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HOlistic Management of Brownfield REgeneration (HOMBRE)

CONCEPTUAL SITE OR PROJECT MODELS FOR SUSTAINABILITY ASSESSMENT AND OVERALL VALUE

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In cooperation with:

CABERNET www.cabernet.org.uk

GREENLAND www.greenland-project.eu

timbre www.timbre-project.eu

GLOCOM Global Partners in Contaminated Land Management MARIE CURIE ACTIONS www.dais.unive.it/~glocom

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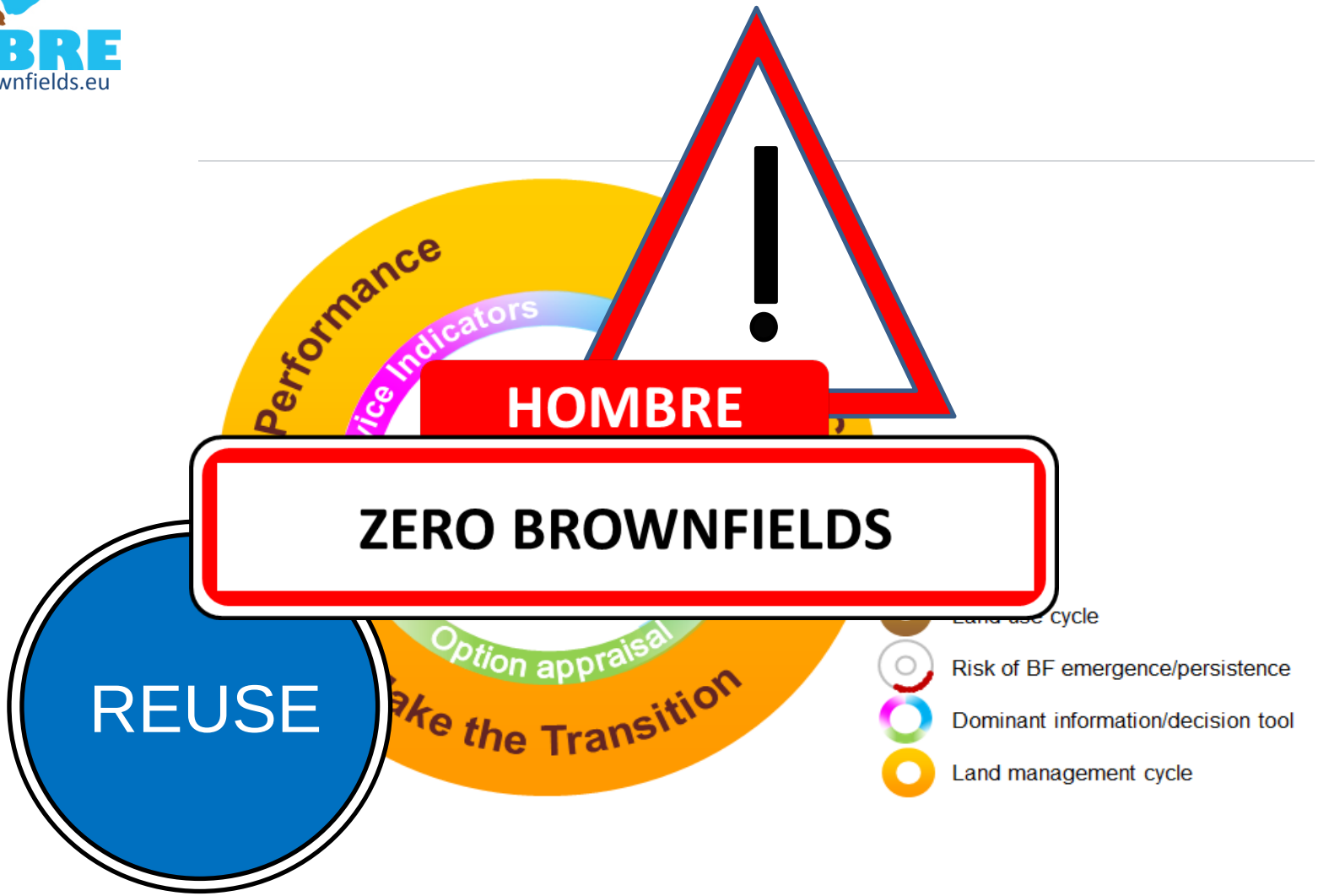

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CABERNET (*) has defined brownfields as sites which:

1. have been affected by former uses of the site or surrounding land;
2. are derelict or underused;
3. are mainly in fully or partly developed urban areas;
4. require intervention to bring them back to beneficial use; and
5. may have real or perceived contamination problems

