

Soft re-use of Brownfields: Decision support and the Brownfield Opportunity Matrix

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In this presentation:

The implementation of soft re-use during brownfield regeneration is often difficult.



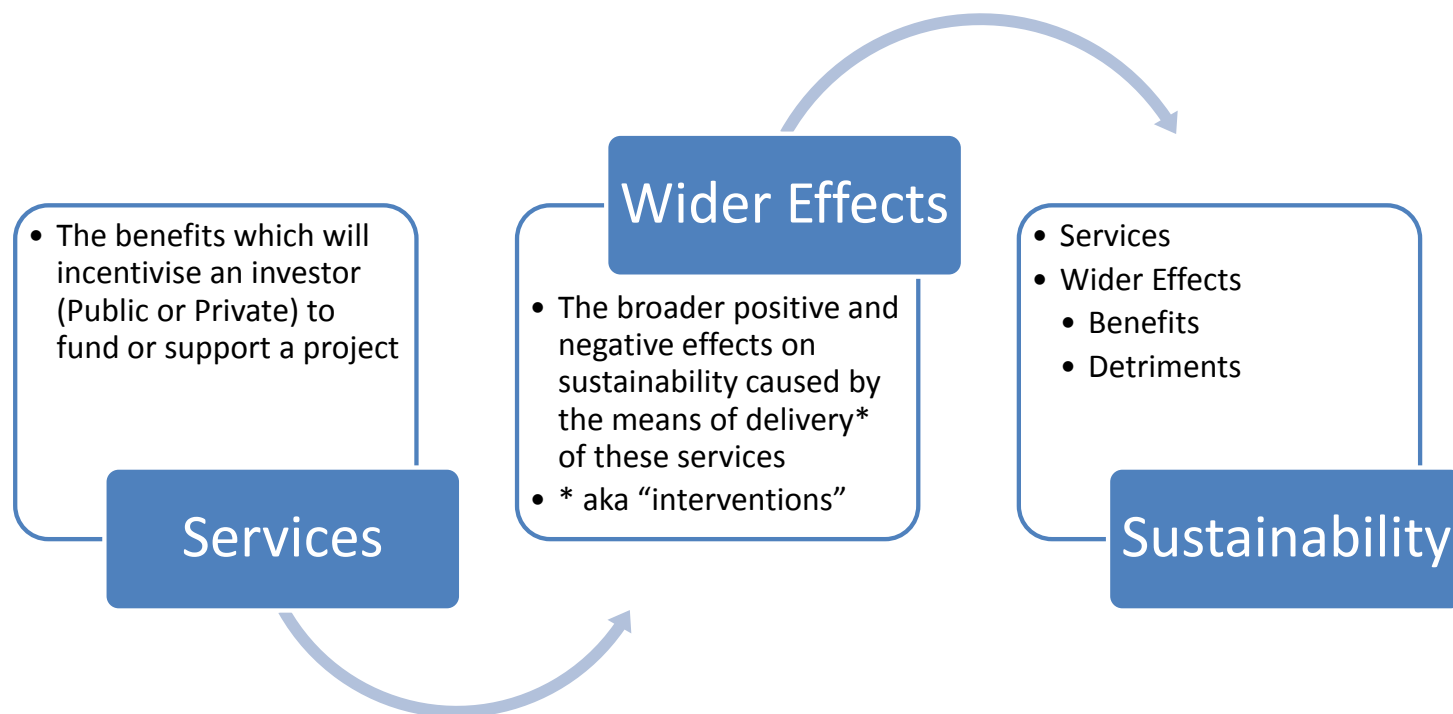
There is still a (knowledge) gap between 'What do I want?' and 'What can I do?'

