Making B£ST better

Benefits Estimation Tool – valuing blue-green infrastructure

22 April 2020

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INNOVATORS IN FORMPAVE PERMEABLE PAVING a Forterra brand

GeoSmart Information Environmental Thinking

HR Wallingford Working with water

Hydro International

illmanYOUNG

Marshalls Creating Better Spaces

NORTHUMBRIAN WATER living water

METIS metisconsultants.co.uk

SEL

SEPA Scottish Environment Protection Agency Buidheann Dìon Àrainneachd na h-Alba

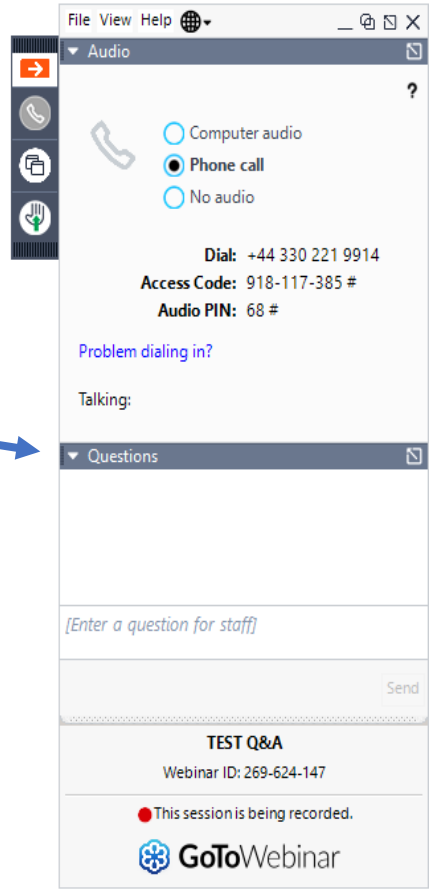
SEVERN TRENT

Stantec

Essex & Suffolk Water a YTL company

How it's going to work

- You've all be muted (sorry!)
- Please use the control panel to ask questions
- We'll also be running a few polls
- We will answer questions after the presentations
- A recording will be available



2020 susdrain SuDS Awards

Have you delivered or approved a great scheme?

So you know someone you'd call a SuDS champion?

We're celebrating:

- Exceptional implementation of SuDS
- SuDS champions

Award categories:

- New-build SuDS (small, and large)
- Retrofit SuDS

Award-winning 'Grey to Green' project

Showcase SuDS & celebrate champions

2018 susdrain SuDS Award winners

Submission deadline:
31 May 2020
bit.ly/2020SuDSAwards

Winners announced:
16 July 2020

Contact:
louise.walker@ciria.org

Making B£ST better

22 April 2020

@sudsulike | #sudsmakesense

Ariennir gan Lywodraeth Cymru
Funded by Welsh Government

Programme

11:05 Welcome and introduction

11:15 An overview of B£ST and key changes in the new version
Bruce Horton, Stantec

11:35 Applying B£ST: A run-through of the tool
Chris Digman, Stantec

11:55 Case study: A partnership-based habitat creation scheme in Surrey
Bruce Horton, Stantec and Viviana Levy, Environment Agency

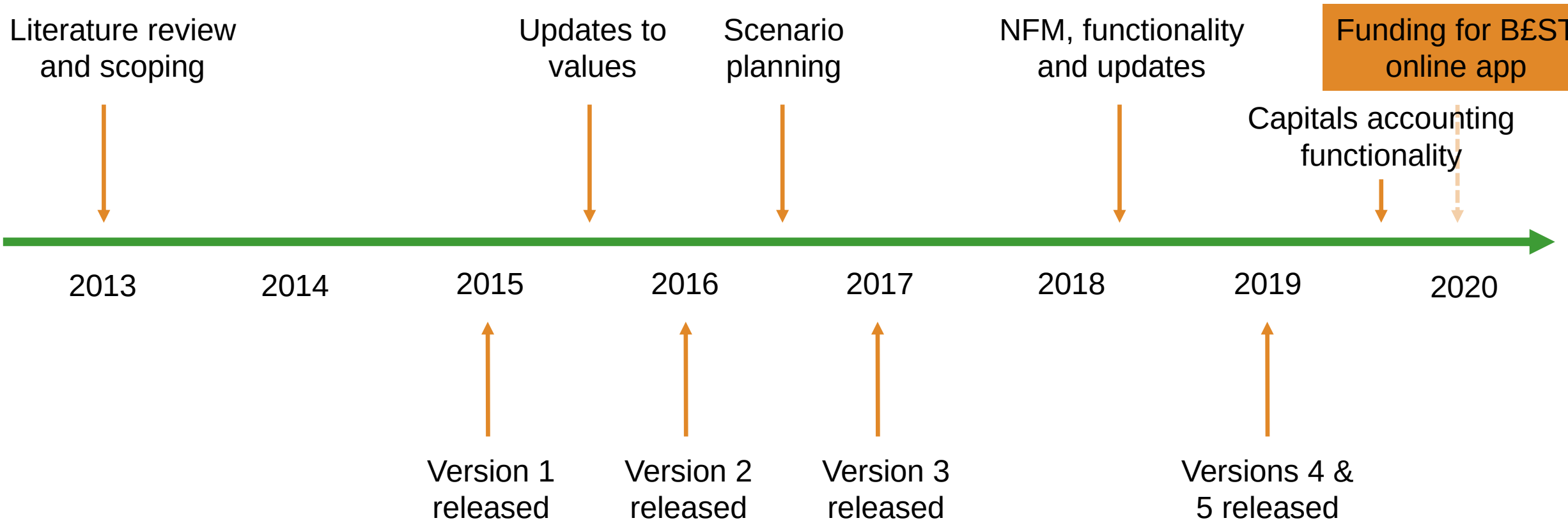
12:15 Live Q&A with Bruce Horton and Chris Digman

