

Investing in urban underground space –

Maximising the social benefits

Blue Paper

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This paper has been prepared by Think Deep UK and follows a workshop on the social value of urban underground space, which was attended by a cross-section of industry experts including urban planners, economists, geotechnical engineers, geologists, tunnellers, public servants and researchers.

The aim of this paper is **to make the social value of urban underground space more visible in London**. It considers how social value is defined and measured, how it applies to underground space and how we might re-define business cases and planning approaches to include social values. A series of key findings and recommendations are made.

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# Executive summary

The Public Services (Social Value) Act 2012 requires those that commission public services to deliver wider social, economic and environmental benefits, however [social value itself is not clearly defined and less still is understood about the benefits and values associated with underground space](#). Our workshop asked participants from a range of industries to reflect on the intrinsic values, environmental services, and competing demands associated with underground space and resources.

The workshop found that although the term social value could be better and more consistently articulated (with many different definitions, frameworks, guides and policy documents on the subject), timing is more important than language. Early stage consultation with community-led engagement can refocus project development away from purely economic endeavours to a more socially inclusive process. [Discussing social value in the early stages of a new project is also critical to avoid missed opportunities and help unlock development potential](#). Industry experts highlighted individual successes where public consultation had led to enhancement of social value accompanied by financial savings.

Underground development is currently viewed as problematic and potential benefits are not highlighted sufficiently. The challenge to balance individual preferences, community benefits and national interests is acknowledged as is the trade-off between long-term benefits, and short-term costs. [Developing an evidence-base of the social benefits and impacts is considered key, to explain the value of underground space utilisation and to make the benefits more visible. In this way the full potential of underground development, which may have a higher initial cost but greater long-term benefits and fiscal impact, can be realised](#).

The principal drivers that currently exist to evaluate social value for large infrastructure projects tend to be focused on cost and risk. This approach is too restrictive, as from the outset of a project the social value assessment becomes intimately linked with the cost-benefit analysis and the design life of the scheme. As such, only the tractable, evidence-based social benefits can be easily accounted for. [We suggest that social value frameworks must be flexible enough to incorporate qualitative measures of value, across different timescales such that long-term benefits and broader societal needs of future generations are planned for](#).

For social value to become a meaningful concept that advances sustainable subsurface development, we need:

- A framework defining social value to create a base for early discussion.
- A collection of case studies, with information about how social benefits were described and accounted for along with the potential concerns expressed by stakeholders and the public.
- A strategy to assess potential long-term benefits of subsurface interventions and weigh them against short-term considerations.

These tools would allow more meaningful discussion between all parties at all stages of a project and help to decide in each case whether underground space utilisation is the best option over use at surface.

*“We need to consider the macro environment and wider social enhancement associated with underground urban development. It can help generate fiscal growth and act as a catalyst for new technology and innovation”*

# What is social value?

Social value is the contribution that projects and investments make to society. It results in a positive impact to people's lives.

## Social value is not clearly defined in practical terms.

There are many different definitions for social value, and a multitude of frameworks, guides and policy documents for social value assessments which generate confusion and ambiguity in its application.

Some define social value in its narrowest sense and consider only societal impact, other definitions embrace environmental and economic benefits. Some encourage economic valuation and financial indicators to measure social value whilst other adopt more qualitative measures.

The Public Services (Social Value) Act was introduced in 2012 as a means to evaluate the social value of new public services. It requires the social, economic and environmental benefits of the public services to be

considered at the commissioning (pre-development) stage in order to design better services and find innovative solutions to maximise the potential benefits. Large government projects will often adopt a 'Benefits management' framework to reflect this. The act only applies to public services but 'social value' as a concept is increasingly being applied by both public and private bodies across the infrastructure sector and wider built environment. However, whilst social value is embedded in the planning process, there is a perception that the rigidity of the assessment frameworks can inhibit the concept of social value being harnessed to enhance collective community benefits.