COSTS

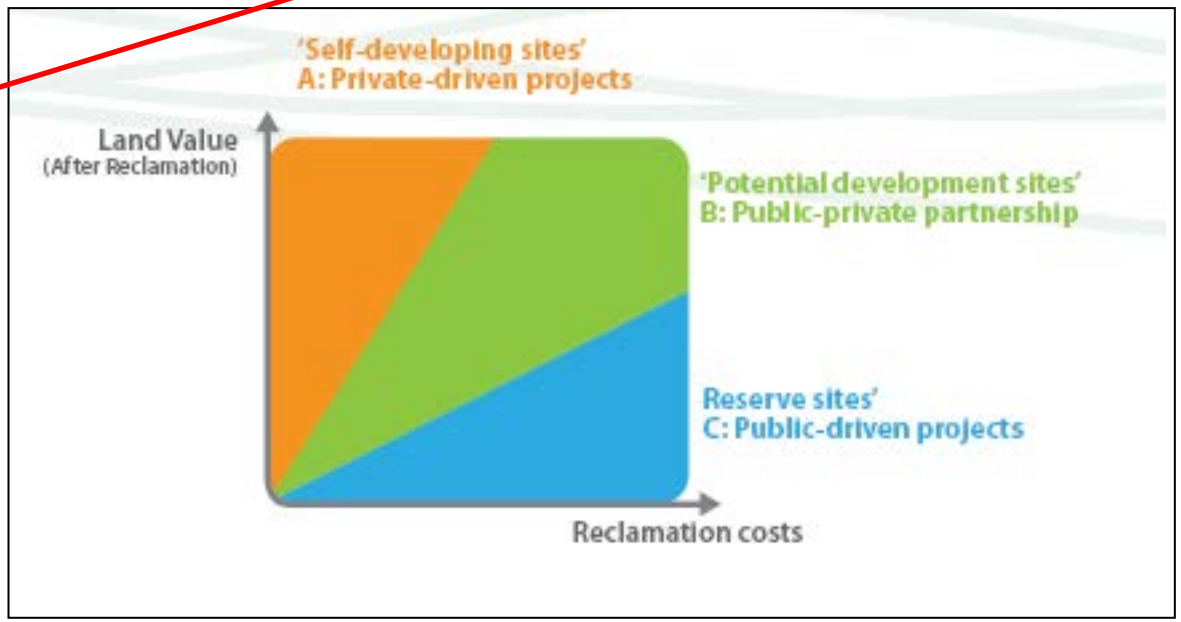
ECONOMIC RISKS

LIABILITY RISKS

STIGMA

…

BENEFIT / VALUE OF REGENERATION ??



Source: CABERNET 2006: Sustainable Brownfield Regeneration

(*) CABERNET (Concerted Action on Brownfield and Economic Regeneration Network) is the European Expert Network addressing the complex multi-stakeholder issues that are raised by brownfileld regeneration

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PROJECT SERVICES

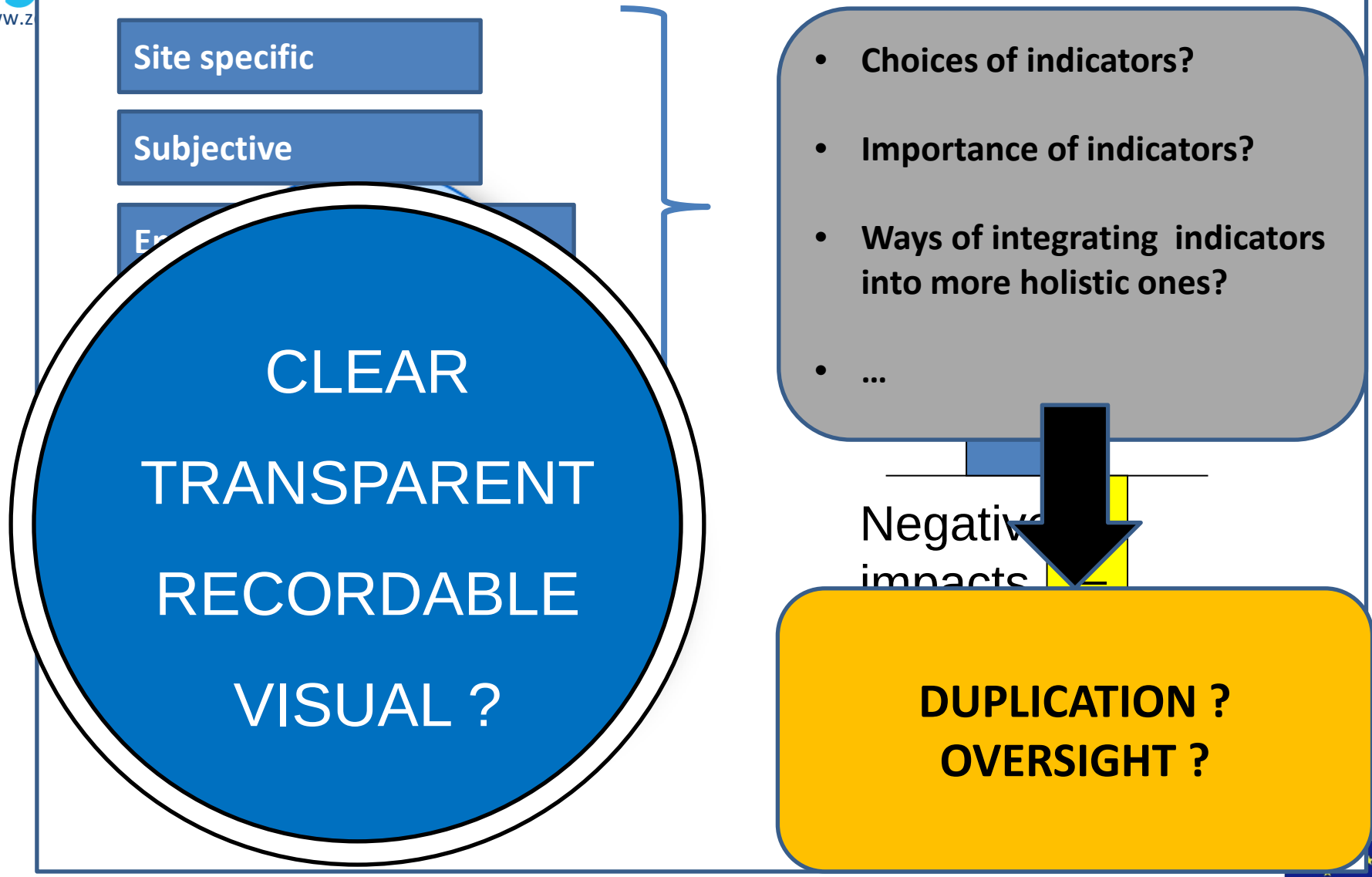
beneficial outputs deliberately planned within a project for particular recipients