Aims of the webinar

- Introduce the 2019 version of B£ST and outline next stages
- Help users appreciate how the tool can be used value benefits for blue-green infrastructure
- Use case studies to demonstrate how to use the tool

About the project

B£ST's journey



B£ST in use

- Steadily grown in the UK
- Around 10,000 downloads
- Water and sewerage companies
- Partnership schemes
- Local authorities
- Used and reviewed internationally
- Supported a greater awareness and benefit assessment

Making B£ST better | project phases

Phase 1

Engagement and review of evidence

- Assess and include new methodologies / evidence related to the outcomes and monetary benefits of blue-green infrastructure (SuDS and NFM)

Phase 2

Capitals Accounting

- Include additional functionality around Capitals Accounting (i.e Natural, Social Capital etc)

Phase 3

B£ST online application

- Develop an online application that enhances usability and uses GIS to improve data entry and spatial presentation of benefits

Time for polls and questions

An overview of B£ST and key changes in the new version

Bruce Horton

Principal Consultant

Stantec

An overview of B£ST and key changes in the new version

susdrain

B£ST

Benefits £stimation Tool for blue-green infrastructure

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Summary

- Freely available spreadsheet-based valuation tool
- Provides estimate of benefits of SuDS and NFM
- Can be applied at programme or scheme level
- Helps to engage stakeholders/potential funders
- Robust, simple to use, best use of available info

The multiple benefits of blue-green infrastructure

download BeST here
susdrain.org/resources/best.html

HEALTH

SuDS can play a role in greening streets, neighbourhoods and cities which can contribute to health and wellbeing. They can improve quality of life by reducing pressure on health services and increasing productivity. **Use of vegetated SuDS can provide as much as £400,000 in health-related benefits per 100 adults.**

RAINWATER USE

Harvested rainwater can be used for everyday use where drinking water quality is not needed eg. watering gardens and flushing toilets. **Collecting rainwater and using it in 1,000 properties can save up to £300,000 for water companies, and provide a similar value to customers through reduced water usage.**

WATER QUALITY

SuDS can improve water quality in rivers and water courses. They reduce water pollutant loads and divert these pollutants from combined sewers that are found in many cities, by reducing overflow spills. **Improving a 1km stretch of watercourse from a poor to moderate water quality classification, can result in benefits of over £250,000.**

FLOODING & BIODIVERSITY

Distributing SuDS across green infrastructure networks can reduce flood risk by intercepting rainfall, holding, conveying and storing surface water runoff. Managing water on the surface can cost significantly less than below ground infrastructure. Through good integrated design, SuDS can deliver other benefits. **The creation of 5,000m² of wetland habitat can provide up to £9,000 of benefits through enhanced biodiversity and habitat connectivity.**

AIR QUALITY & CARBON SEQUESTRATION

SuDS that include trees and vegetation can absorb air pollutants and help to remove noxious gases. **1,000 medium sized trees planted in an area with air pollution can absorb up to 80kg of nitrogen dioxide (NO_2) and store 2,500 tonnes of carbon dioxide (CO_2). Over 50 years this can bring £170,000 benefits from reduced damage to health and sequestered carbon.**

EDUCATION

SuDS provide a rich learning environment for students if constructed within or near to school grounds. **Just 200 students visiting a SuDS scheme every year can provide educational benefits equivalent to £50,000.**

AMENITY

SuDS can enhance the attractiveness and desirability of urban areas. **Property prices can increase by 3-10% and the value of greening streets with SuDS could be worth £25,000 to nearby residents.**

BUILDING TEMPERATURE

Green roofs help manage flooding and pollution. They also keep buildings cool in summer and warm in winter. **An 800m² green roof can generate benefits worth £3,500 by reducing CO_2 emissions, and £6,000 by reducing energy costs.**

GROUND WATER RECHARGE

Infiltrating rainwater into the ground replenishes groundwater. This increases water availability, reduces abstraction and treatment costs. **Infiltrating runoff from five streets, each 200m long, can provide £16,000 of benefits.**

When to use BeST?