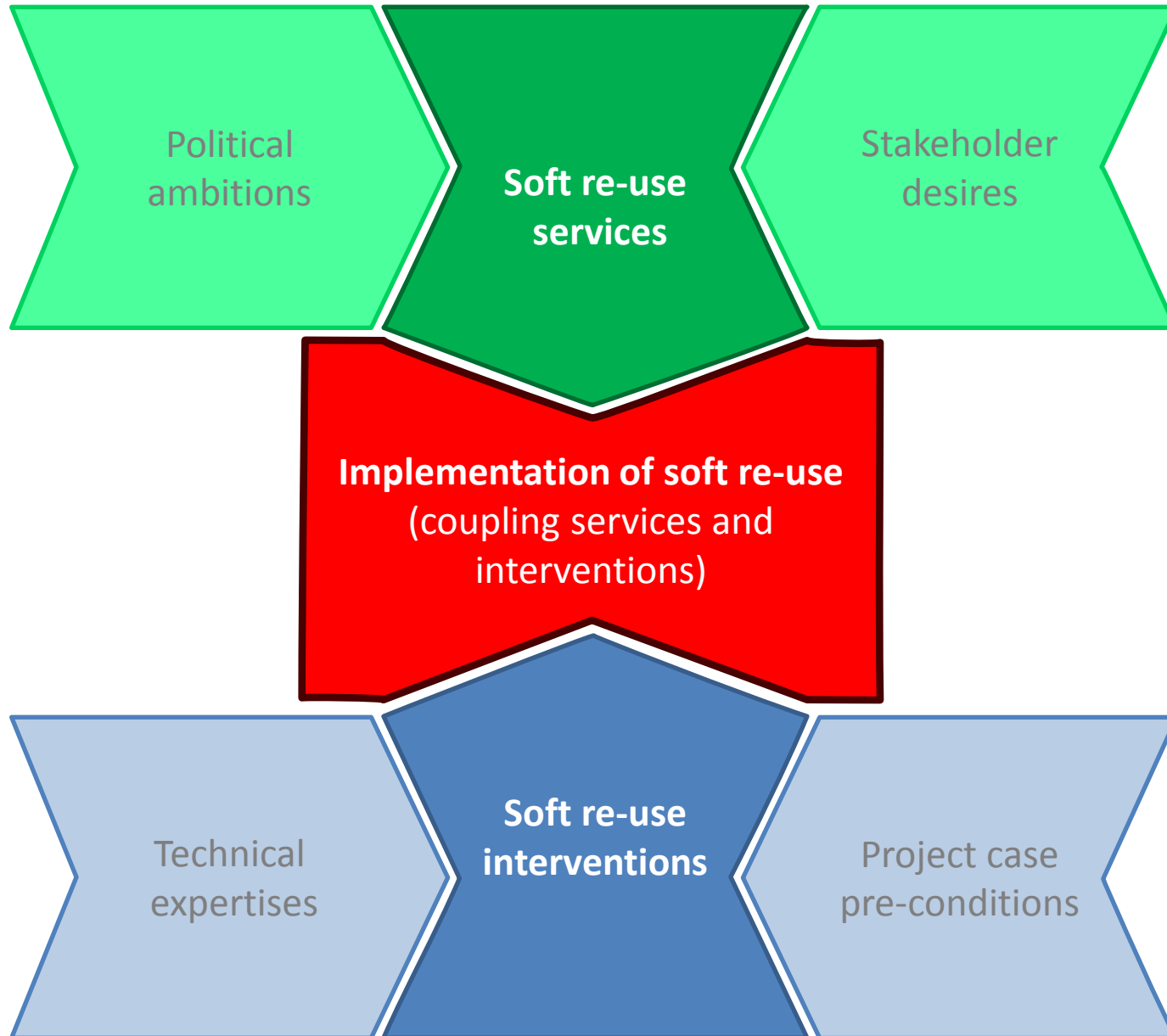
Coupling 'Soft re-use services' with 'Soft re-use interventions'