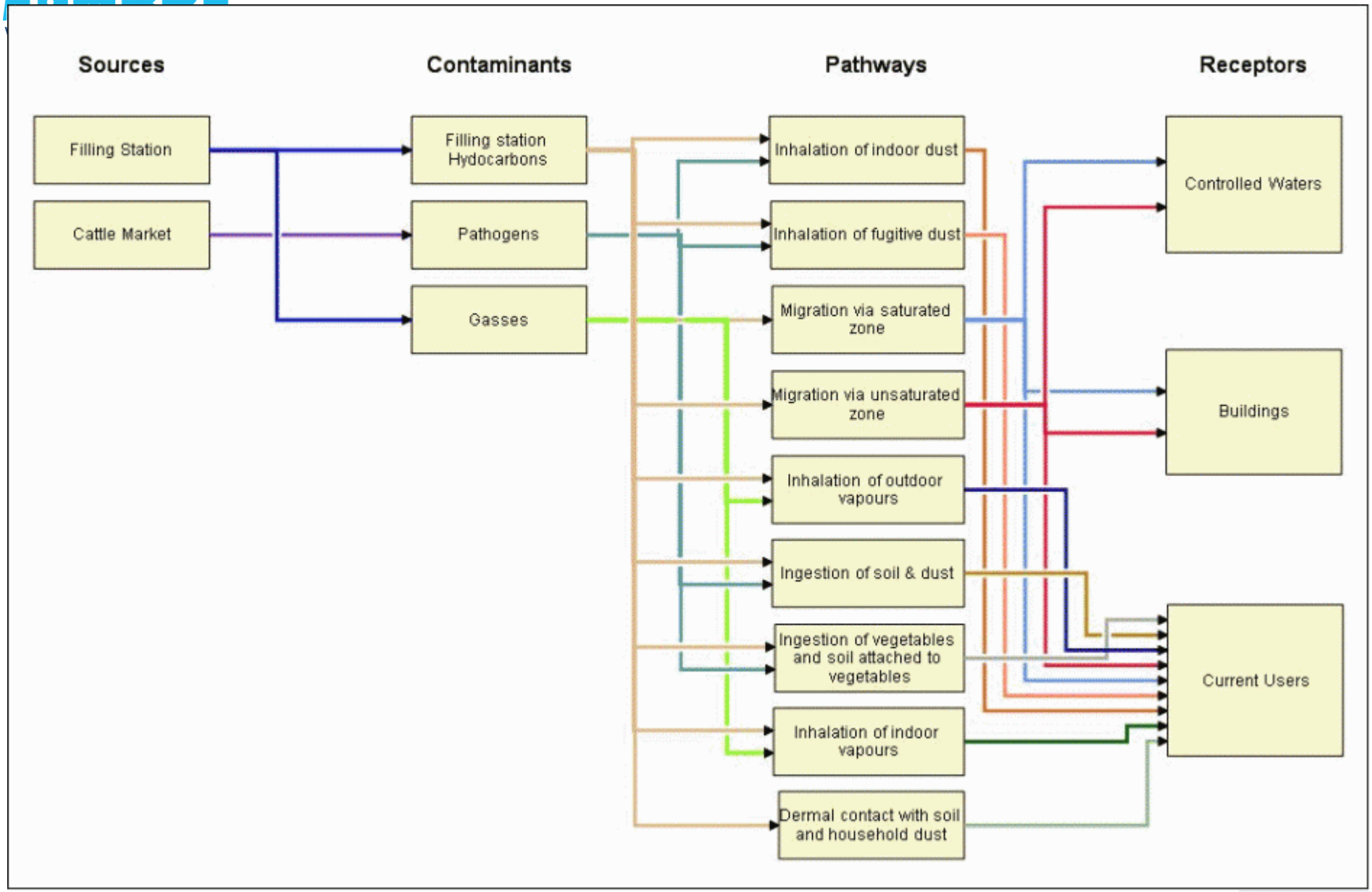
ARE THE OVERARCHING PRINCIPLES

FOR VALUE CREATION

THROUGH BROWNFIELD REGENERATION

Tailored & Sustainable Redevelopment towards Zero Brownfields


Site specific
Subjective
CLEAR
TRANSPARENT
RECORDABLE
VISUAL ?
• Choices of indicators?
• Importance of indicators?
• Ways of integrating indicators into more holistic ones?
• …
DUPLICATION ?
OVERSIGHT ?


Sources
Contaminants
Pathways
Receptors
Filling Station
Cattle Market
Filling station Hydocarbons
Pathogens
Gasses
Inhalation of indoor dust
Inhalation of fugitive dust
Migration via saturated zone
Migration via unsaturated zone
Inhalation of outdoor vapours
Ingestion of soil & dust
Ingestion of vegetables and soil attached to vegetables
Inhalation of indoor vapours
Dermal contact with soil and household dust
Controlled Waters
Buildings
Current Users

