THE DONCASTER (CITY GATEWAY – RAILWAY SQUARE AND PHASE 1)

COMPULSORY PURCHASE ORDER 2023

THE TOWN AND COUNTRY PLANNING ACT 1990

AND

THE ACQUISITION OF LAND ACT 1981

INDEX OF DOCUMENTS ACCOMPANYING

PROOF OF EVIDENCE OF MATTHEW LAMBERT

FOR AND ON BEHALF OF CITY OF DONCASTER COUNCIL

POE/ML/9	Department for Transport's Active Mode Appraisal Toolkit (AMAT)	149 - 151
POE/ML/10	Data on footfall	152
POE/ML/11	The Living Street's (2018) report, The Pedestrian Pound: The business case for better streets and places - https://www.livingstreets.org.uk/media/3890/pedestrian-pound-2018.pdf	153 – 207
POE/ML/12	Mott MacDonald's proprietary Transparent Economic Assessment Model (TEAM)	208 – 212
POE/ML/13	HMT Green Book 2020 revision	213 – 364
POE/ML/14	Data from UK Crime Stats	365
POE/ML/15	City of Doncaster Council, Q1 2022 cost estimates	366 – 31
POE/ML/16	HMT, Green Book Supplementary Guidance: Optimism Bias, 2013	372 - 386
POE/ML/17	Scheme costs summary	387
POE/ML/18	UK Government Value for Money framework – POE/ML/18 - Department for Transport, 2015, Value for Money Framework	388

Department for
Communities and
Local Government

The DCLG Appraisal Guide

December 2016
Department for Communities and Local Government

This document/publication is also available on our website at www.gov.uk/dclg

If you have any enquiries regarding this document/publication, complete the form at http://forms.communities.gov.uk/ or write to us at:

Department for Communities and Local Government
Fry Building
2 Marsham Street
London
SW1P 4DF
Telephone: 030 3444 0000

For all our latest news and updates follow us on Twitter: https://twitter.com/CommunitiesUK

December 2016

ISBN: 978-1-4098-4831-8

Contents

Acknowledgements

We would like to thank the following organisations and people for their support and input in the development of this document.

- All Economists at the Department for Communities and Local Government
- Department for Business, Energy and Industrial Strategy
- Department for Transport
- HM Treasury
- The Homes and Communities Agency
- Michael Spackman, NERA

Foreword

Assessing the value for money of projects and programmes is a critical part of the policy making process, enabling Ministers to make informed decisions based on the potential costs and benefits of different options. However, doing this presents a number of challenges.

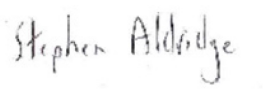
Firstly, scarce public resources means there is a need for robust and rigorous appraisal of costs and benefits in order to extract maximum public value for the tax-payer.

Secondly, the public sector is making increasing use of innovative policy solutions and methods of funding rather than relying on traditional grant-based funding assistance and regulation. Today, there is a greater use of financial instruments and alternatives to regulation which pose analytical and appraisal challenges that need to be addressed.

Finally, and most importantly, when it comes to any economic appraisal, sound judgement is critical. There are usually many unknowns that mean impacts are not always monetised and where judgement about how to account for such impacts is needed. This Guide is designed to support those involved in economic appraisal to make these judgements.

Although this Guide has been designed primarily for economists in DCLG as a means of appraising specific developments in the residential and commercial sectors, it also has wider applications and will be of interest to economists in other areas of the public sector.

I am therefore very pleased to recommend the use of this guidance as a means of helping to deliver better evidenced-based policy making and I look forward to future improvements to the Guide that should make it even more helpful.



Stephen Aldridge,

Chief Analyst, Department for Communities and Local Government

List of abbreviations

AONB	Area of Outstanding Natural Beauty
BCR	Benefit Cost Ratio
BRE	Better Regulation Executive or Building Research Establishment
CORE	Continuous Recording of Lettings and Sales in England (DCLG survey)
EANCB	Equivalent Annual Net Costs to Business
GVA	Gross Value Added
IA	[Regulatory] Impact Assessment
LEP	Local Enterprise Partnership
MV	Market value
NPPV	Net Present Public Value
OB	Optimism bias
PDL	Previously Developed Land
PRP	Private Registered Providers
PRS	Private Rented Sector
SR	Spending Review
SRS	Social Rented Sector
VfM	Value for Money
VOA	Valuation Office Agency

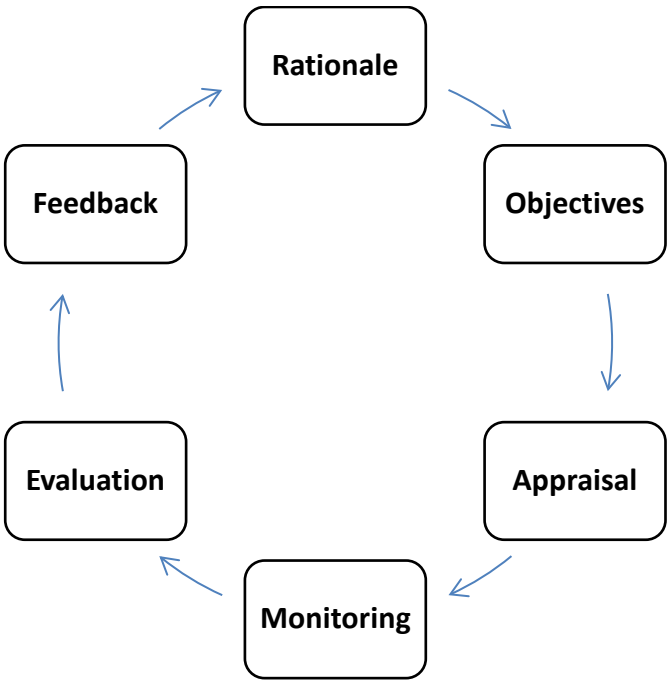
DCLG Appraisal Group

- Stephen Aldridge, Chief Analyst at the Department for Communities and Local Government
- Matthew Carson, Economic Advisor, Housing and Planning Analysis
- Paul Chamberlain (Chair), Deputy Director of Integration, Decentralisation and Deregulation, Appraisal
- David Craine, Economic Advisor, Housing and Planning Analysis
- Zainab Kizilbash Agha, Senior Policy Advisor (former Economic Advisor), Cities and Local Growth Unit
- Scott Dennison, Deputy Director of Housing and Planning Analysis
- Stephen Smith (lead author and editor), Economic Advisor, Integration, Decentralisation and Deregulation, Appraisal
- Ben Toogood, Senior Economic Advisor, Housing and Planning Analysis
- Cody Xuereb, Economic Advisor, Local Policy Analysis

Introduction

Economic appraisal is an essential part of the policy making process. It involves the assessment of the costs, benefits and risks of different policy options. In any appraisal, it is essential that costs and benefits are estimated in a consistent manner to enable appraisal information to be comparable between policy options. The diagram below shows HM Treasury's Green Book ROAMEF framework which sets out the broad policy making process. The diagram illustrates the continuous nature of the policy making cycle with evaluation evidence on the impact of a policy feeding into appraisals of future policies.

Figure 1: ROAMEF model[1]



This Appraisal Guide sets out suggested assumptions, theoretical framework and metrics to be adopted by economists in the Department for Communities and Local Government (DCLG) when carrying out or scrutinising an appraisal. The Guide is a technical document designed for DCLG economists, though given the range of applications, the Guide may be of use to economists in other departments or sectors. The focus is mainly on the economic appraisal of development, including housing, commercial development and land-based interventions. However, the Guide also provides guidance on the metrics and appraisal information that needs to be calculated and presented for all policies.

[1] HM Treasury (2003), The Green Book: Appraisal and Evaluation in Central Government, p3.

Some of the key principles from HM Treasury's Green Book[2] are set out in this document with an explanation of how they should be applied in DCLG appraisals. As well as being consistent with the Green Book, this document has been developed in tandem with the current Green Book 'refresh' and is consistent with the Department for Transport's (DfT) recommended approach to appraising dependent development which is set out in their online appraisal guidance, WebTAG. In addition, while the DCLG Appraisal Guide focuses purely on economic appraisal, ex post evaluations are an important part of the policy making cycle (see ROAMEF model above) and therefore evaluation evidence should be an important component of the evidence base underlying an appraisal.

The assumptions and metrics set out in the Appraisal Guide should be the default when carrying out appraisal for policy development and advice, business cases and Impact Assessments (IAs). However, users are free to adopt different assumptions, frameworks and metrics where appropriate. If users wish to do this, it is essential a clear explanation for doing so is documented in the relevant business case or IA for audit trail purposes.