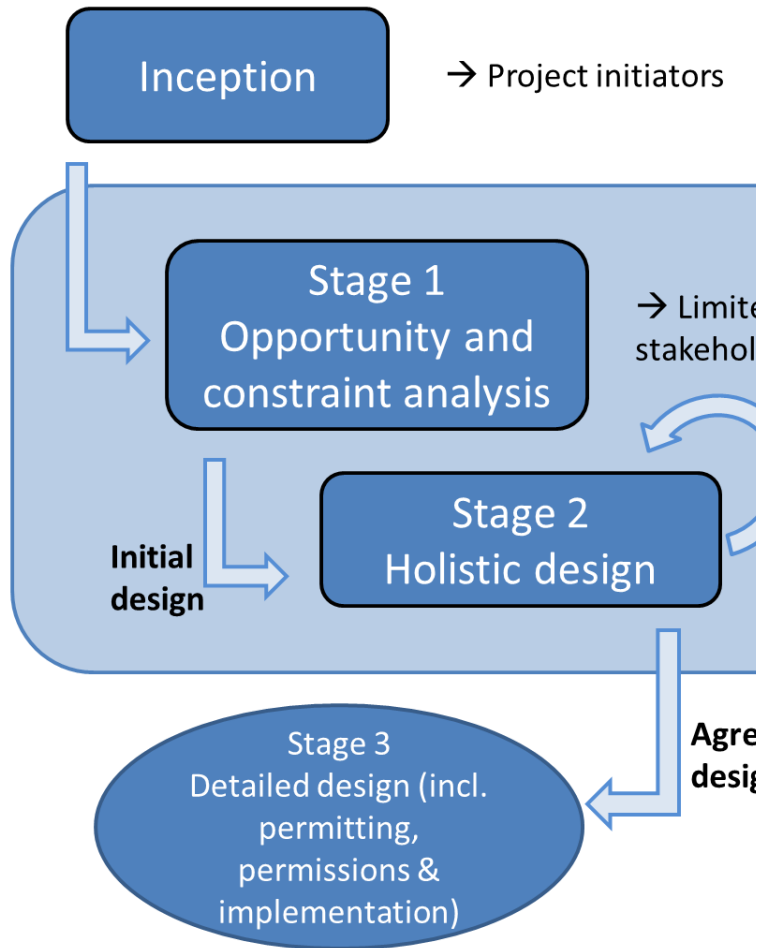
How to use this knowledge in a regeneration process?

Interventions facilitate services, but also wider effects!

