Over to you this afternoon:
  - Over to Frank!