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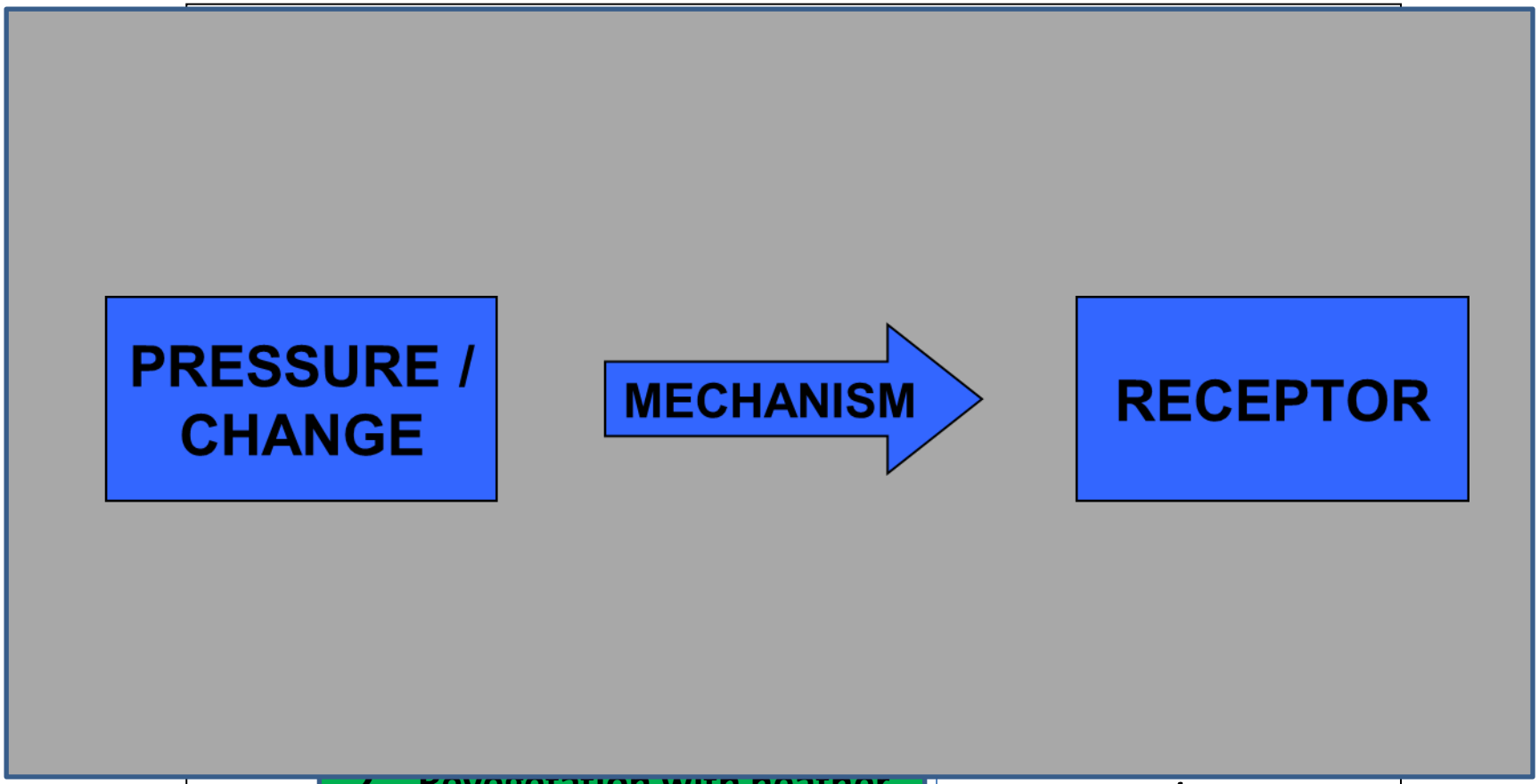
Parys Mountain

- Parys Mountain is a historic copper mining area near Amlwch in Anglesey (used since Roman times)

Some of these settlement ponds pose a risk to residents of a house adjacent to them by dust blow

nds. These are dry for



2. Revegetation with heather

outputs are ***services***;
value describes the
"level of ***benefit***"

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Examples of sustainability linkages

economic	Construction of access road → Improved access → increased property values in the region of the regeneration project
environmental	Construction and operations (i.e. use of raw materials) → subtraction → primary resources
social	Creation of dust from a contaminated site →wind-blow →human health risks

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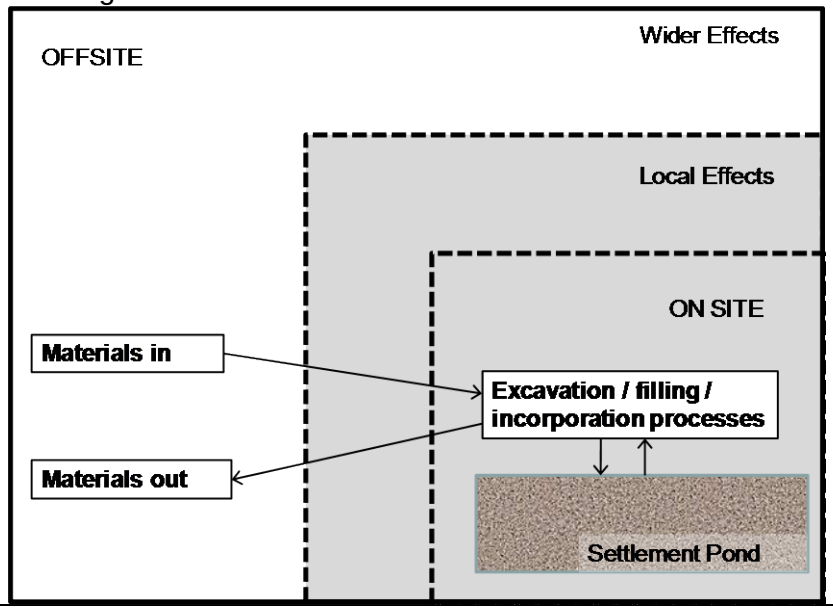
BOUNDARIES

Boundaries- System	Remediation work for the mitigation of human health risks to a residential property adjacent to disused sediment ponds. Movement of all prepared materials to Parys Mountain site, all operations to treat the sediment pond to fully achieve agreed risk management objectives for the remediation. Removal and disposal of all residues.
Boundaries- Life cycle	What is consumed by a process, the effect of operations – such as their emissions, the impacts of depreciation on capital equipment that will be reused and the effects of its maintenance
Boundaries- Proximity	Local effects are those affecting the sediment pond and its adjacent dwelling 
Boundaries- Permanence	Temporary effects are those of duration less than or equal to the remediation project operational period