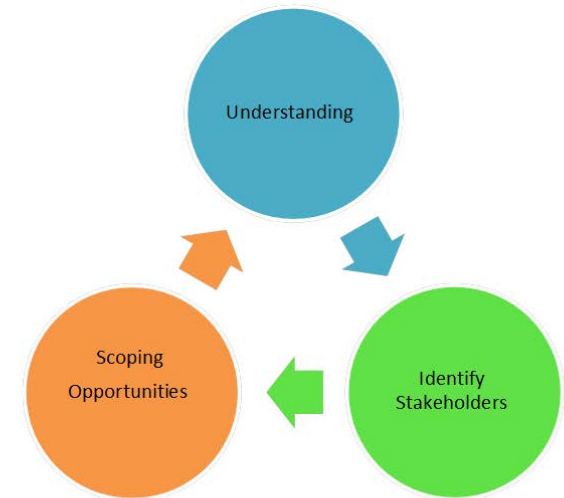




Possible process for re-design of a Brownfield



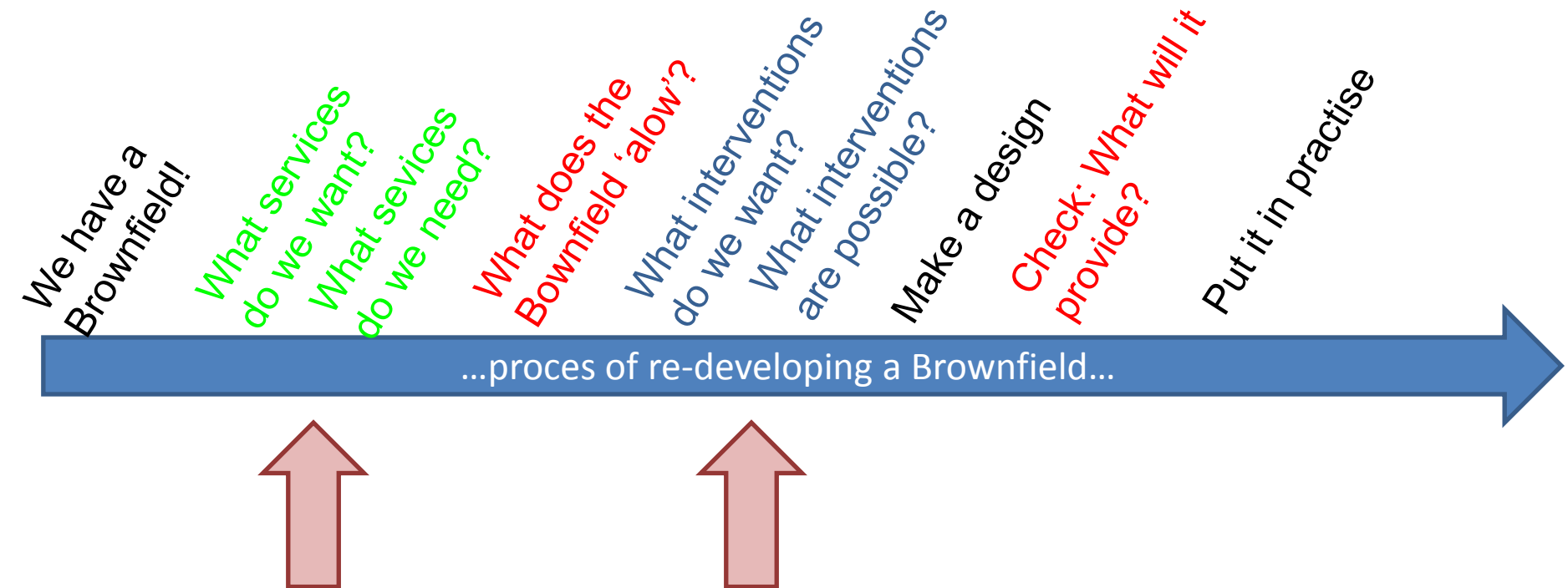
Stage 1 activities



Stage 2 activities



Where is this gap between *'What do I want?'* and *'What can I do?'*?



Brownfield Opportunity Matrix

The opportunity matrix plots Soft Re-use

IN Inter the	Soft re-use	Service 1	Service 2	n ate
	Intervention 1			er
	Intervention 2			

The goal is to encourage redevelopment of Brownfield land so that it re-enters the land-use cycle.


Who is the Matrix for?

- Land owners
- Potential investors
- Local Authority/Government
- And so on...



Soft re-use interventions

Level 1	Level 2	Level 1	Level 2	
Gentle Remediation Options (GRO)	Phytoremediation	Implementing Green Infrastructure	Ecological Engineering	
	Amendment Addition		Biodiversity and Environmental Management	
	Natural Attenuation of Groundwater		Conservation	
Other Remediation Options	Ex Situ Remediation	Renewables	Producing Renewable Feedstock's	
	In Situ Remediation		Energy Generation	
	Traditional Remediation Options	Sustainable Land Planning and	Development Of Amenities	
Soil Management Activities	Re-naturalization of soil	Soft re-use	Service 1	Service 2
	Amendment Addition	Intervention 1		
Water Management Activities	Attenuation Of Contaminated Surface Waters	Intervention 2		
	Flood/Drainage Engineering	Development towards Zero Brownfields		



Development towards Zero Brownfields





Soft re-use services

Level 1	Level 2	Level 1	Level 2
Risk Mitigation of Contaminated Land and Groundwater	Biosphere (including protection of Human Health)	Provision of Green Infrastructure	Enhancing Ecosystem Services
	Hydrosphere (protection of water resources/environmental receptors)		Enhancing Local Environment
Soil Improvement	Soil Fertility	Mitigation of Human Induced Climate Change (global warming)	Renewable Energy Generation
	Soil Structure		Renewable Material Generation
Water Resource Improvement	Water Resource Efficiency and Quality		
	Flood and Capacity Management		
	Rehabilitation of Water		
Soft re-use		Service 1	Service 2
Intervention 1			
Intervention 2			