Components

A. Evaluation Tool
B. Options Comparison Tool
C. Guidance

Changes in the 2019 version

2015 version	2019 version
SuDS measures	SuDS and NFM measures (BGI)
Evidence up to 2015	Evidence up to 2018
‘Clunky’ spreadsheet	Improved usability and better links to other tools
Ecosystem services and TBL	Natural, social and other capitals
Values in 2014 prices	Values in 2018 prices
19 categories	17 categories - Noise and traffic calming added - Rationalisation of others
Results - Ecosystem services - Triple bottom line	Interactive results dashboard
Detailed info requirements	Simplified requirements and coarse screening
Separate guidance	Integrated help and guidance

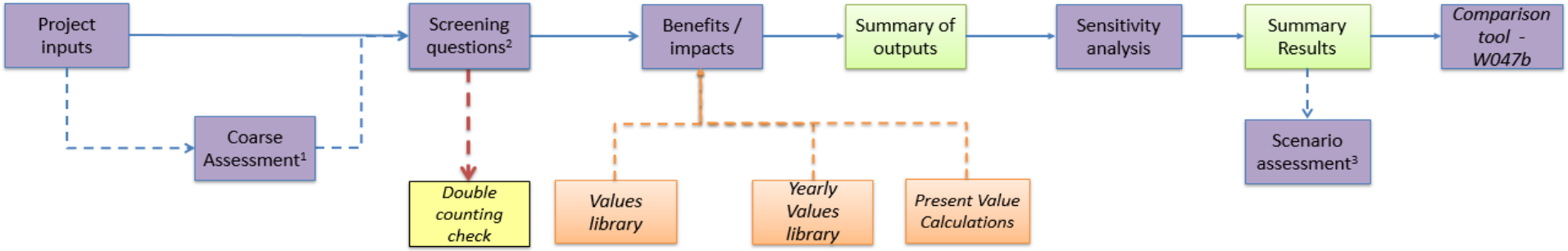
	Benefit categories in 2015 version	Benefit categories in 2019 version
Monetized benefits	Air quality	Air quality
	Amenity	Amenity
	Pumping wastewater Treating wastewater	Asset performance - Pumping wastewater and stormwater - Treating wastewater
	Biodiversity and ecology	Biodiversity and ecology
	Building temperature	Building temperature
	Carbon sequestration	Carbon reduction and sequestration
	Education	Education
	Enabling development	Enabling development
	Flooding	Flooding
	Groundwater recharge Rainwater harvesting	Quantity of water - Flow in waterbodies - Groundwater recharge - Rainwater harvesting
	Health	Health and wellbeing
	-	Noise
	Recreation	Recreation
	-	Traffic calming
	Water quality	Water quality
Non-monetised benefits	Crime	Crime
	Economic growth	Economic growth
	Flexible infra/CC adaptation	-
	Tourism	Tourism
	Traffic calming	-

Integrated workflow & guide along with linked technical guidance

B£ST Workflow & how to Guide

PROJECT DETAILS - No.: insert. Name: insert. Assmt. Version: insert. Date: insert.

B£ST Workflow with links to selected pages.



LEDGEND

Step must be followed

Step may be required or followed

Work sheets to fill in

Worksheets automatically completed

Fill in & for information[4]

For information & support

NOTES:

[1]User may undertake a coarse assessment to gain an indication of benefit value

[2]User selects to open up selected benefits to evaluate

[3]Only completed if undertaking scenario analysis on the option

[4]User can add their own benefit values can update GDP Deflators values

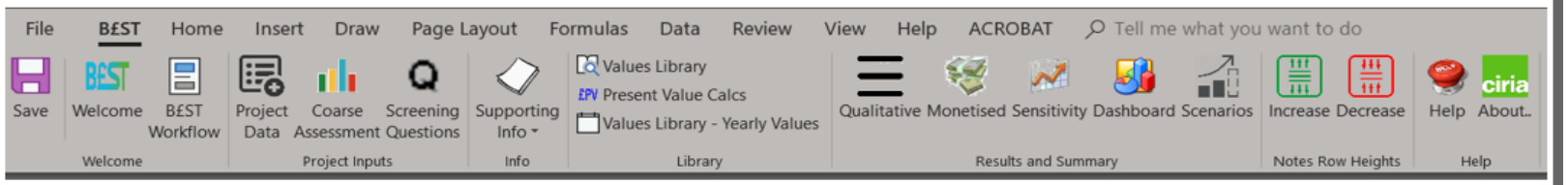
HOW TO GUIDE

B£ST Ribbon

Use the buttons to navigate through the tool.