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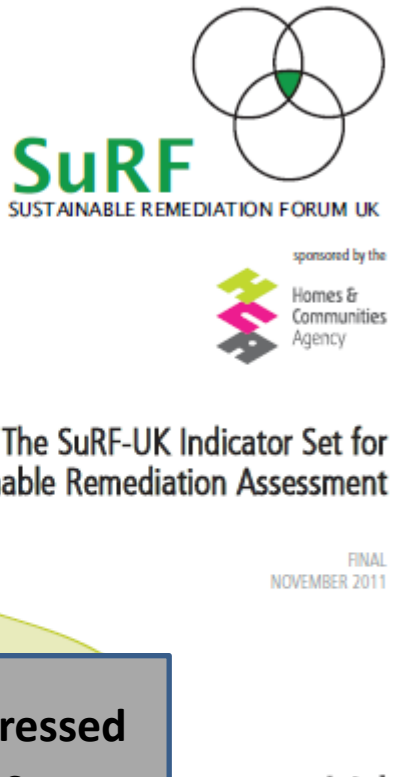
Identifying sustainab

Environment	Social
Emissions to Air	Human health & safety
Soil and ground conditions	Ethics & equality
Groundwater & surface water	Neighbourhoods & locality
Ecology	involvement
Natural resources & waste	Uncertainty & evidence

Approximatively 80 different issues addressed within these 15 indicator categories



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Possible sustainability effects = complete linkages

SuRF-UK Cat	Pressure (t_0) / Change (t_1)	Mechanism	Receptor
ENV1	GHG generation	Emission to air	Atmosphere
ENV1	NOx, SOx from process plant and traffic	Emission to air	Atmosphere
SOC1	NOx, SOx from process plant and traffic	Emission to air	Human health
SOC1	Particulates e.g. PM10	Emission to air	Human health
ENV2	Soil plant nutrient status	Suitability for biological functions	Vegetative cover
ENV2	Soil contamination	Suitability for biological functions	Vegetative cover
ENV2	Soil buffering capacity / CEC	Suitability for biological functions	Vegetati
ENV2	Soil pH/redox	Suitability for biological functions	Vegetati
ENV2	Soil carbon	Sequestration	Atmosph
ENV2	Soil condition and WHC	Suitability for biological functions	Vegetative cover
ENV2	Nutrient cycling and other biological functions	Suitability for biological functions	Vegetative cover
ENV2	Soil structure	Erosion	Soil
ENV2	Soil structure	Compaction	Vegetative cover
ENV3	Plant nutrients	Leaching	Surface water
ENV3	Plant nutrients	Leaching	Groundw
ENV3	Soil pH/redox	Leaching	Surface w
ENV3	Soil pH/redox	Leaching	Groundw
ENV3	Soil contamination	Leaching	Surface water
ENV3	Soil contamination	Leaching	Groundwater
ENV3	Soil contamination	Flood resilience	Surface water
ENV4	Soil contamination	Suitability for biological functions	Soil ecology
ENV4	Soil buffering capacity / CEC	Suitability for biological functions	Soil ecology
ENV4	Soil pH/redox	Suitability for biological functions	Soil ecology
ENV4	Soil condition and WHC	Suitability for biological functions	Soil ecology
ENV4	Vegetative cover	Change in biodiversity	Local ecology
ENV4	Light / activity / noise	Disturbance	Fauna

67 found (by the assessor)

Notice grouping of categories

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conceptual site model

- Identify relevant pressures / changes
  - From the site
  - From the interventions
- List those which lead to complete linkages
- Prioritise
- Pressures, mechanisms and receptors can be grouped
- So a single network diagram can be used to show all linkages as a conceptual model for the site
- A network diagram summarises the connections between pressures, mechanisms and receptors, i.e. the linkages