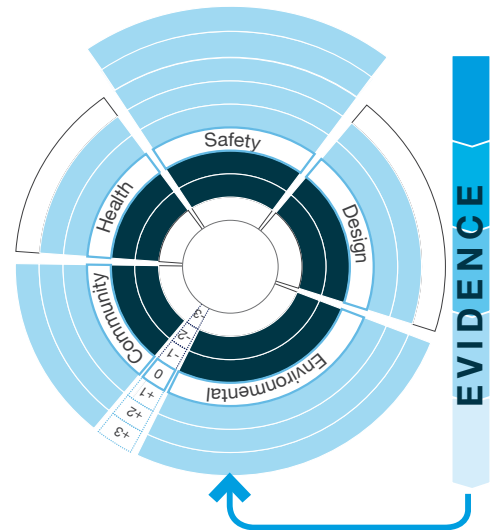
'More sophisticated life cycle and cost benefit analysis could allow us to reflect on the intrinsic values, environmental services, and competing demands associated with underground space and resources'\*

'Social value is still poorly defined, and its assessment is dependent on the team's knowledge and expertise. It is very easy to lose sight of fundamental issues when tackling a concept of this magnitude and complexity'\*



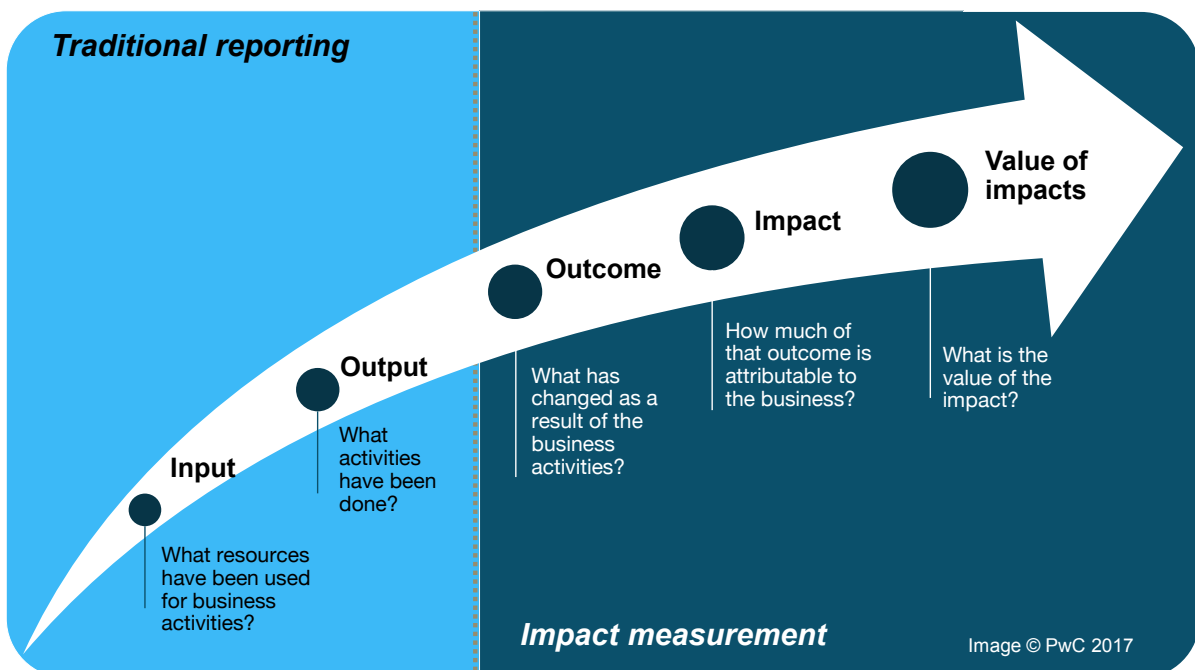
\* Comments made by participants during the Think Deep UK Social Value workshop.