The Analysis and Data Directorate (ADD) has created this Guide to:

- help ensure consistency in DCLG appraisals;
- help improve the audit trail and justification of certain assumptions; and
- improve the quality of methods and assumptions employed in DCLG appraisals over the long term by improving transparency and understanding and facilitating challenge.

Achieving greater consistency in appraisal will mean the estimated value for money of projects – as measured by the Net Present Public Value (NPPV), Benefit Cost Ratio (BCR) or value for money category – will be more comparable to each other. This will enable decision makers to make more informed choices about the projects they wish to support.

A DCLG Appraisal Group has been formed to oversee the updating of this document and any changes to key assumptions and metrics. **This Guide will be regularly updated and so will be a 'living' document containing sections which are likely to change between updates. We will keep all assumptions and metrics under continuous review. We would welcome receiving evidence or analysis on any aspect of this guidance so we can improve the quality of our appraisals. Please send this evidence to ChiefEconomistSign-off@communities.gsi.gov.uk.**

[2] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf

The Appraisal Guide is structured as follows:

Section 1 provides a short overview of the Strategic Case;

Section 2 sets out what appraisal information is needed and how it should be presented for all policies;

Section 3 sets out the methodology and theoretical basis for appraising and valuing development, both residential and non-residential, using land value uplift;

Section 4 documents the key assumptions that should be the default in DCLG appraisals;

Section 5 sets out useful source of information;

Section 6 contains a series of Annexes which contain further detail on different aspects of the Guide.

Section 1: the Strategic case

1.1 The Strategic Case of a business case – or the relevant sections in an IA - sets out the case for change and the rationale for intervention. It should demonstrate that a spending proposal 'provides business synergy and strategic fit and is predicated upon a robust and evidence based case for change'.[3] The Strategic Case should include the rationale for intervention and 'a clear definition of outcomes and the potential scope for what is to be achieved'.[4] The Economic Case should demonstrate that the spending proposal represents value for money and should include an appraisal of a range of realistic and achievable options.[5] Economists should ensure they concern themselves with both the Economic and Strategic Case.[6]

1.2 The 'underlying rationale is usually founded either in market failure or where there are clear government distributional objectives that need to be met. Market failure refers to where the market has not and cannot of itself be expected to deliver an efficient outcome'.[7] If there is no market failure or equity justification, government intervention may be welfare reducing unless the intervention is correcting an existing 'government failure'. Economists will therefore want to ensure that the rationale for public sector intervention is clear.

1.3 Establishing the rationale for intervention is important for determining the appropriate counterfactual against which to assess a policy. The counterfactual should usually be the status quo and be a clear articulation of how things will evolve in the absence of the policy being considered, including continuing trends and development proceeding anyway to a slower timetable. For example, there is no additional economic benefit from government providing support for a development which would have happened anyway (though there may be if the development happens quicker, or is of a better quality than it otherwise would be).

1.4 Once a credible counterfactual has been established, this should be compared against the 'do something' scenario. The 'do something' represents a forecast of the outcomes that can be expected with the policy in place. By having a consistent definition of the counterfactual and 'do something', key appraisal metrics – Benefit Cost Ratios (BCRs) and Net Present Public Value (NPPV) for example – for different policies can be compared.

---

[3] HM Treasury (2013), 'Public Sector Business Cases', Green Book Supplementary Guidance on Delivering Public Value from Spending Proposals, p11.
[4] Ibid.
[5] Ibid, p12.
[6] The other elements to a business case are the financial, commercial and management cases though there tends to be less direct involvement from economists on these cases.
[7] HM Treasury (2003, p11)

1.5 This means only outcomes which are additional to the counterfactual should be assessed (see Additionality section for further details on assessing additionality). For example, if a policy is expected to result in the provision of 1,000 housing units but 500 of these units are expected to be delivered in the status quo, then the benefits of the policy should only be for the 500 additional housing units that would not otherwise be delivered. If 1,000 units are expected to be delivered in the status quo, there are no benefits unless the units are delivered faster or are of a higher quality.[8]

1.6 The status quo and 'do something' are likely to be different because of the existence of a market failure. For example, a market failure could be preventing a development from happening in the status quo which once addressed could be welfare enhancing. An example of this is in the years immediately following the financial crisis in 2008 when failures in the lending market restricted firms' (particularly small firms) ability to access finance to invest. By government intervening and correcting for this market failure, additional development was able to take place.

1.7 Although there may still be credit constraints in the lending market, users will need to ensure there is sufficient evidence justifying such a claim as the existence of risk is not in itself a market failure e.g. a firm that is not willing to invest in area X because of the level of risk does not mean there is a market failure requiring government intervention. It may simply reflect the fact that the economic (private) benefits are highly uncertain rather than there being a market failure in the lending market. Credit constraints will not be a form of market failure if the lending market is operating normally.

1.8 Another common rationale for intervention for many DCLG interventions is the existence of externalities which impose costs (or benefits) on third parties. For example, the existence of a brownfield site which cannot be developed due to the presence of contaminated land but which once developed could provide an amenity benefit to society and improved environmental outcomes. Another example is the existence of an information failure, such as consumers not knowing the standard to which buildings are built. Economists will therefore want to ensure there is sufficient evidence justifying the cited market failure and form the appropriate counterfactual and 'do something' scenarios accordingly. As the additionality section explains, a weak market failure could imply relatively high levels of deadweight (and therefore small additionality) so it is crucial this is assessed in significant detail.

[8] There will be benefits under such a scenario because future impacts are discounted. This means an intervention which has a net benefit to society and is brought forward will, all else being equal, have a higher social benefit than if the same intervention was delivered later.

Section 2: Assessing Value for Money

2.1 This section outlines what metrics should be calculated in a DCLG appraisal and how this appraisal information should be presented.

Appraisal Summary Table (AST)

2.2 An appraisal should provide clear and transparent advice to decision makers on different policy options, taking account of costs, benefits, risks and significant non-monetised impacts. The objective of appraisal should be to provide a consistent comparison of benefits and costs. Presenting such information in summary form with detailed analysis underpinning it is crucial if complex technical information is to be communicated effectively.

2.3 The table below is a recommended Appraisal Summary Table (AST) which should be used for all spending proposals. It should feature in business cases and in all documents where appraisal information is contained. The AST aims to capture all the key appraisal information to enable decision makers to understand the value for money of different options. AST's also aim to explain the Benefit Cost Ratio and NPPV in further detail by presenting it in the context of other factors that cannot be reliably monetised and giving an overall judgement on value for money in a value for money category.

2.4 The AST below should be incorporated in all business cases and advice on value for money of different policy options. Please note this AST is for two policy options. However, a business case should contain several spending options which should be included in an AST. An example of how to complete an AST for a hypothetical scenario is given in Annex A.

Figure 2: Recommended DCLG Appraisal Summary Table

		Option 1 relative to status quo (preferred option)	Option 2 relative to status quo (do minimum)
A	**Present Value Benefits [based on Green Book principles and Green Book Supplementary and Departmental guidance (£m)]**		
B	**Present Value Costs (£m)**		
C	**Present Value of other quantified impacts (£m)**		
D	**Net Present Public Value (£m) [A-B] or [A-B+C]**		
E	**'Initial' Benefit-Cost Ratio [A / B]**		
F	**'Adjusted' Benefit Cost Ratio [(A + C) / B]**		
G	**Significant Non-monetised Impacts**		
H	**Value for Money (VfM) Category**		
I	**Switching Values & rationale for VfM category**		
J	**DCLG Financial Cost (£m)**		
K	**Risks**		
L	**Other issues**		

2.5 Most of the information above is relatively straightforward to produce such as the Net Present Public Value (NPPV) and Benefit Cost Ratio (BCR). However, many interventions will have significant monetised and non-monetised impacts (that are not accounted for in a BCR) such as landscape impacts (if not accounted for in a land value uplift estimate), antisocial behaviour, increased opportunities for training and future employment, family breakdown etc. To prevent these impacts being 'overlooked' it is important they are documented with appropriate switching analysis provided (see non-monetised impacts section). All monetised impacts which are not based on Green Book Supplementary or Departmental guidance should feature in row C of the AST ('Present Value of other quantified impacts') and not in row A. These impacts will be part of the 'adjusted' BCR calculation and inform the overall value for money category (see below).

Benefit Cost Ratio (BCR)

Definition of budget constraint

2.6 For spending proposals, the BCR of a project is the estimated Present Value Benefits (PVB) divided by a budget constraint or the Present Value Costs (PVC). It can be interpreted as the estimated level of benefit per £1 of cost. The difference between the PVB and PVC is the NPPV. This measures the overall level of public welfare generated by a policy.[9]

2.7 However, there are different budget constraints that can be used. For example, the PVC could measure total public and private costs or just costs to the public sector. Costs could also be net (inclusive of any offsetting revenue streams) or gross (excluding any offsetting revenue streams). While the choice of budget constraint has no impact on the NPPV of a project, it does have an impact on the BCR. It is therefore essential that a consistent definition is used across the department to enable projects to be compared.