Press help if programme freezes.

Help button contains links to the guidance and how to contact CIRIA about B£ST.



Getting started. Please refer to the guidance for further information and support to use the tool.

Project inputs

Title	Input Box	Notes
Location name	Killingworth and Longbenton	Type text into box
Development or Location size (nearest Ha)	982	Enter size
Scheme Type	Retrofit	Double click & select from list
Summarise baseline option	**No change**	Enter option summary (MAX 144 Characters)
Summarise proposed option	**Separate surface water from Longbenton Letch and Killingworth Lake**	Enter option summary (MAX 144 Characters)
Baseline option Present Value Cost (if applicable)	**£0**	Enter Cost
Proposed option Present Value Cost	**£6,103,000**	Enter Cost

Coarse assessment

ciria | B£ST guidance - Coarse Assessment Assumptions | **Coarse Assessment** | Export Coarse Asmnt. Info

PROJECT DETAILS - No.: 1, Name: Webinar, Assmt. Version: 0A.

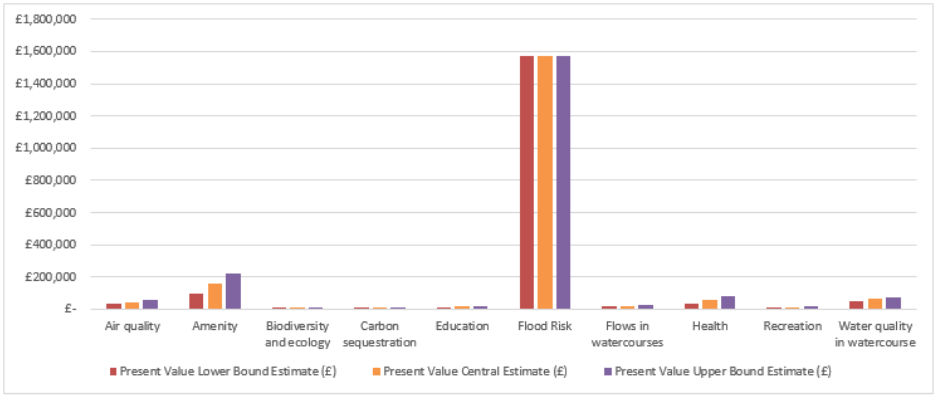
Notes:

This part of the tool gives you an indicative range of benefit values that your scheme may provide. This should not be used to support a business case for investment or to support a funding application. In such case, a detailed assessment using the complete tool should be undertaken.
Whilst we have aimed to keep this part of the tool as simple as possible, please read the questions carefully as the estimates you make have a significant impact on the indicative values. The assumptions used are included in the Technical Guidance.
We have adjusted the values to consider the potential confidence that a coarse assessment can provide, and this is already included within the calculation. These are fixed values.
The timescale for the assessment is over a 40 year period starting from 2020.

Coarse Assessment Results Summary Table

Benefit category	Present Value Lower Bound Estimate (£)	Present Value Central Estimate (£)	Present Value Upper Bound Estimate (£)
Air quality	£ 33,532	£ 45,977	£ 58,423
Amenity	£ 94,077	£ 156,795	£ 219,513
Biodiversity and ecology	£ 288	£ 1,209	£ 2,129
Carbon sequestration	£ 2,111	£ 8,552	£ 14,061
Education	£ 12,887	£ 16,302	£ 19,716
Flood Risk	£ 1,572,307	£ 1,572,307	£ 1,572,307
Flows in watercourses	£ 17,541	£ 21,352	£ 25,163
Health	£ 34,128	£ 56,465	£ 78,802
Recreation	£ 6,378	£ 12,771	£ 19,164
Water quality in watercourse	£ 52,623	£ 64,056	£ 75,489
TOTAL	£ 1,825,872	£ 1,955,786	£ 2,084,767

Coarse Screening Results Summary Graph



Coarse Assessment Data Entry Section. *Estimate the quantity (in the orange boxes) related to the question. Record evidence and reasoning.*

Question	Estimate quantity	Reasons /evidence for the estimated quantity
How many trees are being planted in urban and suburban areas (not as woodland)? Insert the number of trees to be planted.	264	*New trees are being planted as part of this scheme*
How many trees are being planted as woodland?		