# How can social value be measured?



<p>1. Total assessment of the environmental, economic and social factors</p>	<p><b>The big picture</b> The initial assessment considers the investment or ‘input’ to the project and the ‘outputs’ that are generated as a result of the investment. What is changing as a result of the project? All of the economic, environmental and social factors that contribute to the project need to be identified.</p>
<p>2. What are the impacts and outcomes?</p>	<p><b>Ask the right questions</b> It's important to look beyond the inputs and outputs: What are the outcomes from the project? An outcome is a change that occurs over the longer-term. What impact will it have? What would have happened anyway? Consider who will be effected and at what scale will the impact be felt.</p>
<p>3. Can these outcomes and impact be quantified?</p>	<p><b>What gets measured gets valued</b> An evidence base to monitor and evaluate the change that occurs as a result of development allows the outcomes and impacts to be measured and then valued. Not all indicators of change are monetary, e.g. number of jobs, and area of land protected, are other metrics that could be used.</p>
<p>4. Can the options be adjusted to optimise social value?</p>	<p><b>Value is in the eye of the stakeholder</b> Social value considers the impact on society and peoples lives. It's important to consider the priorities of the project and the stakeholders, consult with them, and identify shared priorities and potential conflicts to deliver a solution that maximises the benefits.</p>

Table adapted from PwC Total Impact Measurement and Management Tool (TIMM) and London Business School Measuring Social Impact: the foundation of social return on investment 2004.



# Why should we value the subsurface?

There is increased pressure on underground space in our cities. Our cities are growing, and with increasing pressure on space, higher land prices and a drive for compact, resource efficient cities, we are seeing greater development underground.

The ground beneath our cities provides a valuable resource for a wide range of applications. Urban underground space can contribute to urban resilience, sustainable growth, liveability and an improved urban environment. In the UK, cities and towns have evolved to use and exploit the urban subsurface in a multitude of different ways, for example for water supply, transport infrastructure, buried utilities, and waste disposal. These different services and functions can be broadly classified as follows:

- source of natural resources
- storage of materials (solid, liquid, gas)
- space for public and commercial use
- space for infrastructure
- medium for foundation for construction
- component in life-support systems
- archive of historical and geological heritage

These subsurface services and functions deliver a range of economic, environmental, social, cultural and

political benefits. In reality subsurface functions deliver multiple benefits, for example groundwater abstraction delivers both economic and social benefits. Despite these multiple benefits the value of underground space is underappreciated; it is not routinely considered in ecosystem service assessments, natural capital accounting or planning frameworks. No market for underground space utilisation exists. The result is that underground space is not planned, engineered or managed in a way to realise its value.

To help unlock the multiple benefits of the ground we need to understand and demonstrate the value of the services it provides. What benefits do we as a society get when we utilise underground space? The Public Services (Social Value) Act requires those that commission public services to deliver wider social, economic and environmental benefits. To apply this effectively for underground space those who commission and undertake assessments need to know the benefits that use of underground space brings, and to have the means to include the value of those benefits within their assessment.



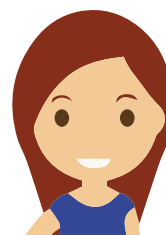
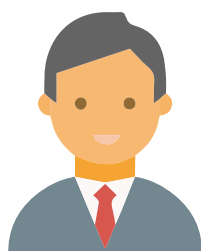
Images ©UKRI 2018

## The key questions

Is investment in underground development preferable to development at surface?

If space limitations in our cities necessitates underground development — how do we maximise the social benefits?