2.8 For DCLG spending proposals, the budget constraint should be real discounted net costs to the public sector.[10] This means all exchequer costs – changes in Job Seekers Allowance and Housing Benefit for example as well as any local authority costs and revenues – should be accounted for when estimating net public sector costs (the denominator of the BCR). If they are a transfer – like Job Seekers Allowance, a government grant or Housing Benefit for example – an identical value should also feature in the net benefits figure (the numerator of the

[9] Data Book 2.0.2

[10] In some instances it might not be appropriate to include all changes in wider public finances in the budget constraint, particularly if by including them the BCR of policy options becomes difficult to interpret. In such a scenario, a different BCR metric may be required to aid interpretation of value for money (though the NPPV would not be affected by choice of budget constraint).

BCR) unless it is already reflected in a different variable such as land value uplift. Transfers like this have no impact on the NPPV but do impact on the BCR.

2.9 This metric has been selected because: (1) it is a metric that can be used by DCLG, local government and Local Enterprise Partnerships (LEPs) as the budget constraint encompasses all public expenditure and revenues and (2) if projects are prioritised on the basis of the BCR - which impacts on the value for money category - it helps ensure welfare is maximised from a budget closely resembling DCLG's.

'Initial' and 'Adjusted' BCR for internal business cases and value for money advice

2.10 When estimating the BCR, it is important that there is transparency in what is included in the benefits and costs. This means being clear about the robustness of the underlying evidence base and the appraisal values being used. It also means being clear when more subjective values are included in the appraisal.

2.11 To account for this, it is recommended two BCRs are calculated: an 'initial' BCR and an 'adjusted' BCR (this is in line with DfT appraisal guidance). The 'initial' BCR takes into account all appraisal values where there is a strong underlying evidence base and which are based on Green Book and Green Book Supplementary and Departmental guidance. A link to a list of this supplementary guidance is given in the footnote below and includes the valuation of the following externalities: air quality, crime, environment, health and greenhouse gas emissions.[11] The 'adjusted' BCR may include additional estimates of impacts, based on users' own evidence i.e. evidence not currently incorporated in Green Book Supplementary and Departmental guidance. These estimates may be based on more tentative assumptions where the evidence base is not so well established (see Annex F). However, both BCRs should inform the overall value for money category of the policy along with appropriate sensitivity analysis.

2.12 For example, suppose there is a market failure in the lending market that is preventing a particular development from taking place. The development is expected to result in an external transport cost of £5m.[12] However, there would also be an external benefit from 'cleaning up' the land in the form of an amenity benefit to the surrounding area. There is also expected to be some affordable housing provided as part of the development. These two external impacts - termed 'other quantified impacts' in the AST - are estimated to be in the region of £5m. No other external impacts are expected to result from this proposal.

[11] https://www.gov.uk/government/collections/the-green-book-supplementary-guidance
[12] Assume this estimate is based on DfT's WebTAG guidance meaning it should feature in the 'initial' BCR.

2.13 Assume several policy options are being considered, one of which is a government grant of £10m. With such a grant the development would 'go ahead' and there would be £20m in land value uplift.[13] For simplicity assume there is no deadweight or displacement (in practice we would not assume this but the purpose of this example is to demonstrate the calculation of the 'initial' and 'adjusted' BCR). In this example, the present value benefits would be £15m i.e. the £20m land value uplift less the £5m external cost (this cost features in the PVB as it is not a public expenditure cost). The present value costs would be the £10m grant.

2.14 Therefore, in this example, the NPPV would be £5m (the £15m present value benefits minus the £10m present value costs) and the 'initial' BCR would be 1.5 (the £15m benefits divided by the £10m costs).

2.15 The 'adjusted' BCR would include other quantified impacts. In this instance they include the benefit from cleaning up the land and the affordable housing, and these are estimated to be £5m. If these appraisal values are included in the analysis, the present value benefits would be equal to £20m (the £15m of benefits in the 'initial' BCR plus the £5m of other quantified impacts) and the economic costs would be £10m. In this case, the NPPV would be £10m (the £20m of benefits minus the £10m of costs) and the 'adjusted' BCR would be 2 (the £20m of economic benefits divided the £10m of economic costs).

2.16 Figure 3 sets out the types of impacts that would feature in the numerator and denominator of the BCR for DCLG policies (note those impacts in squared brackets would be negative values). Impacts that should only feature in the 'adjusted' BCR are highlighted. Impacts can be split according to whether they impact on consumers or business (private impacts) or whether they are external or impact on public sector finances (public impacts). Under this metric, no costs to consumers or business feature in the budget constraint (the denominator of the BCR).

2.17 In some instances a BCR may not be appropriate. For example, when there is a negative or zero cost. For policies such as this – which could include devolution of funding which transfer resources from one place to another – it may be better to focus the value for money analysis on the NPPV and potential Value for Money category.

[13] In this example the benefit to the recipient of the £10m grant is reflected in the land value uplift.

2.18 Once an 'initial' BCR is calculated, it is important users assess its plausibility. For example, if the estimated 'initial' BCR is high and consists mainly of private impacts, then it is important to consider why such a project would not have happened in the absence of the intervention. This will mean ensuring there is a sound market failure underpinning the rationale for intervention as set out in the Strategic Case. Where there is no market failure, this may mean there is significant deadweight (see Additionality section) and therefore users should re-visit the underlying additionality assumptions.

2.19 As Section 1 explains, all impacts should usually be relative to the status quo. Some examples of how the NPPV and BCR should be calculated for typical DCLG policies are given below.

Figure 3: Description of benefits and costs under proposed BCR metric

	Consumer and business impacts	**External impacts and public sector finance impacts**
Present Value Benefits (numerator)	Private benefits e.g. land value uplift [Private sector costs if not captured in land value][14] Public sector grant or loan if not captured in land value[15] [Public sector loan repayments if not captured in land value] Distributional benefits*	External benefits * [External costs]*
Present Value Costs (denominator)		Public sector grant or loan [Public sector loan repayments] Other public sector costs [Other public sector revenues]

* only impacts that are based on Green Book and Green Book Supplementary and Departmental guidance should feature in the 'initial' BCR calculation (see Annex F). Other impacts should feature only in the 'adjusted' BCR. Distributional benefits should feature in the 'adjusted' BCR and not the 'initial' BCR.

[14] The land valuation of a particular development will already account for the private costs (and possibly the benefits of potential government support) associated with a development as it is equal to the Gross Development Value of a site less any development costs less a minimum level of profit that is needed. Therefore, care should be taken to avoid double counting of costs (and benefits associated with government support). If the land value data accounts for all costs and the impact of any government support, then there is no need to separately account for further costs or the potential benefits to a firm from government support in the present value benefits. However, if the appraisal is using illustrative Valuation Office Agency land value uplift data, then this data will only account for 'typical' development costs. It will not account for any 'atypical' costs - such as those where there are large 'clean-up' costs associated with brownfield land for example - or the benefits of government support. These impacts will need to be accounted for separately in the appraisal. These 'atypical' private costs should feature as a negative number in the present value benefits as they represent a dis-benefit to the private sector. Any government grant or subsidised loan (less repayments) to the private sector should feature as a positive number in the present value benefits and as a positive number in the present value costs.

[15] As noted above, land value data may already account for the impact of a government grant or loan. If it does not, this should be included separately in the appraisal.

2.20 It should be noted that all the impacts in this calculation should be risk adjusted. In the early stages of policy development this will primarily be through Optimism Bias (OB) adjustments to both costs and benefits. Further guidance on OB is given in the Optimism bias section and in the Green Book.

2.21 The examples below set out the calculations for three hypothetical policies to illustrate how the NPPVs and BCRs of DCLG policies are likely to be calculated. For simplicity, assume all figures have been discounted to the appropriate year, are all in real prices and optimism bias has already been applied to both costs and benefits.

Example 1: A DCLG grant to support a development

2.22 One policy option being considered is a £5m grant to support a development on a brownfield site. The rationale for intervention is the external benefits that may be generated by intervening e.g. improved amenity and health. These external benefits are estimated to be around £5m. However, the development is unlikely to take place in the absence of the intervention because of the high upfront costs of 'cleaning up' the land. These high upfront costs are estimated to be £5m and their existence makes the development commercially unviable i.e. the Gross Development Value does not cover the development costs and a minimum level of profit. Assume that once the land is 'cleaned up' the value of the land in its new use is £5m. Also assume for simplicity that the value of land in its current use is zero and there are no wider external impacts or monetised impacts associated with the intervention other than the improved amenity and health impacts.