Benefit category	Minimum information requirements	Preferred sources of information
Air quality	Size/type of green components in scheme such as the number of trees and green roofs	Local air quality study National Atmospheric Emissions Inventory
Amenity	Number/type of homes/commercial properties and number of people impacted by scheme	Landscape character assessment or landscape visual impact assessment MENE (Monitor of Engagement with the Natural Environment
Asset performance	Change in flows or energy use due to scheme	Pumped flows, pump run times, energy consumption from hydraulic modelWwTW assessment including chemical and energy usage
Biodiversity and ecology	Change in size/type of green and blue space due to scheme	Biodiversity Action Plan or local habitat surveys
Building temperature	Area of green roof / number of trees	Energy management plan and assessment of building operational performance (e.g. using BREEAM In-Use)
Carbon sequestration	Number and type of trees	Carbon management plan
Crime	Non-expert qualitative estimation of potential impacts from scheme	Assessment of change in crime indices or deprivation levels
Economic growth	Non-expert qualitative estimation of potential impacts from scheme	Assessment of value added, job creation, productivity, investment
Education	Number of children engaged or educational visits/talks	Engagement with schools and other educational institutions
Enabling development	Avoided infrastructure costs	Local development plan, water cycle study or sewerage management plan
Flooding	Number of buildings or people impacted by the scheme	Flood risk modelling assessment
Health	Number of homes and number of people impacted by scheme	Health management plan
Noise	Size/type of green components in scheme such as number of trees	Local noise management study
Recreation	Change in number of visits and type of recreation due to scheme	Open space provision assessments in Local Env Action Plans (LEAPs)
Tourism	Non-expert qualitative estimation of potential impacts from scheme	Assessment of change in visitor numbers
Traffic calming	Non-expert qualitative estimation of potential impacts from scheme	Assessment of change in vehicle movements, traffic speed
Water quality	Current and projected water quality status and length/area of waterbody impacted	UPM (Urban Pollution Management) modelling or similar Reason for Failure (RFF) dataset
Water quantity (groundwater recharge)	Volume of water infiltrating to groundwater	Ground water study, water cycle study
Water quantity (rainwater harvesting)	Number of properties, household size, water consumption rates	Water demand / use study
Water quantity (flows)	Current and projected flows in water bodies and length/area of waterbody impacted	Flow modelling assessment

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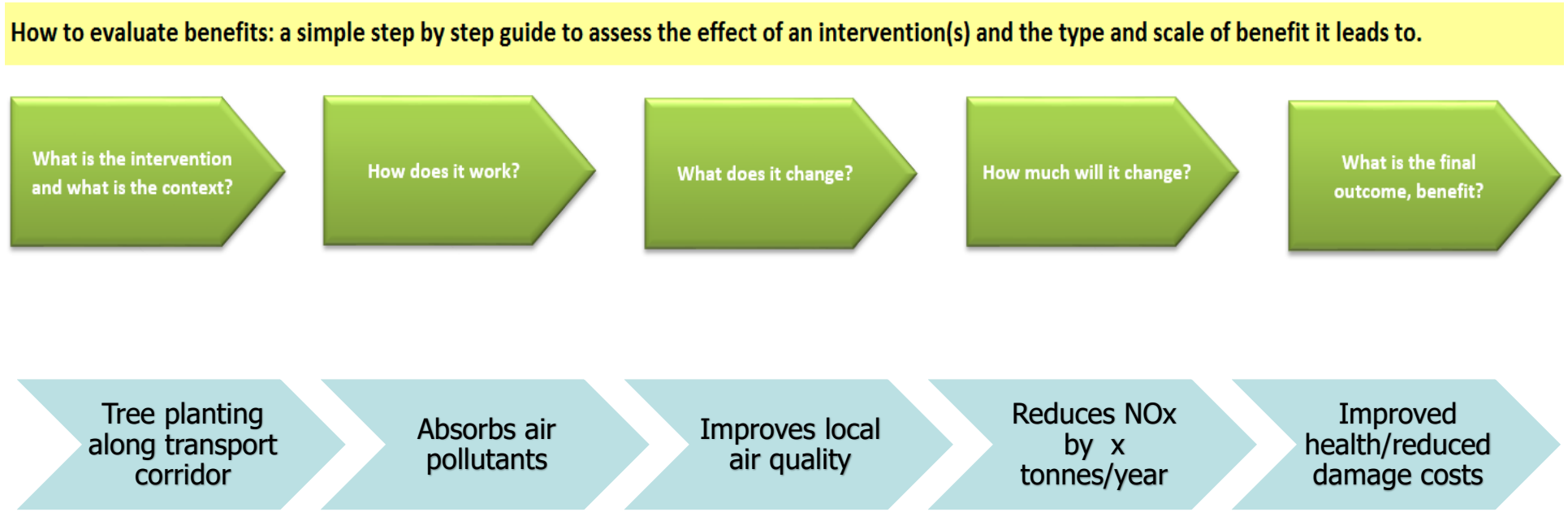
How to evaluate benefits

Based on impact pathway approach



Screening

B£ST guidance - Screening questions | Click to Open Benefit Pages | Screening Questions

PROJECT DETAILS - No.: 1, Name: Webinar, Assmt. Version: 0A.