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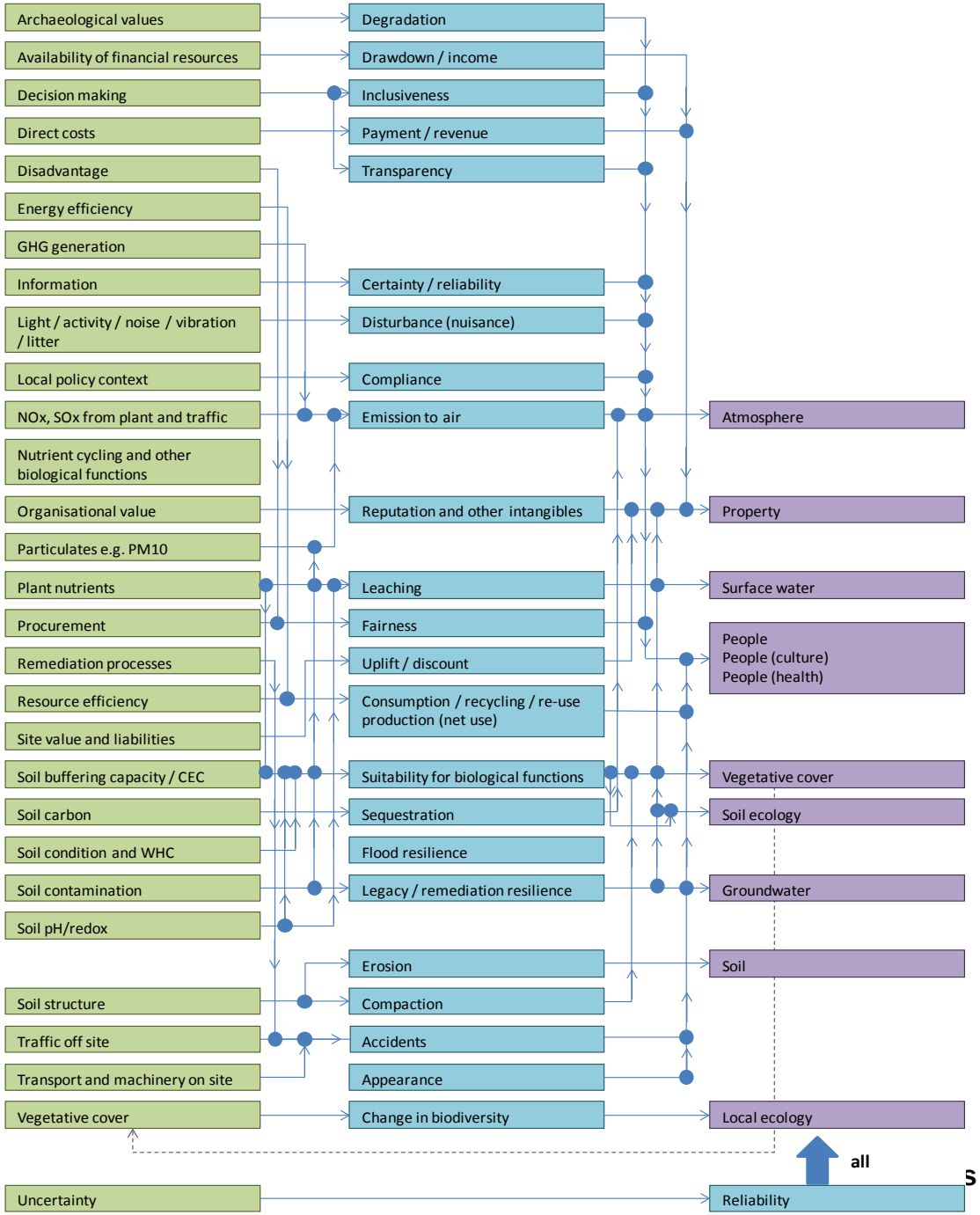

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Sustainability linkages and project services

- Linkages for services are an obvious priority
  - Risk management for the householder
  - Conservation of heather vegetation (several linkages)
- But reviewing potential linkages may identify additional explicitly useful “services” for different beneficiaries amongst the wider effects, e.g.
  - Resilience to flooding
  - Preservation of archaeological features
- Hence sustainability assessment may increase the interest in a project and increase its perceived benefits.
- Sustainability assessment may more clearly describe and reconcile differing stakeholder interests and so facilitate a project.

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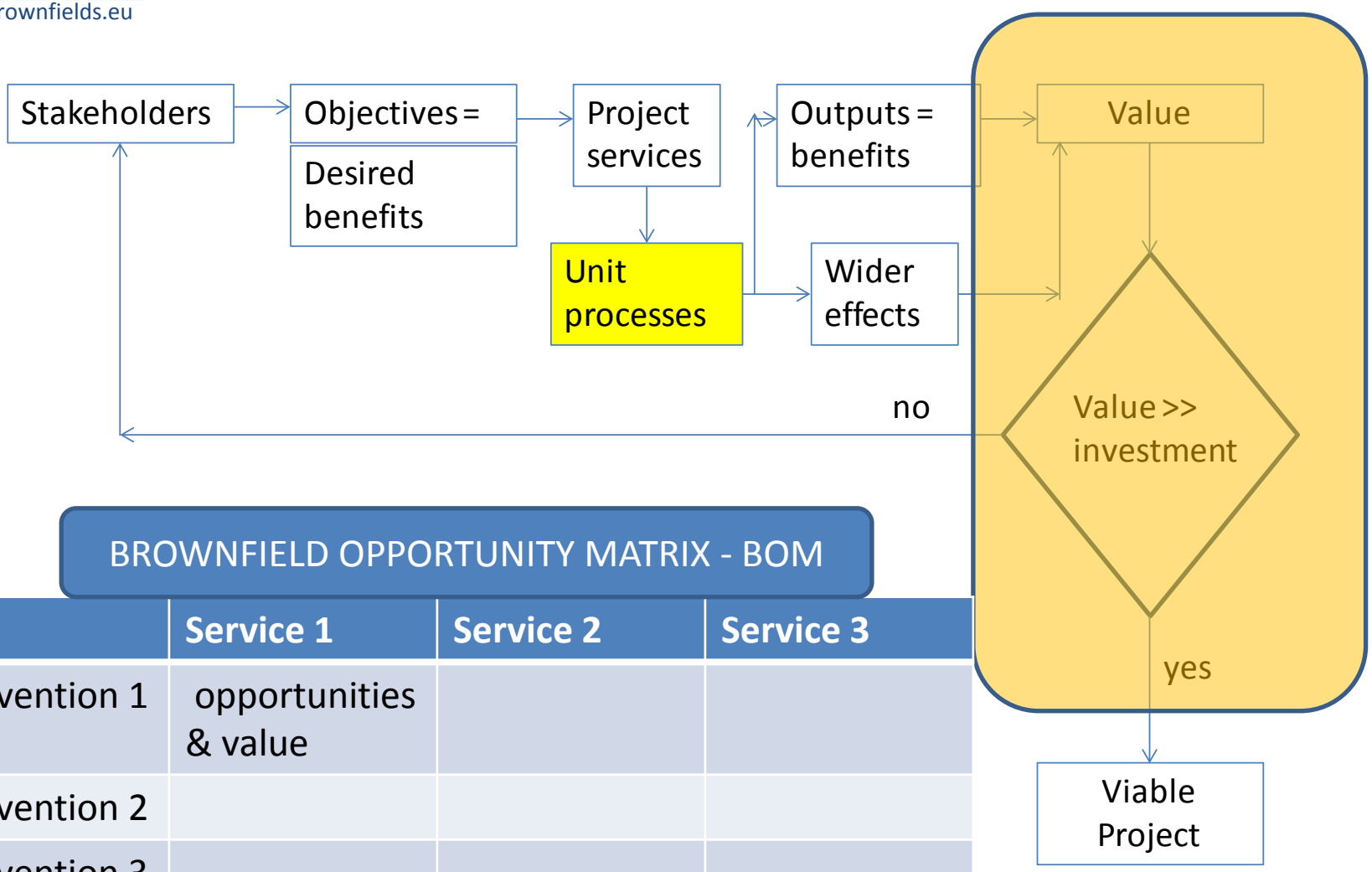