2.23 In this example - and for simplicity assuming there is no displacement of economic activity - the 'initial' BCR of intervening would be calculated as follows: the present value benefit is the land value in its new use (£5m) minus the value of the land in its previous use (£0m).[16] The estimated cost is the £5m grant. In other words, the NPPV would be £0m and the 'initial' BCR would be 1. However, the other quantified impacts are estimated to be around £5m. By including these impacts in the appraisal, the estimated benefits become £10m and the estimated costs are £5m. This means the NPPV is £5m and the 'adjusted' BCR is 2.0.

[16] In this example, for simplicity the £5m benefit to the firm from the grant is not shown given it is financing the private 'clean-up' costs of £5m and so these two terms cancel out.

Example 2: A DCLG loan to support brownfield land clean-up and development

2.24 DCLG is approached for a loan to support the redevelopment of a brownfield site. The rationale for intervention is that there is evidence of market failure in the lending market which is restricting firms access to finance. The development is expected to provide an external amenity and health benefit.

2.25 The site is suitable for 1,000 houses but the high upfront 'clean-up' costs and difficulties in accessing financing make the development commercially unviable. The land value in its new use is £85m based on a financing arrangement which enables the firm to borrow £100m and repay £50m over the appraisal period.[17] Once developed, there are potential net external benefits of £10m. Assume for simplicity the value of the site in its current use £10m.

2.26 Assume for simplicity that there is no deadweight or displacement from intervening. In this case, by DCLG providing a loan of £100m and receiving £50m back over the appraisal period, the present value benefits would be equal to the land value in its new use (£85m) less the value of the land its current use (£10m). The present value costs would be the initial loan of £100m less expected repayments of £50m (i.e. £50m net exchequer costs). In this example, the NPPV would therefore be £25m (£75m economic benefits less £50m economic costs). The 'initial' BCR would therefore be 1.5 (£75m economic benefits divided by £50m economic costs).

2.27 When including the potential external benefits of £10m, the present value benefits increase to £85m while the economic costs are £50m. The NPPV would therefore be £35m and the 'adjusted' BCR would be equal to 1.7.

Example 3: A DCLG grant to subsidise housing for lower income groups

2.28 DCLG pays a grant of £100m to subsidise affordable housing for lower income groups. The policy is forecast to deliver £100m in land value uplift as a result of the additional housing created. There are also estimated to be £50m worth of distributional benefits and net external benefits associated with this policy.

2.29 In this example, the payment of the grant enables those on lower income groups to live in sub-market rent accommodation. Therefore, while the £100m grant represents a cost to the exchequer, it is also a benefit to the tenants who are now able to live in sub-market accommodation i.e. it is a transfer payment.

[17] This means the land value uplift reflects the private benefit of the initial loan and the costs of the subsequent repayments.

2.30 In this example, the present value benefits are therefore the £100m land value uplift created plus the £100m benefit to the tenants who are now able to pay sub-market rents. The present value cost is the £100m grant. This means the NPPV is £100m (the £200m economic benefits less the £100m grant) and the 'initial' BCR is 2 (£200m economic benefits divided by £100m grant).

2.31 When including distributional and net external benefits, the economic benefits increase to £250m while the economic costs are £100m. This means the NPPV is £150m and the 'adjusted' BCR is 2.5.

Employment

2.32 The default assumption is that any jobs created by a development resulting from government expenditure do not increase aggregate employment as these employment effects are already largely determined by macroeconomic decisions on the level of overall public expenditure (though they often have an important local impact). As a result, it is recommended that DCLG appraisals do not put a monetary value on these employment impacts unless there is strong evidence of a supply side effect (there is separate work planned on developing external productivity impacts of increased employment density). This approach is consistent with HM Treasury's Green Book.

2.33 In the past, DCLG has used the estimated direct employment and GVA impacts as a measure of the potential benefits of a development (this is explained in Annex B). However, the department's preferred approach to appraising a development is to use changes in land values to infer the net private impact (see Section 3) and to separately account for external impacts.

2.34 Users are free to quote the number of gross jobs created by a development in the appraisal. However, these should not be monetised but instead included 'below the line' within the appraisal and set out in the Strategic Case. In certain circumstances, users may wish to quote particular metrics – such as those relating to employment or housing – but these should only be in addition to the key value for money metrics (BCR and NPPV) and not instead. These can be included in the AST in the 'Other issues' box.

Externalities

2.35 An economic appraisal should seek to capture all the benefits and costs associated with an intervention. This will include both private and external impacts. For many DCLG interventions, land value uplift will capture the net private impacts of a development. However, external impacts also need to be captured and can be fundamental to the case for intervention (see Figure 4 and Figure 6).

2.36 All impacts quantified on the basis of Green Book guidance and Green Book Supplementary and Departmental guidance should feature in the 'initial' BCR calculation. These impacts currently include:

- Air quality
- Crime
- Private Finance Initiatives
- Environmental
- Transport (see WebTAG guidance)
- Public Service Transformation
- Asset valuation
- Competition
- Energy use and greenhouse gas emissions

2.37 Land value uplift and the amenity cost of development are part of DCLG's appraisal guidance and therefore should feature in the 'initial' BCR. Additional estimates, for any externalities which are not included in the Green Book and Green Book Supplementary and Departmental guidance, can be included in the 'adjusted' BCR. The department recognises the limits of the current guidance and the difficulties of valuing externalities, particularly as the presence of externalities and their value are likely to vary across different types of investment and location. Current guidance should be seen as a starting point for the calculation of an 'initial' BCR, whilst the 'adjusted' BCR provides flexibility to introduce new estimates, in place or in addition to those in the current guidance. Users are expected to provide justification and evidence to support estimates.

2.38 The current version of the DCLG Appraisal Guide provides estimates for the external amenity cost of development and the health benefits of additional affordable housing. As mentioned above, the amenity cost of development should feature in the 'initial' BCR. However, the health benefits of additional affordable housing should feature in the 'adjusted' BCR as it is not fully established. However, users can replace these estimates with their own estimates if they have more suitable and robust evidence. Estimates from the Unit Cost Database - explained in the Public Service Transformation, Social Policies & Fiscal Benefits section - is Green Book Supplementary guidance so should be included in the 'initial' BCR.

2.39 The DCLG Appraisal Guide is a 'living' document and will be regularly updated. We will continue to review and develop the evidence base on externalities and would welcome views and potential evidence that could help with this.

2.40 As the evidence base evolves, we would expect to see more external impacts featuring in the 'initial' BCR. Where external impacts are not 'ready' to feature in the 'initial' BCR, we would like a wide range of estimates to be included in the 'adjusted' BCR. These estimates can then be developed and refined overtime. The DCLG Appraisal Group will regularly review the evidence base on externalities and the DCLG Appraisal Guide will set out examples of externalities that should feature in 'initial' and 'adjusted' BCRs. Annex F provides a summary of the externalities that are most likely to feature in DCLG appraisals.

Figure 4: Examples of how externalities can inform the economic case

Example 1: externalities are of second order importance

Assume there is a market failure which constrains the demand for housing (such as access to finance). Government intervention seeks to address this which leads to an increase in demand for new housing. As a result, additional houses are built and the monetised net private benefit associated with these additional houses - the additional land value uplift created - exceeds the public sector cost involved. While there are likely to be external impacts from such an intervention - such as the external benefit from each additional social housing unit - these impacts are expected to be small in relation to the net private benefits and therefore they have little impact on the overall value for money assessment.

Example 2: externalities are important but not fundamental to the case

This could be similar to Example 1 with a similar market failure but instead the intervention 'unlocks' lower value development relative to the costs which results in a positive NPPV but a lower BCR. In this scenario, the economic case rests more strongly on the importance of wider impacts (externalities).

Example 3: externalities are fundamental to the economic case

In this example, assume that there is a potential development which generates an external benefit to society - perhaps there is an amenity and health benefit from developing a previously derelict site - but this development will not proceed without government intervention as there is insufficient private value. This is reflected in a low (less than one) 'initial' BCR. In this example, the value for money of the intervention relies on the significance of the externalities.

Impact Assessment metrics

2.41 For policies which are likely to have a regulatory impact, an Impact Assessment (IA) is required. An IA aims to set out all the costs and benefits of a proposal, though there is a greater amount of departmental discretion for those policies qualifying for 'fast-track' (see the Better Regulation Executive guidance).

2.42 In an IA, users will be expected to calculate the NPPV of a policy and the Equivalent Annual Net Costs to Business (EANCB). The difference between the two is that the NPPV is an estimate of the impact to society. This includes external impacts such as environmental impacts as well as private impacts to individuals and business. However, the EANCB is focussed purely on the net costs to business. It is defined as the annualised present value of net costs to business and is applicable from the implementation date of the policy.