	Impact	Question	Further aspects to consider	Significance	Evaluate benefits?	Reasons /evidence for choosing the scale of the impact	LINKS
	**Air quality**	Will the scheme also change the level of air pollution?	- Is the site in an air quality management area? - Will the scheme involve green infrastructure (e.g. tree planting, green roofs)? - Is the scheme in a populated area or a transport corridor?	+	YES	*A number of trees are being planted as part of this scheme. Some potential improvement in local air quality as a result of additional planting*	LINK
	**Amenity**	Will the scheme also change the attractiveness of the place	- Does the scheme involve new/improved water bodies, landscaping or greening? - Is the scheme in a populated area, or an area used for recreation, work, commuting, tourism, etc? - Will the scheme components be visible to those living nearby or passing by?	+	YES	*There will be new greening as part of this scheme*	LINK
	**Biodiversity and Ecology**	Will the scheme also lead to a change in habitats for plants and animals	- Will the scheme involve components that may enhance biodiversity and ecology? - Will the scheme create new sites that supports the growth of biodiversity and ecology? - Will the scheme significantly improve connectivity between sites?	+	YES	*Enhanced water quality and increase in flows to watercourse and lake. Provision of GI to enhance connectivity of green spaces.*	LINK

Assessing benefits (amenity example)

Street improvements through greening

Option Description		Estimated no. of residents living in green streets	Select appropriate monetary value description (or enter used defined) £/yr/resident	Quantity	Valuation (£)	Present value before confidence applied	Present value after confidence applied	Confirm the start and end year of the evaluation	
Baseline option	No change					£ -	£ -	Start	End
Proposed option	Separate surface water from Longbenton Letch and Killingworth Lake					£ -	£ -		
					Difference	£ -	£ -		

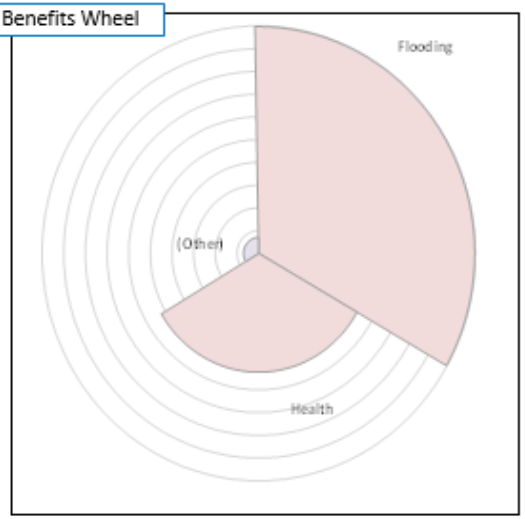
Confirm the confidence you have in the calculation method and valuation

Results dashboard

B£ST Results Dashboard

PROJECT DETAILS - Name: Killingworth and Longbenton, Assmt. Version: 1, Date: Sep 2018.