Brownfields Opportunity Matrix			Service level		Services																						
			Level 1	Provision of Green Infrastructure		Mitigation of Human Induced Climate Change (global)												Service Significance Information									
A high level matrix designed to develop opportunities in brownfields			Level 2	Enhancing Ecosystem Services	Enhancing Local Environment	Renewable Energy Generation	Renewable material generation	Greenhouse Gas Mitigation	Amenity				Economic Assets														
Intervention level	Level 1	Examples	Protection of habitat and biodiversity (where existing and for developing new habitat and increasing biodiversity)	Improve urban soundscapes and air quality	Limiting visual intrusion by landscaping (buildings, transport)	Urban Climate Management (such as mitigation of urban heat island)	Energy for on-site use	Energy for off-site use	Supply to an integrated energy mix	Biofeedstocks (for biofuel/gas/plastics)	Re-use of organics	Reduced GHG Emissions	Carbon Sequestration	Open Space	Leisure	Education	Improved health and wellbeing	Access (footpaths, cycle routes)	Tourism	Community Centre	Views and viewpoints	Framing Built Developments	Grazing	Job Generation	Land value recovery over time	Area value uplift	Interim land management
Interventions	Renewables	Energy Generation Geothermal/Ground Source Biomass Energy Creation (e.g. Wood, biofuel, Biogas etc) Photo-voltaic/solar panels for power generation and heating water Wind turbines	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺
	Sustainable Land Planning and Development	Development of Amenities Landscape planning and development Leisure design, development and management Educational Facilities Facilities, fencing, paths, paving and other	☺ ☺ ☺ €	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺	€ ☺ ☺ ☺

High Level Operating Window (HLOW)

ISICs and Opportunity Windows



Brownfield Land Valorization Opportunity Matrix			Service level		Services																																																																																																																																																																																																																																																																																																																																																				
			Level 1	Level 2	Risk Mitigation of Contaminated Land and Groundwater		Soil Improvement		Water Resource Improvement			Provision of Green Infrastructure			Mitigation of Human Induced Climate Change (global warming)			Socio-Economy Benefits																																																																																																																																																																																																																																																																																																																																							
			Bioremediation (including human health)	Water Resource (Hydrological)	Fertility	Soil Structure	Increased risk (e.g. for polluted) removal	Flood Management	Rehabilitation of water	Enhancing Ecosystem Services		Enhancing Local Environment	Renewable Energy Generation	Renewable resource generation	Overhead Gas Mitigation	Amenity			Economic Assets																																																																																																																																																																																																																																																																																																																																						
Intervention level	Level 1	Level 2	Examples	Human Health Protection	Pollution of Energy	Surface Water Treatment (Local Water Draining for A&P and protection Groundwater Treatment and Protection)	Managing the Water and Pollution Risk and ability to respond to natural and human induced risk	Improving soil structure and fertility	Improve soil moisture	Preventing degradation cover	Mitigation measures for local climate and weathering	Enhanced Groundwater Recharge	Surface Water Storage	Retention of water	Stockpiling (incorporating vegetation)	Other water storage	Transfer water to local	Local water to network	Renewable energy and for production (e.g. Development of local and cross area sustainability)	Engage urban stakeholders and air quality	Setting local restoration objectives	Urban Green Management (such as mitigation of urban heat island effect)	Energy for on-site use	Support for integration and B2B	Bioremediation (the natural process of plants)	Reused of parks	Reduction of GHG Emissions Carbon Sequestration	Open Space	Leisure	Improved health and well-being	Access (topography, cycle routes)	Transects	Community Facilities	Visitors and Employment	Franchising/Development	Overhead	Job Generation	Land value recovery over time	Area value uplift	Income and investment																																																																																																																																																																																																																																																																																																																	
Interventions	Gentle Remediation Options	Phyto-Remediation	Phyto-extraction Phyto-stabilisation Phyto-containment Phyto-filtration Phyto-degradation/stimulation	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€ € € € €	€

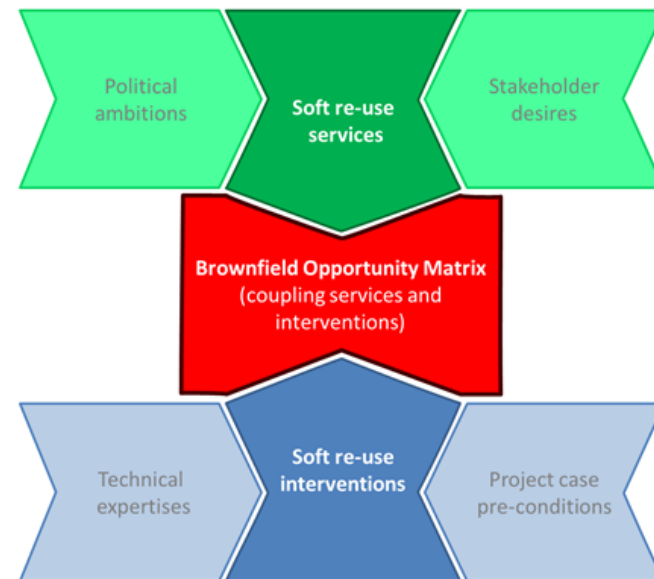
Opportunity Windows

Opportunity Windows provide relevant information using a range of exploratory tools relevant within the matrix:

- Advantages/Disadvantages
- Grouping/Compatibility with other services
- Beneficiaries and Value
- Potential Stake Holders

Brownfield Land Valorization Opportunity Matrix			Service level		Services																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
			Level 1		Rehabilitation of buildings		Infrastructure		Urban landscape planning				Management of urban open spaces (parks, playgrounds)				Socioeconomic benefits																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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le Redevelopment towards Zero Brownfields

Service guide



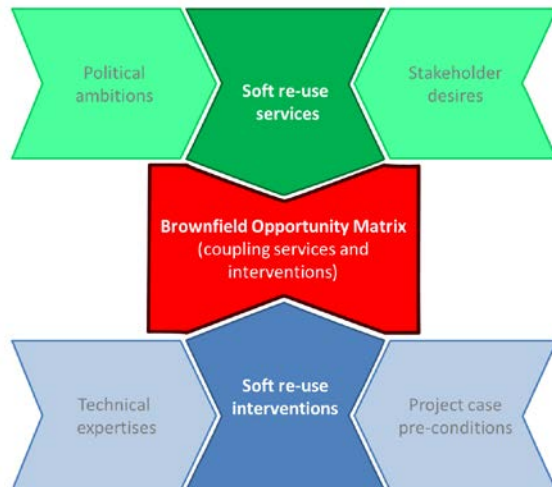
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What are you looking for?		More detailed ambitions
Society and economy		
Ambition: A liveability improvement in the area. Ambition: Economic development of the area.	Group: Socio-Economic Benefits	I want to create open space. I want to create recreation possibilities. I want to create educational elements. I want to attract tourists. I want to improve health and well-being for the neighbourhood. I want to generate jobs. I want to increase the land and area value.
Sustainability		
Ambition: Compensation of global warming	Group: Mitigation of Human	I want to produce sustainable energy for the Brownfield land/or its surroundings. I want to produce bio-fuel, gas, or plastics. I want to produce something while re-using organics. I want to reduce greenhouse gas emissions.

Society and economy

Ambition: A liveability improvement in the area.
Ambition: Economic development of the area.

Group: **Socio-Economic Benefits**



	Group: Water Resource Improvement	I want to create open space. I want to create recreation possibilities. I want to create educational elements. I want to attract tourists. I want to improve health and well-being for the neighbourhood. I want to generate jobs. I want to increase the land and area value.
	Group: Soil Improvement	
	Group: Risk Mitigation of Contaminated Land and Groundwater	

d & Sustainable Redevelopment



What do I want?
What is not possible?

Service
Guide

Brownfield
Opportunity
Matrix

Understanding

Scoping
Opportunities

Identify
Stakeholders

What can we combine?
What is realistic?

Inception

→ Project initiation

Stage 1
Opportunity and
constraint analysis

→ Limited group of
stakeholders

HOMBRE's scope

Potentially
iterative
process

Stage 2
Holistic design

→ Full group of
stakeholders

Initial
design

Agreed
design

Stage 3
Detailed design (incl.
permitting,
permissions &
implementation)

Tailored & Sustainable Redevelopment towards Zero Brownfields

Sustainability
assessment &
valuation

Refining
Opportunities

Brownfield
Opportunity
Matrix

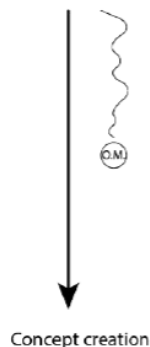
Stakeholder
engagement

Elaboration
(adding detail)

Take home messages

- Bridging the gap between 'What do I want?' and 'What can I do?' = Connecting interventions with services.
- The Brownfield Opportunity Matrix is a tool that shows:
 - Dos and don'ts of soft re-use interventions
 - Which interventions to combine to get multiple services
- The Brownfield Opportunity Matrix can be used in three ways:

Three ways to use the Matrix



- At the start of the process
- During the design
- Evaluative

THANKS FOR YOUR ATTENTION

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