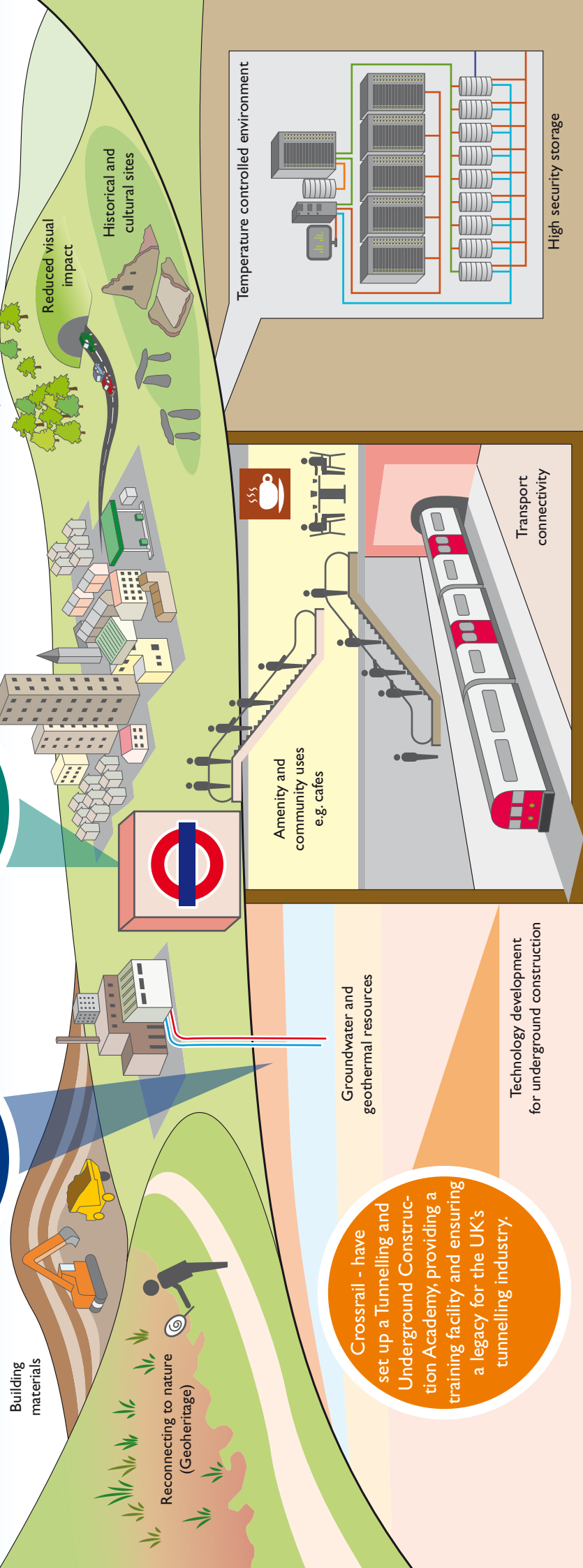
How do we balance individual preferences, community benefits and national interests?



# Social value delivered by urban underground space

Groundwater from the rocks beneath London and the Thames Valley supports 30% of our water supply.

There are 11 underground lines, connecting 270 stations across the capital for up to 5 million passengers a day.



Building materials

Reconnecting to nature (Geoheritage)

Crossrail - have set up a Tunnelling and Underground Construction Academy, providing a training facility and ensuring a legacy for the UK's tunnelling industry.