2.43 As the EANCB is purely an estimate of the impact on business it should exclude any potential recoverable indirect taxation that is levied (see units of account section).[18] The formula for calculating the EANCB given in the Better Regulation Executive (BRE) guidance is as follows:

Figure 5: EANCB equation

$$EANCB = \frac{PVNCB}{a_{t,r}}$$

Where $a_{t,r}$ is the annuity rate given by:

$$a_{t,r} = \frac{1+r}{r}\left[1 - \frac{1}{(1+r)^t}\right]$$

Where PVNCB = Present Value of Net Costs to Business

$a_{t,r}$ is the annuity rate

t = time period over which the policy is active in the appraisal

r= discount rate

Multi-Criteria analysis

2.44 Details of Multi-Criteria analysis (MCA) can be found in the Green Book and published guidance.[19] Subject to having an agreed set of criteria and weightings,

[18] There are some indirect taxes that business cannot reclaim (such as fuel duty) so users need to take such issues into account.
[19] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7612/1132618.pdf

MCA can be a useful ranking tool when there are significant non-monetised impacts. However, MCA does require judgement in establishing objectives and criteria, as well as estimating the relative importance of weights and in judging the contribution of each option to each performance criterion. There is therefore a risk of subjectivity in MCA.

Non-monetised impacts

2.45 There are various ways users may want to deal with non-monetised impacts and it is up to the user to decide how best to handle such impacts. One method is multi criteria analysis (see above) while a further way to capture the significance of such impacts is the use of sensitivity analysis and 'switching values'. A description of switching values is given in the Green Book. The key part to switching analysis involves working backwards and asking the following type of question:

How large do the non-monetised impacts have to be to shift the value for money of the policy from High (where the BCR is greater than 2) to Acceptable (where the BCR is between 1 and 2) or from High to Poor (where the BCR is less than 1)?

2.46 Users will need to state how large – in monetary terms – an impact will have to be to change the overall value for money category. Presenting non-monetised metrics such as output data - number of trees 'lost' as a result of a development or the number of people who visit a particular attraction for example - could help inform decisions on whether such impacts are significant or not (and therefore whether the value for money category needs to change). Users will therefore need to use their judgement in determining the appropriate value for money category.

2.47 It is essential that where monetisation is not possible, a full qualitative assessment of the potential impacts is carried out. For example, in the context of DCLG appraisals this could include a discussion on the potential environmental and other amenity impacts of changes in land use.

Public Service Transformation, Social Policies & Fiscal Benefits

2.48 In addition to appraising housing related policies, DCLG also leads on appraising a number of the Government's major social programmes ranging from the

Troubled Families programme, policies to tackle homelessness, rough sleeping, domestic abuse, welfare reform, and policies to encourage public service transformation and integration of services.

2.49 Appraisal of social policies and public service transformation is based on the same principles contained in the Green Book but can present additional challenges. In particular, estimating and monetising the net impact of redesigning services on the use of public services and wider economic and social outcomes. Detailed guidance on appraising public service transformation and social policies is set out in *Supporting Public Service Transformation: cost benefit analysis for local partnerships*. This document was developed by analysts in DCLG in collaboration, with New Economy Manchester, and the Public Service Transformation Network.

2.50 Alongside this guidance, New Economy Manchester has developed a *Unit Cost Database*, to help with the appraisal of service transformation and social policies. Using the best available research from various government and academic sources, the database provides fiscal, economic, and social cost estimates for over 600 outcome measures covering a range of issues from crime, education, employment, fire, health, housing and social services. The database provides costs which can be used to monetise outcomes relevant to social policies in terms of costs to public services (fiscal costs) and the wider economy and society. The database is widely recognised across government as the best available source for information on the costs of a number of issues and is being extensively used for various appraisal projects across government departments and local authorities.

2.51 In addition to the guidance and the Unit Cost Database, New Economy has also produced a *model* which acts as a template for carrying out cost benefit analysis.

Spatial level of analysis

2.52 Cost benefit analysis involves calculating two metrics for each policy: the NPPV and Benefit Cost Ratio (BCR). Both of these should be estimated at the national level to give insight into the value for money to the exchequer. This means additionality estimates should be at the national rather than local level.

2.53 However, local impacts should still form an important part of an appraisal and feature in any spatial and distributional analysis. If there are significant local impacts, then this information should be presented alongside the national level appraisal information. For example, in the context of an Impact Assessment, a policy which has significant rural impacts must contain rural proofing analysis within it. Alternatively, a spending proposal which has significant local impacts

should be set out within a business case and summarised in the Appraisal Summary Table.

Units of account

2.54 The factor price unit of account excludes indirect taxation while the market price unit of account includes it. As per Green Book guidance, costs and benefits should normally be presented in market prices. This unit of account reflects the best alternative uses that goods and services could be put to (the opportunity cost). The use of market prices means that costs and benefits are generally expressed in units of consumption or consumption equivalent.

Value for money categories

2.55 A Value for Money (VfM) category should be produced for each spending option. A VfM category is an assessment of the overall VfM of a policy based on monetised and non-monetised impacts. As well as providing a more holistic and comprehensive assessment of VfM rather than a narrow BCR approach, VfM categories help ensure greater consistency in the presentation of appraisal information and help avoid the temptation to produce inflated and non-robust BCRs.

2.56 A VfM category will ultimately be a judgement based on the size of the monetised benefits relative to monetised costs (the BCR) and the potential significance of non-monetised impacts. To produce a VfM category, an initial VfM category should be derived based on the 'initial' and 'adjusted' BCR. The value for money categories based on the size of the BCR is given below.

BCR < 1 = Poor value for money

1 ≤ BCR < 2 = Acceptable value for money

BCR ≥ 2 = High value for money

2.57 There is a clear rationale for the Poor VfM category as this would mean the policy being considered has costs greater than benefits. However, in practice the BCR should be greater than 1 given the existence of non-monetised factors and given a pound in spending is not identical to a pound in welfare.

2.58 The High VfM category would mean the intervention is expected to deliver twice the amount of benefit per unit of cost hence why it is termed High VfM. Please note if the policy involved is positive NPPV and is zero or negative cost – meaning a BCR cannot be calculated – then the VfM category should be High.

2.59 Where the 'initial' and 'adjusted' BCR result in the same value for money category, then this should be the appropriate value for money category to use before non-monetised impacts are considered. Where the value for money categories differ, a judgement needs to be made about which is most appropriate. It may only be appropriate to determine this after sensitivity analysis and appropriate consideration of non-monetised impacts.

2.60 Users are free to decide the most appropriate way of dealing with non-monetised impacts e.g. using sensitivity analysis to understand how large these non-monetised impacts need to be to change a value for money category. However, it is essential any approach and subsequent judgement is transparent and clear to decision makers.

2.61 One way to make such a judgement transparent is to carry out sensitivity analysis and highlight key 'switching values'. In other words, to highlight how large the non-monetised impact has to be to change a value for money category (an example is given below). This analysis could include a 'switching value' on additionality i.e. how big does the additionality need to be to make the policy being appraised Acceptable value for money.

2.62 To make the judgement transparent, value for money categories and BCRs should be communicated in a value for money statement (which should also include the relevant AST). A value for money statement will simply state what the estimated value for money category is and why.

2.63 If the value for money category shifts because of the existence of significant non-monetised impacts then the value for money statement will need to explain this. There is no set way of producing a value for money statement as users will have different approaches for handling non-monetised impacts. Three examples of how judgement has been used to inform a value for money category are set out in the value for money statements below.

Figure 6: Examples of a value for money statement

Value for money statement example 1

The estimated value for money of this policy is High with the 'initial' and 'adjusted' BCR of 2 indicating there is £2 worth of benefits per £1 of net public expenditure. The benefits of this policy are reduced CO2 emissions (equal to £x) and increased land value (equal to £y). The costs of the policy is the grant of £z. There are no significant non-monetised impacts estimated for this policy.

Value for money statement example 2

The estimated value for money of this policy is Acceptable. While the 'initial' and 'adjusted' BCR of this policy is 2.1, there is a significant non-monetised cost from the damage to the landscape in the surrounding area. The main monetised benefit of this policy is the land value uplift (equal to £x) while the main costs is the loan provided less repayments (equal to £y). For this policy to be High value for money, the non-monetised cost would need to be no greater than £a. For this policy to be Acceptable value for money, this non-monetised cost would need to be no greater than £b. For this policy to be Poor value for money, this non-monetised cost would need to be no greater than £c. We consider an Acceptable value for money category to be appropriate given X number of houses would be affected by this policy and the size of the landscape costs for other value for money categories would be disproportionate to this.