BROWNFIELD OPPORTUNITY MATRIX - BOM

	Service 1	Service 2	Service 3
Intervention 1	opportunities & value		
Intervention 2			
Intervention 3			

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Assisting design with sustainability assessment

- Increasing range of beneficial services identified
- Identifying synergies and trade-offs between different stakeholder goals, avoiding net losses!
- Framework for prioritisation and thresholds
- Avoidance of “nonviable” design
- Note: need for iteration, e.g. →

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Assisting option appraisal

- The conceptual site model provides transparency in
  - Agreeing priority effects to be used as criteria
  - Their aggregation and
  - Setting minimum thresholds
- It links well with multicriteria analyses
- It supports qualitative, semi-quantitative, quantitative and mixed approaches (e.g. cost effectiveness assessment)
- Good practice is to always include a no action scenario (even if this does not meet thresholds)

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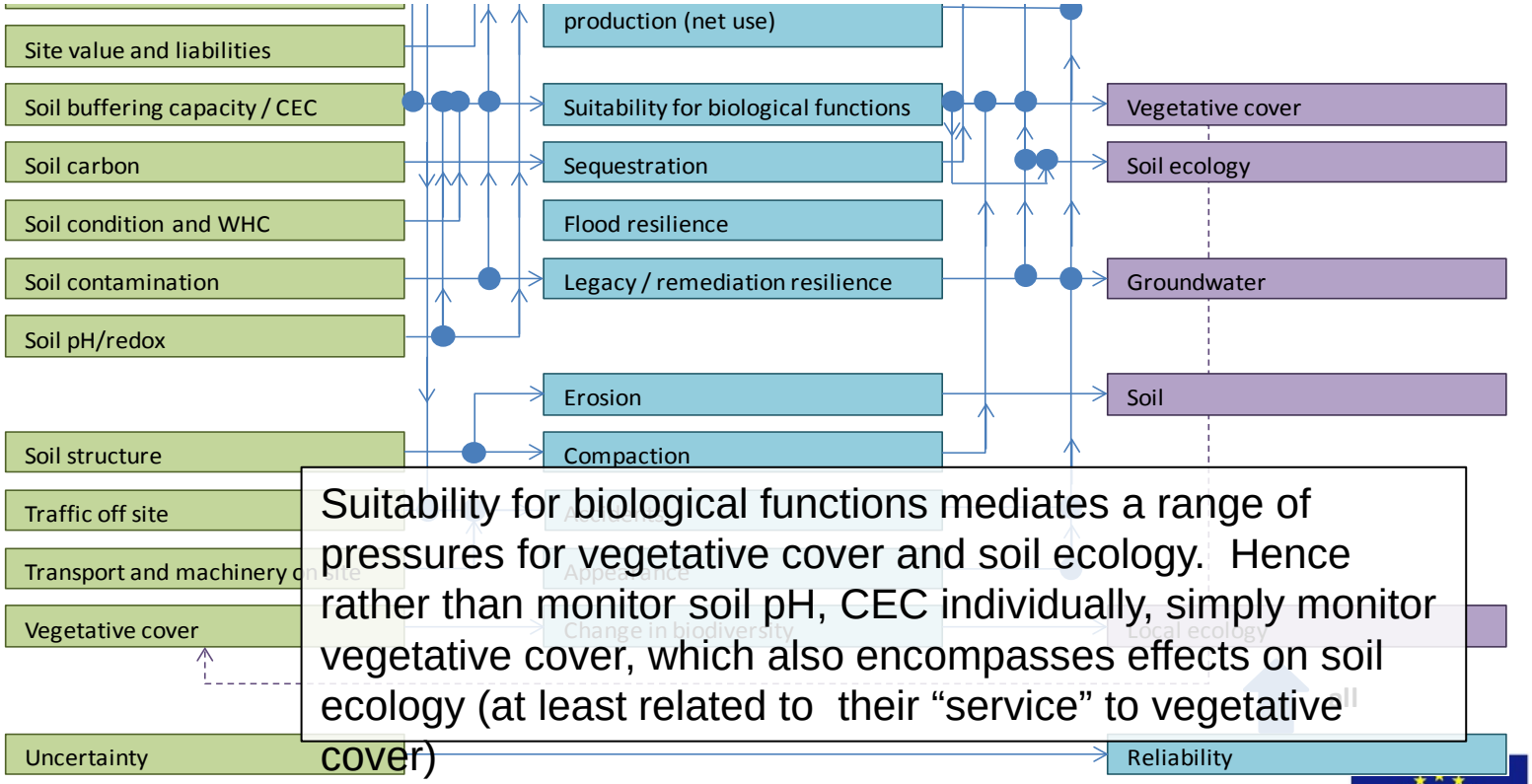
Assisting verification

- rationale for verification indicators
- rationale for avoiding unnecessary monitoring



Suitability for biological functions mediates a range of pressures for vegetative cover and soil ecology. Hence rather than monitor soil pH, CEC individually, simply monitor vegetative cover, which also encompasses effects on soil ecology (at least related to their "service" to vegetative cover)