Groundwater and geothermal resources

Amenity and community uses e.g. cafes

Technology development for underground construction

Transport connectivity

Temperature controlled environment  
High security storage

Preservation of surface space

Reduced visual impact

Historical and cultural sites

# Evaluating the social value of urban underground space

## Benefits

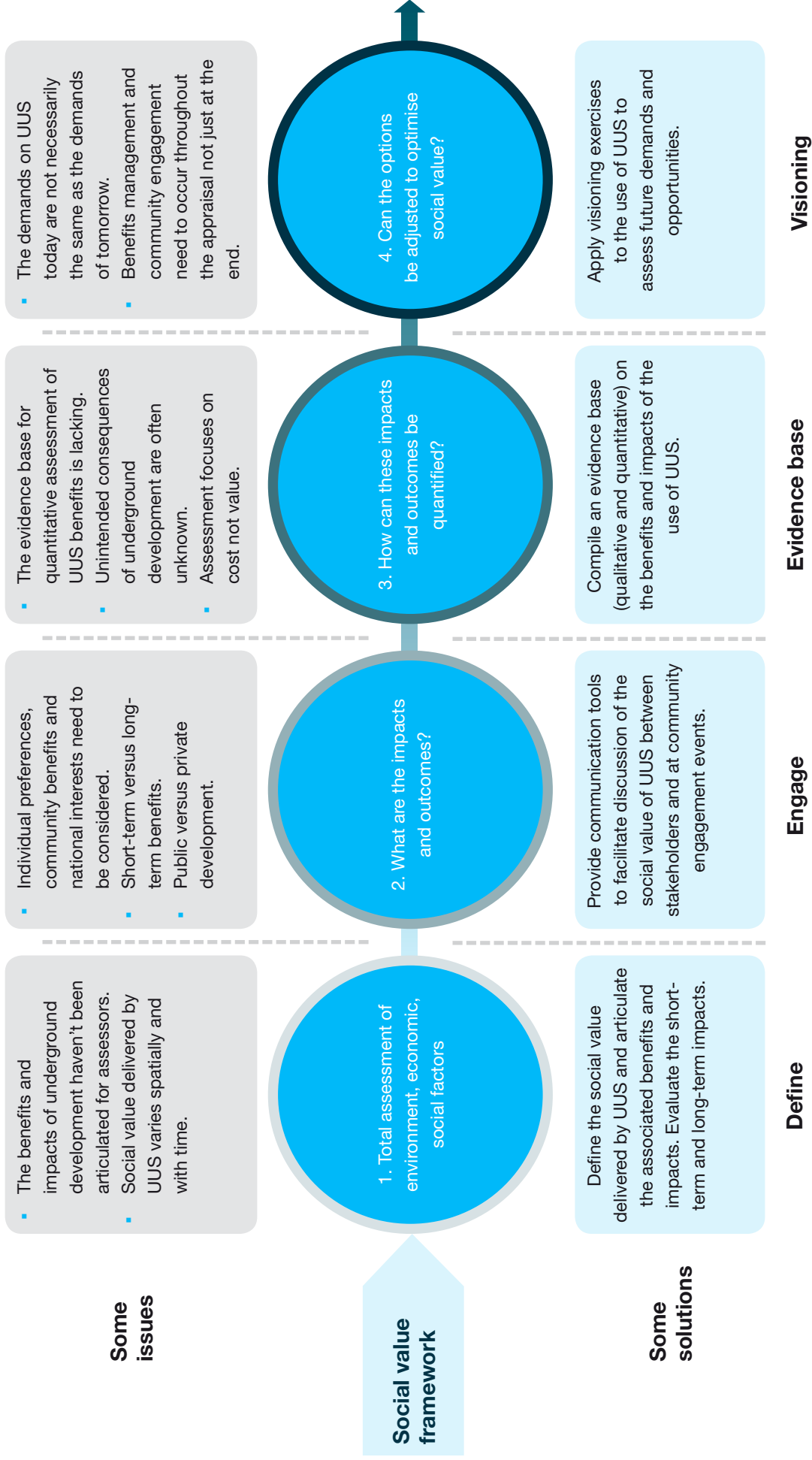
- Utilisation of underground space means that we have more options to make good choices about surface uses that deliver social value — the surface of cities can be prioritised for higher value land uses and needs.
- Inclusion of underground space early on in the planning process permits more effective selection of development options through robust cost-benefit analyses. It would also ensure that stakeholders who already utilise underground space are involved in the consultation process.
- The social value that is delivered by underground space utilisation over the longer-term is often greater than capital expenditure. More sophisticated life cycle and cost benefit analysis will allow us to reflect on the intrinsic values, environmental services, and competing demands on underground space and resources.
- Underground space is an over-looked social resource that will gain recognition if its included in the cost-benefit analysis.
- Smart use of underground space uses can be designed from the outset rather than costly retrofitting later in the project cycle.

## Focus areas

- The social value delivered by underground space needs to be better defined and its effective assessment requires an expert and informed project team.
- There is government support for quantitative measurement of social value; industry must work together with government to ensure that it can be applied consistently.
- The long-term impact and unintended consequences of underground development need to be assessed and should be a priority research area. Underground space is a finite resource that should be managed effectively.
- A robust evidence base to inform future underground development is needed. This includes data about what is there already, and what is being displaced or impacted as well as visions about what might be there in the future.
- Balancing the trade-offs across different spatial and temporal scales. Engaging in national and local politics, communicating with key stakeholders and the public, and adopting multidisciplinary approaches is critical to a successful outcome.
- Underground space is an abstract concept. We need a cultural shift to make underground uses desired and valued. We need to articulate the multiple benefits and forms of value delivered by underground space.
- New innovation and technology must be applied to help realise the full benefits of underground space utilisation.



## How could social value principles be applied to Urban Underground Space (UUS)



# A planned approach

National interests, community benefits, and individual preferences for underground development need to be managed effectively.