Value for money statement example 3

The estimated value for money of this policy is Acceptable. While the estimated 'initial' BCR of this policy is 0.95, the 'adjusted' BCR is 1.2 given the potential for £15m worth of external amenity benefits that could be generated as a result of this policy. Given only £5m of additional benefit is required to achieve an Acceptable level of value for money, the existence of these potential £15m of external benefits means this policy has been assessed as Acceptable value for money.

Section 3: Land value uplift approach to appraising development

3.1 This section explains DCLG's recommended and preferred approach to valuing the benefits of development.[20] This approach is also set out in DfT's WebTAG.[21] A step-by-step guide for how to appraise residential development is given in Annex C. For non-residential development, step by step guides are given in Annex D and Annex E.

What is land value uplift?

3.2 The value of land is determined by a number of factors, most significantly by its use and location. The Gross Development Value (GDV) of a site is the estimated total revenue a developer could obtain from the land. In the context of housing, it would effectively be:

$$GDV = House\ prices \times number\ of\ dwellings$$

3.3 A developer will also incur costs and would expect a minimum level of profit from developing a site. The residual method of land valuation gives the maximum price a firm is willing to pay for the land. In a competitive market, the firm will pay a price that gives a normal level of profit. The land price is therefore equal to:[22]

$$Land\ price = GDV - (Development\ costs + fees + profit)$$

3.4 In an economic appraisal, economists should seek to capture all costs and benefits of a policy. Crucially, costs should be economic costs and therefore capture the opportunity cost of the investment as per Green Book guidance. Subtracting normal profit off the land price reflects the opportunity cost of capital in the development (wage costs reflect the opportunity cost of using labour in the development).

3.5 The land price then reflects the value of the land in its new use. In appraisal terms, the difference between this new value and its previous value is the land value uplift and this represents the net private benefits of a development.

[20] While a land value uplift approach to estimating the benefits of a development is DCLG's preferred method, there may be alternative approaches.
[21] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/370534/webtag-tag-unit-a2-3-transport-appraisal-in-the-context-of-dependent-development.pdf
[22] Although this suggests the majority of benefits will accrue to landowners, some of the value can be captured for the benefit of wider society through taxation and planning obligations. Therefore, if there are any Community Infrastructure Levy (CIL) or Section 106 costs included in developer costs, they should be added to the land value as although they are a cost to the developer, they are of a benefit to the recipient. In effect, this is additional land value that is transferred as a condition of the development going ahead e.g. for affordable housing or transport projects.

3.6 A simple example illustrates this point. Assume the current land value of a site is 50. Planning permission is then granted for a particular development. In its new use, assume the total obtainable revenue from the site which utilises all factors of production (land, labour and capital) is 300 (the GDV), development costs are 50 and fees are 50. Assume also that the market is competitive and that the level of normal profit is 100. The new land value would then be:

$$Land\ price = GDV - (Development\ costs + fees + profit)$$

$$Land\ price = 300 - (50 + 50 + 100) = 100$$

3.7 The developer is therefore willing to pay 100 for the land in order to earn a normal level of profit of 100. In an appraisal, the net private benefits from this development is therefore 50 (the land value in its new use, 100, less the land value in its previous use, 50).

3.8 The key point is that the land value is derived demand and means the land value includes the returns to all factors of production less economic costs i.e. returns to capital, land and labour (300) less construction costs (50) less fees (50) less expected profit (100).

3.9 Therefore, changes in land values as a result of a change in land-use for a development reflect the economic efficiency benefits of converting land into a more productive use.[23]

3.10 Land value data should be the primary means of assessing the benefits of a development. Land value data is a rich source of information because it is actual market data on individuals' / firms' willingness to pay for a piece of land. Assuming individuals and firms are rational in their decision-making, market prices should reveal the 'true' private benefit of a development. This information can be used to undertake cost benefit analysis to quantify the potential welfare implications of a development.

3.11 There are alternative options to appraising development – such as the use of employment and GVA data – but such approaches rely on a number of assumptions rather than using observable market data (see Annex B for further explanation on the GVA and employment approach).

[23] Note this only holds where the value of the land in its new use is greater than its previous use. It is possible for a land use change to produce a negative uplift.

3.12 Note also that land value uplift is concerned purely with the net private benefits of a development. External impacts should be accounted for separately and summed with the net private impacts to give the net social impact. See below for further details on external impacts.

Accounting for external impacts

3.13 Once the private benefits of a development have been calculated, external impacts should be accounted for. The value to society of a change in use of the land may be separated into: (a) the private benefit associated with the change in land use, as represented by the uplift in land value and (b) the net external impact of the resulting development such as any amenity impacts from changes in landscape. The net social impact is then the summation of these two impacts.

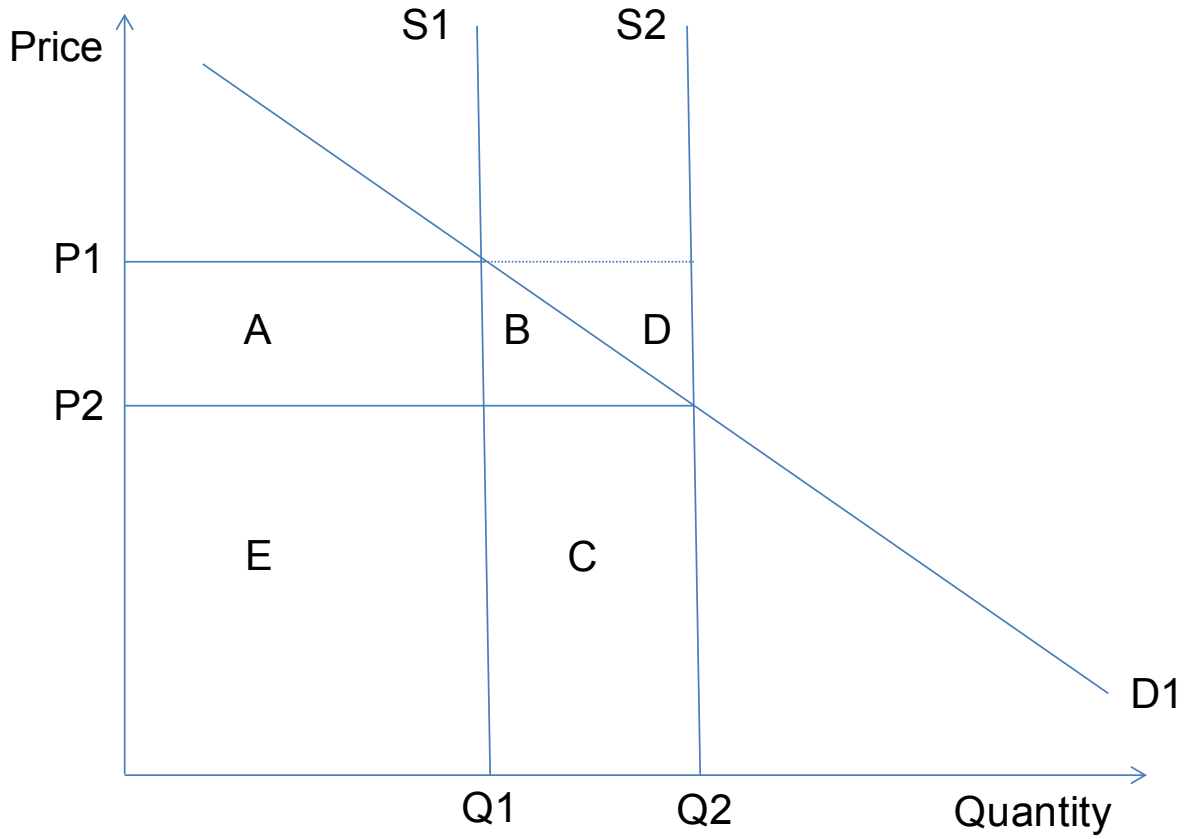
3.14 These external impacts are in addition to the land value uplift. Examples of external impacts include improved health outcomes as a result of reduced overcrowding and reduced external costs from reducing rough sleeping. As explained in the externalities section, when accounting for externalities, the 'initial' BCR should be based on all impacts that can be robustly appraised using Green Book and Green Book Supplementary and Departmental guidance. The 'adjusted' BCR should then include a further range of externalities where the evidence base may not be as well established but which are important to consider in the overall appraisal. Examples of these impacts are given in Annex F. The 'initial' and 'adjusted' BCRs, non-monetised impacts and sensitivity analysis should inform the appropriate value for money category of the policy.

Using land value uplift in cost benefit analysis

3.15 Consider a hypothetical market for commercial floor space (this can either be the freehold or rental market). There is a supply curve S1 and demand curve D1 as per diagram below.[24]

[24] For simplicity we have assumed an inelastic supply curve.