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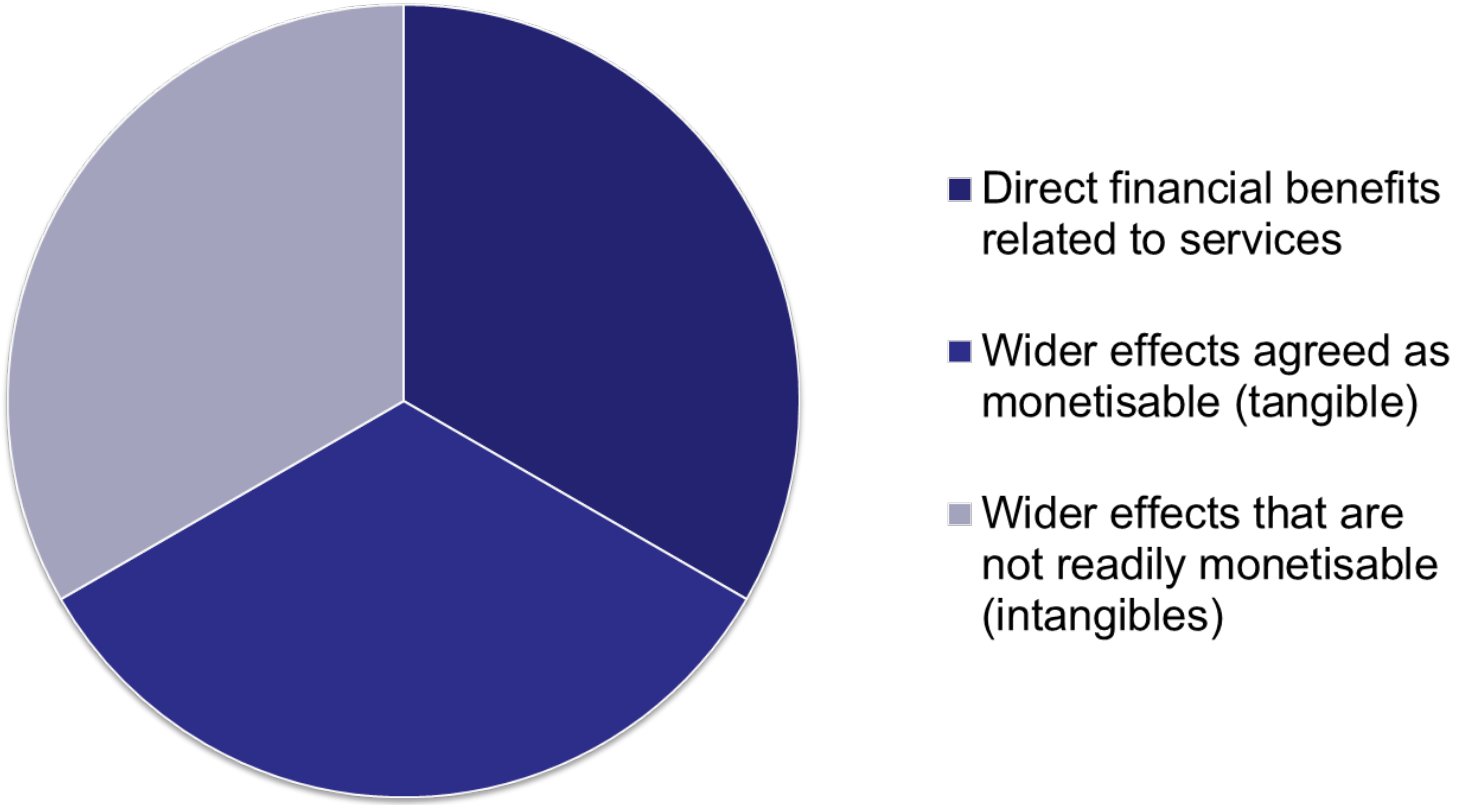
Sustainability linkages and value; defining “overall value”



Individual linkages can be assigned to these different classes in a transparent way

Elements of “overall value”

- **DIRECT FINANCIAL VALUE = returns from services such as site value increase, revenues; vs direct costs**
- **TANGIBLE WIDER VALUE = economically visible wider sustainability benefits and impacts (e.g. wider property value enhancement, costs of impact mitigation)**
- **INTANGIBLE WIDER VALUE = wider sustainability benefits and impacts where monetary value is not easily agreed by stakeholders.**

- **“Goodwill”, but this is different for each stakeholder**

Monetisable - CBA

MCA

CBA?

Cost effectiveness analysis

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CONCLUDING REMARKS

- CLARITY, A MEAN OF DOCUMENTING AND ILLUSTRATING SUSTAINABILITY OBJECTIVES
- REDUCES COMPLEXITY, ELIMINATES DUPLICATIONS
- AVOIDS CONSIDERATION OF IRRELEVANT PRESSURE ON SUSTAINABILITY, ONLY PRESSURES LINKED VIA MECHANISM TO A RECEPTOR QUALIFY
- SIMPLIFICATION OF SUSTAINABILITY ASSESSMENT – LIMITS ASSESSEMENT CRITERIA TO THE COMMON PRESSURES
- PROVIDE A RATIONALE FOR THRESHOLDS LINKED TO BOTH SUSTAINABILITY LINKAGES AND PROJECT SERVICES
- PROVIDES A CLEAR RATIONALE FOR OPTIMISING EFFECTIVENESS OF MONITORING AND VERIFICATION OF SUSTAINABILITY
- HELPS STAKEHOLDER COMMUNICATION ON SUSTAINABILITY BOUNDARIES (TIME, SCALE)
- SUSTAINABILITY LINKAGES CAN BE ASSIGNED TO VALUE CLASSES

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THANKS FOR YOUR ATTENTION

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