Benefits Wheel

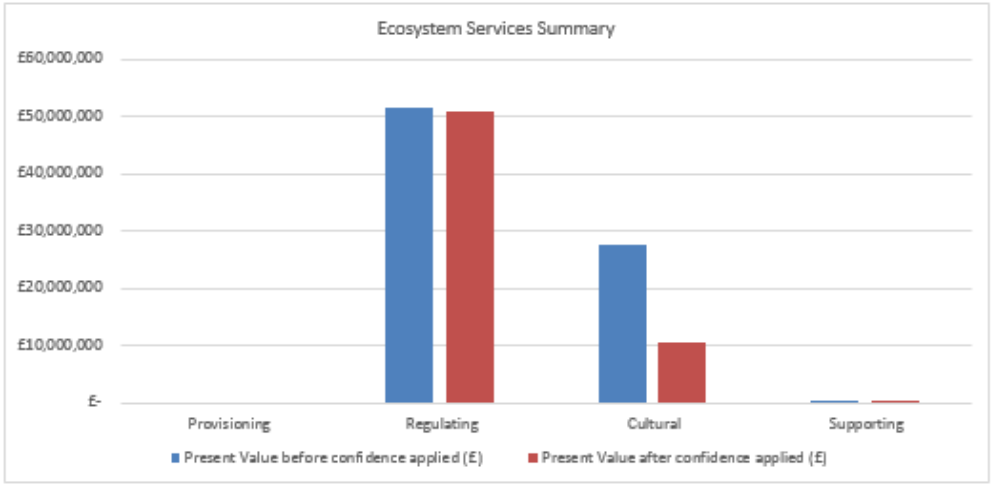


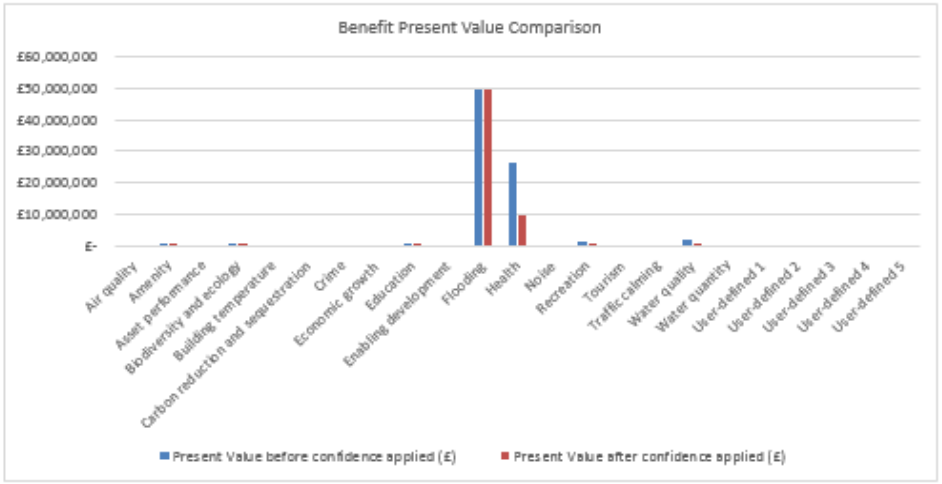
Select the number of benefits (1-10)

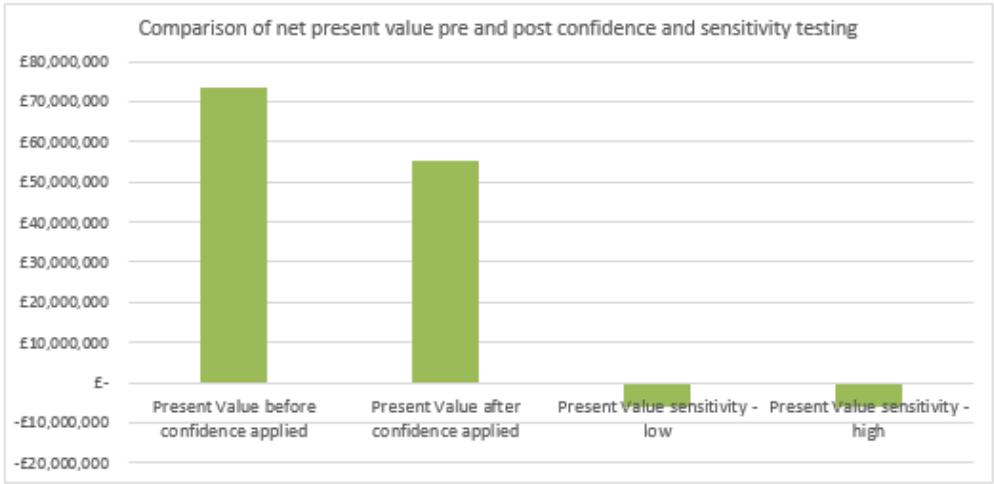
2

Select the present values results

Present Value before confidence applied







B£ST v5 (2019) Capitals Account

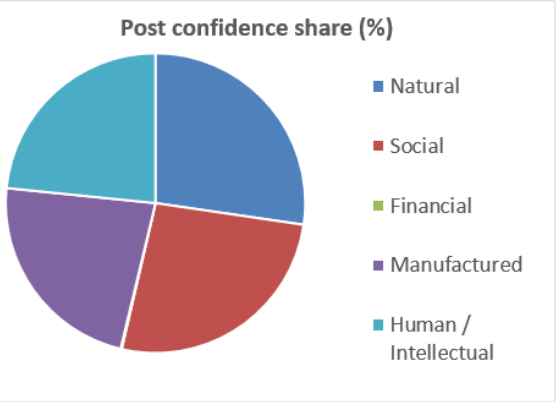
B£ST Capitals Account

Export Information

(Project Details Incomplete)

Asset group	Capital (Present) Value (pre-confidence) (£)	Capital (Present) Value (post-confidence) (£)	Pre confidence share (%)	Post confidence share (%)
Natural	£ 5,854,310	£ 3,323,463	27%	27%
Social	£ 5,696,587	£ 3,203,820	26%	26%
Financial	£ 23,743	£ 13,356	0%	0%
Manufactured	£ 4,945,386.17	£ 2,781,779.72	23%	23%
Human / Intellectual	£ 5,061,797	£ 2,847,261	23%	23%
Gross asset value	**£ 21,581,824**	**£ 12,169,680**		
Liabilities (costs)	£ 5,000,000	£ 5,000,000		
Net asset value	£ 16,581,824	£ 7,169,680		

Note: Where a category applies to more than one type of capital, the values above are allocated based on the values held with the "Capitals Distribution" sheet.