Figure 7: Supply and demand diagram for commercial floor space



3.16 The equilibrium is where D1=S1 which creates price P1 and quantity supplied Q1. At this point, the total value of the commercial floor space is P1 x Q1 or A + E.

3.17 Assume government intervention is required to correct for a particular market failure which creates additional commercial floor space (perhaps government has provided financial support to 'clean up' a contaminated brownfield site thus correcting a negative externality). As a consequence of this intervention the supply curve shifts from S1 to S2. This results in a new market price of P2 and quantity supplied Q2. Consumer surplus[25] increases by A+B while the total value of the commercial floor space is now P2 x Q2 or E + C (in other words the change in the total value of the commercial floor space is C - A). How this is then captured in an economic appraisal is discussed below.

[25] **Consumer surplus** is defined as the difference between the total amount that **consumers** are willing and able to pay for a good or service (indicated by the demand curve) and the total amount that they actually do pay.

Estimating the gross impact of an intervention

3.18 A new development creates economic value which is reflected in the land value uplift of the land. In this example, area C effectively measures the GDV of the development - the amount of commercial floor space multiplied by the market price - so the land value uplift is equal to area C less development costs less profit less the value of the land in its previous use.

3.19 As well as the land value uplift, there is also a change in the market price from P1 to P2. The reduction in price increases consumer surplus by A + B. However, while A effectively measures the gain to existing tenants of commercial floor space who now pay a lower market price, area A also represents the reduction in the value of existing commercial floor space and is therefore a cost to landlords (see distributional section below).

3.20 Area B represents the consumer surplus gain to 'new' tenants who benefit from the reduction in the market price for commercial floor space. However, for DCLG appraisals, the gross change in (private) welfare is assumed to equal the value of the development being appraised (area C) less private and public costs, profit and the previous value of the land.[26] This value would then reflect the present value of future net private benefits. Area B is therefore effectively ignored as, for a single development, it is likely to be negligible (though this depends on the size of the scheme).[27]

3.21 In many instances, actual land value data may not be available and therefore illustrative values provided by the department can be used (these are explained in Annex C for residential development and Annex E for non-residential development). However, these values will tend to reflect a price level that is closer to P1 than P2 which means the size of the GDV could be closer to area B + C + D (and therefore accounts for the consumer surplus gain of B). When using such values, the department would expect to see appropriate sensitivity analysis around these values to ensure a robust estimate of the (net) private benefit is made.[28]

[26] As the previous section explains, the residual method of land valuation implies land value uplift equals the final value of the development - the Gross Development Value - less development costs less a minimum level of profit less the value of the land in its current use.
[27] If users wish to include an estimate for Area B they need to provide sufficient justification and evidence of the development having a significant impact on the market price (perhaps using local data on rateable commercial floor space). This analysis should also only be undertaken where the policy is marginal e.g. if the BCR is slightly less than 1. Users are free to decide the most effective way of estimating this consumer surplus gain but one way of doing this would be to assume a linear demand curve and estimate the change in welfare as equal to (Q2-Q1)(P1-P2)1/2.
[28] This will mean testing whether the policy could have a noticeable impact on land values. Sensitivity analysis is most useful where the policy impacts are non-marginal.

Estimating the net impact of an intervention

3.22 As Section 1 and Section 2 explain, all costs and benefits should be relative to a counterfactual. The above example is based on a partial equilibrium analysis in the area where a development takes place. It therefore attempts to estimate the gross impact of an intervention. However, in a general equilibrium context, there are potential impacts that need to be considered in other markets / places. For example, as there will be development in the status quo, we need to account for the possibility that some of the benefits associated with this development would have happened anyway (deadweight) and some benefits that would have occurred no longer do (displacement). Each of these is discussed below.

Estimating deadweight

3.23 Estimating the net impact of a policy requires any impacts which would have happened anyway to be subtracted from the gross estimates of a policy. In the example above, a critical issue is whether the expansion of commercial floor space (or housing) – and crucially the land value created – would have happened without government intervention, either in the location where the intervention takes place or somewhere else in the economy i.e. 'while an investment may be additional to the area in which it takes place, it may not be to a wider area or to the country as a whole'.[29] Therefore, it is important that when appraising an intervention a correct counterfactual is established (see Section 1 and additionality section).

3.24 A key question to ask when trying to establish a counterfactual like the above is: why does the private sector require government support and would the private investment genuinely not happen without it? If there is a genuine market failure that means the development would not otherwise have happened somewhere in the country without government support then there is no deadweight. However, if it would have gone ahead somewhere in the country anyway, then there is no additional value created.

3.25 Without a sound rationale for intervention (e.g. market failure), a high BCR consisting of mainly private impacts is potentially a sign of significant deadweight i.e. in the absence of the intervention the market would deliver the same outcomes. In this instance, it would be appropriate to revisit the underlying additionality assumptions underlying the BCR calculation.

[29] Venables, A., Overman, H., Laird, J. (2014), Transport investment and economic performance: Implications for project appraisal, p45.

3.26 In some instances, it may only be appropriate to include the external impact of a development – such as the positive external (amenity) value of redeveloping a previously derelict site – in the additional economic benefits because the development would have gone ahead somewhere in the country but not necessarily on a brownfield site. Strategic considerations will be important in determining this. For example, the clustering of economic activity of a particular sector in a particular area may mean a firm is unlikely to want to locate somewhere else (see Additionality section).

Estimating displacement

3.27 As well as potential deadweight, for some developments economic activity will be displaced from one location to another. In an appraisal we should seek to capture the gross impact of a development (as measured by the land value uplift), and deduct any reduction in economic activity from elsewhere (as well as any deadweight). This will give us the net change in land value (or overall additionality).

3.28 There are various ways in which displacement can be accounted for such as:

- Estimating the total change in land prices for all areas e.g. using a land-use transport interaction model;
- Using a spatial general-equilibrium model to estimate how an intervention affects the spatial and sectorial distribution of economic activity; or
- Adjusting the land value uplift for areas with new development.

3.29 Users are free to decide which method is most appropriate, though the method and evidence used should be proportionate to the size and context of the scheme.[30] The third option effectively means converting the gross increase in land value into a net change (or calculating an 'additionality factor'). It should be noted, however, that displacement is more relevant to non-residential developments (see below) and details for how this can be accounted for are given in the additionality section.

[30] A useful definition of proportionality can be found in WebTAG: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427078/webtag-tag-guidance-for-the-technical-project-manager.pdf

Distributional considerations

3.30 In the example in Figure 7, there is a reduction in price following the increase in the supply of a good (commercial floor space or additional housing for example). In this market, the reduction in price in response to the increase in supply means a reduction in land value for those who owned commercial floor space (or housing) before the intervention (this reduction is equal to area A). However, this reduction is a transfer to consumers in the form of increased consumer surplus. For example, the economic benefit of expanding office space is captured by 'companies that use the offices (in the form of rents being lower than they otherwise would have been) or to workers (in the form of higher wages). Income is thus transferred 'from existing office owners to office users'.[31]

3.31 In a housing context, the 'release of new land for development reduces the scarcity of residential land, and so reduces the value of existing residential land. This reduction in value should be regarded as having purely distributional effects – there is a transfer from the asset-rich who lose out from new development, to the asset-poor, including non-home-owners, who gain'.[32]

3.32 In both these examples, the key point is that the change in land value for existing land owners is a transfer and so should be a distributional consideration in the analysis. However, the additional (gross) land value generated by the new development is not a transfer as the land use has now changed into a more productive use (though note this land value may simply be displaced - see Additionality section for further guidance).

3.33 An important point to note is that there is a difference between residential and non-residential development. Constrained supply and high demand for housing mean additional housing supply is likely to have only a marginal impact on land values in other locations. However, while housing derives its value from the flow of consumption services to the occupant household, non-residential developments derive their value from their use in the production process. In other words, while the change in the land price of these areas is a transfer, the change in economic activity in these locations may not be. For example, new entrants replacing the firms that might have vacated an area to move into a new area supported by a government grant may be less (or more) profitable than the businesses they replace. This is explained in the additionality section.

[31] Venables et al (2014, p48)
[32] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427094/webtag-tag-unit-a2-3-transport-appraisal-in-the-context-of-dependent-development.pdf, p9.

Other issues to consider

3.34 Any private costs associated with the development should be included in the appraisal as a dis-benefit and therefore feature in the numerator of the BCR calculation (unless such costs have already been accounted for in the residual land value estimate – see BCR section for further details). All public sector costs should also be included and feature in the denominator of the BCR.