The benefits, risks, and limitations of underground development need to be articulated to urban planners and embedded in the planning framework if we are to fully understand the social benefits of underground space.

The integration of social value in cost-benefit analysis is enshrined in the Public Services (Social Value) Act but also embedded in other frameworks such as 'Social Return on Investment' (SROI) and HM Treasury guidance for development of a business case for public sector spending — the 'Green Book'. These evaluation tools consider social value and wider society benefits but the assessment forms part of the business case, therefore the process favours quantitative measures, it is often domain-specific with projects considered in isolation and cost and risk are primary drivers for the evaluation process. As such, only tractable, evidence-based social benefits can be easily accounted for. The more qualitative impacts are difficult to capture. This style of assessment process is challenging for social value where different benefits occur at a multitude of levels, for example local- to national-scales, and where it may take a long time for the full benefits to be realised.

Whilst evaluating long term and wide ranging societal benefits and impacts is complex and difficult to communicate, public consultation throughout the

planning and evaluation process is proven to be highly effective. It helps to resolve conflicting priorities at an early stage, include innovative design solutions, and to help balance the functional elements with more creative, community development options.

## Water industry community engagement

Business in the Community (BiTC) has been working with Anglian Water and United Utilities to encourage community engagement and enhance social value delivered along their supply chains. Success lay in the creation of a 'Business Connector' role, to connect with local communities affected by new development, to address local concerns, link communities to industry experts and build long-term partnerships for social improvement. For example, through the Business Connectors work at Anglian Water, their @one Alliance now sponsors two new BTEC courses for young people wanting to train in construction and mechanical and electrical engineering. Meanwhile United Utilities used the Business Connector initiative to help engage local communities affected by a new pipeline to ensure smoother progression through the planning application process.

\* Comments made by participants during the Think Deep UK Social Value workshop.



# Rethinking social value for underground development

We need to refocus project development from a purely economic endeavour to an inclusive process that embraces socio-economic indicators.

Underground development is currently viewed as problematic, the benefits of underground space utilisation are not highlighted sufficiently, and the evidence base demonstrating these benefits needs articulating. To balance individual preferences, community benefits and national interests is a major challenge and there is a trade-off between long-term benefits, and short-term impacts: The short-term cost and impacts of development underground are often higher than comparable development at surface but this is often outweighed by the long-term societal benefits.

Communicating the social benefits and impacts is key to explaining the value of underground space utilisation and making the benefits more visible. Discussions about social values, benefits or impacts of underground activities cover a wide range of topics and will differ by project, location, stakeholders and cultural setting. Social value is often discussed in the context of specific

settings and people likely to be affected rather than of a wider national or, potentially global discussion. Considering underground space as public commons could facilitate shared use and help protect high social value uses.

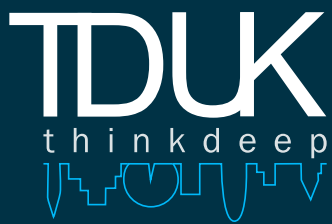
A clear definition of the terms of social value and what this entails is needed but **it is considered more important to discuss the societal impact early in the project development and identify potentially missed opportunities**. As such, early stage consultation with potential beneficiaries and community-led engagement are considered markers of success. Experts highlight individual successes where public consultation had led to enhancement of social value — with associated financial savings. With this type of approach the full potential of underground development, which may have a higher initial cost but greater long-term benefits, could be realised.



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## Key findings and recommendations

- The social benefits of underground space utilisation need to be better articulated.
- An evidence base to help measure and evaluate the benefits and impacts needs to be developed.
- The benefits and limitations of underground space need to be considered fully at the outset and in parallel with planning policy. Managing underground space as a public commons would facilitate shared use of underground space and help protect high-value uses.
- Early stage consultation with potential beneficiaries and community-led engagement are markers of success to maximise social value, encourage development of innovative solutions and to unlock full development potential
- Social value frameworks must be flexible enough to incorporate qualitative measures of value, across different timescales such that long-term benefits and broader societal needs of future generations are planned for.



Get involved by contacting us:

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