Asset Values Pre-Confidence

For fuctionality, this page is not locked - do not change the equations in the green cells

Assets	Capital (Present) Value (pre-confidence) (£)	Pre Confidence Share of each asset as a % of the total	Percentage distribution of each Capital per asset (Pre-Confidence)				
			Natural	Social	Financial	Manufactured	Human/Intellectual
Air quality	£ 16,318	0%	50%	50%	0%	0%	0%
Amenity	£ 626,631	3%	0%	100%	0%	0%	0%
Asset performance*	£ -	0%	0%	0%	0%	0%	0%
Biodiversity and ecology	£ 8,501	0%	100%	0%	0%	0%	0%
Building temperature	£ -	0%	0%	0%	0%	0%	0%
Carbon reduction and sequestration**	£ 70,682	0%	100%	0%	0%	0%	0%
Crime	£ -	0%	0%	0%	0%	0%	0%
Economic growth	£ -	0%	0%	0%	0%	0%	0%
Education	£ 185,335	1%	0%	50%	0%	0%	50%

... Summary of outputs-Qualitative | Summary of outputs - Monetised | Capitals Results Summary | Sensitivity Analysis | B£ST Results Dashboard | B£ST Capitals Account | Preser ...

Available case studies

- Three updated
  - Managing flood risk in Killingworth and Longbenton
  - Reducing CSO Spills in Roundhay
  - Glasgow City Centre Surface Water Management Plan
- Two new
  - Clothworkers Wood NFM
  - Burpham Ct Farm Sustainable Alternative Natural Greenspace

Time for polls and questions

Applying B£ST: A run-through of the tool

Chris Digman
Technical Director
Stantec

Time for polls and questions

Recorded case study: A partnership-based habitat creation scheme in Surrey

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Viviana Levy
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Time for polls and questions

Making B£ST better – your questions

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NORTHUMBRIAN WATER living water

METIS metisconsultants.co.uk

SEL

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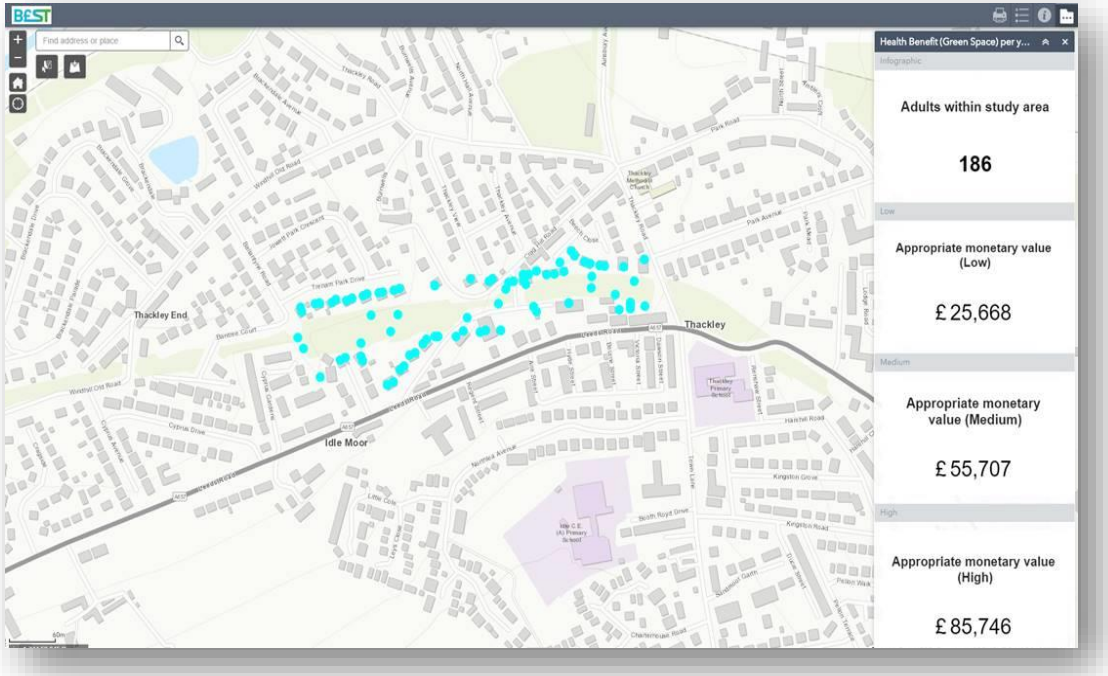
Next steps…B£ST online application



- Want to get involved?
- One of the best tools to value BGI
- Benefits:
  - Early access to outputs:
    - Evidence
    - Guidance and tools
  - Support using B£ST
  - Steer B£ST development

2020 susdrain SuDS Awards

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We're celebrating:

- Exceptional implementation of SuDS
- SuDS champions

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Winners announced:
16 July 2020

Contact:
louise.walker@ciria.org

Making B£ST better

www.susdrain.org/resources/best.html

- The tool
- Guidance
- Case studies
- Other resources (evidence etc)