3.35 When carrying out or reviewing an appraisal, it is essential that there is no double counting of impacts. This could be an issue where local land value data is used. Land value data captures the full net private benefit of a change in land value.[33] For example, any utility derived from being close to open space may be reflected the value of the land. In the context of non-residential interventions, in theory, the full private (commercial) benefit of a development will be reflected in the land value, though there may be an external impact on others such as through agglomeration impacts (see Annex F).[34]

[33] If using Valuation Office Agency (VOA) figures on land value uplift, these already include the amenity cost of greenfield development.
[34] Consideration will also need to be given as to whether changes in land value are due to existence of transfers e.g. the possibility that the land may benefit from tax-breaks. This could cause the value of the land to change but would represent a transfer from the exchequer to landowners. If the land value increases simply due to the existence of a transfer then this will need to be offset by an equal amount as transfers should have no impact on the NPPV.

Section 4: Assumptions list

4.1 This section sets out in alphabetical order recommended assumptions to use in a DCLG appraisal. In some instances – such as with additionality and optimism bias – the relevant assumptions should be formed on a case-by-case basis taking into account the guidance below. Users will therefore need to exercise judgement on the precise assumptions to make.

Additionality – quantitative guidance

4.2 Section 3 outlined the methodology for assessing additionality for all forms of development. This section provides guidance on quantifying the size of the additionality.

4.3 Additionality refers to the extent to which an outcome is genuinely additional. The net impact of a policy therefore excludes any deadweight – impacts which would have happened anyway – and ensures any negative impacts – such as reduced economic activity from elsewhere (displacement) and any economic impacts occurring outside the target area[35] (leakage) are also accounted for.

4.4 Therefore, in order to estimate the correct level of additionality, it is essential to properly determine the counterfactual and work through the logic model of the intervention i.e. clarifying the chain of causation through which inputs translate into outputs and outcomes, both desirable and otherwise. A useful guide to additionality and how users might decide appropriate levels of additionality is the Homes and Communities Agency Additionality Guide (formerly English Partnerships Guide).[36] The HCA formula for estimating additionality is:

[35] When assessing the overall NPPV and BCR of a policy, the target area is the whole economy so leakage would be with respect to international leakage. However, as part of any distributional analysis, when considering significant spatial impacts, leakage would be with respect to the target area of the policy which would be more local.
[36] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/191511/Additionality_Guide_0.pdf

Figure 8: Additionality equation

$$AI = [GI \times (1 - L) \times (1 - Dp) \times (1 - S) \times M] - [GI^* \times (1 - L^*) \times (1 - Dp^*) \times (1 - S^*) \times M^*]$$

Where:

AI = Net additional impact

GI = Gross impact

L = Leakage[37]

Dp = Displacement[38]

S = Substitution[39]

M = Multiplier

* denotes reference case and hence deadweight[40]

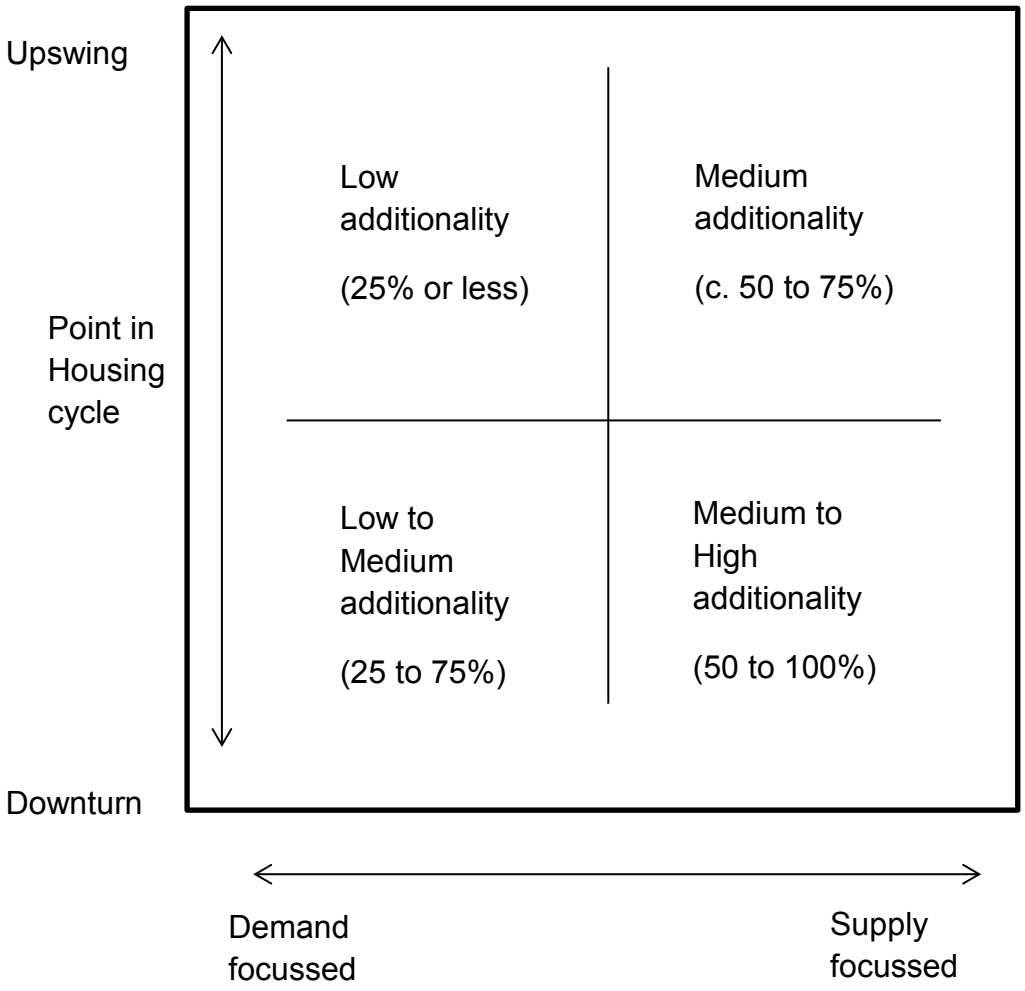
Additionality for residential developments

4.5 Ex-ante assessment of additionality is often extremely difficult to quantify, and therefore any figures used should be subject to rigorous sensitivity analysis as part of the appraisal. Users may wish to calculate a switching value of additionality that gives an overall NPPV of zero for the policy (BCR of 1) i.e. what number or percentage of dwellings would need to be genuinely additional in order for benefits to exactly equal costs. However, conceptually, an ex-ante assessment of additionality can be arrived at using judgement on the degree to which an intervention could be argued to be demand or supply focussed, as well as the point in the housing cycle (timing) the measure comes into force.

4.6 This is shown diagrammatically below. Please note the ranges in the diagram are not hard limits and are for guidance only e.g. there could be a downturn demand-focused policy with lower than 25% additionality.

[37] **Leakage:**Refers to the extent to which the effects "leak out" of the target area into the surrounding area by for example workers commuting in to take up new employment opportunities.
[38] **Displacement:**The degree to which an increase in productive capacity promoted by government policy is offset by reductions in productive capacity elsewhere
[39] **Substitution:**The situation in which a firm substitutes one activity for a similar activity (such as recruiting a different job applicant) to take advantage of government assistance.
[40] Data Book 4.0.1: Additionality Guide, HCA

Figure 9: Framework for assessing additionality



4.7 It is worth noting that this framework should be used as a starting point for assessing additionality. The bracketed figures above are general guides, or starting points, which should be altered to better reflect policy specifics, such as targeting, or scheme specific information that allows an assessment to be made outside of a conceptual framework.

4.8 The following section sets out potential additionality assumptions that could be used in the absence of alternative evidence to help inform the value for money of a housing intervention:

4.9 **0-25% additionality:** policies which fall into this category will be demand focussed and / or about bringing forward housing delivery i.e. the same outcome would have happened in the absence of the intervention but at a later date. The market failure underpinning the intervention may also be less prevalent than in the past (such as access to finance, though we may still expect this to be significant for Small and Medium Enterprises). These policies are therefore likely to have a relatively large amount of deadweight and displacement associated with them.

4.10 **25-50% additionality:** policies which fall into this category may be demand or supply focussed but the level of additionality is higher because of the point in the housing cycle when the intervention takes places, and / or because the market failure (ideally supported by local evaluation evidence) is stronger. For example, the policy may be targeted at a particular group like Small and Medium Enterprises (SMEs) or first time buyers. The level of deadweight is therefore likely to be relatively small, though displacement is still likely to be significant.

4.11 **50-75% additionality:** policies which fall into this category will usually be supply focussed with good supporting evidence justifying the additionality assumption. Deadweight and displacement are likely to be relatively small. An example would be Affordable Housing where there is strong evidence to suggest housing of this type is unlikely to be built by private developers in the absence of policy and very little crowding out of private development occurs in practice.

4.12 **75%+ additionality:** policies which fall into this category will usually have a strong supply focus with good supporting evidence. Deadweight and displacement are likely to be small. For example, it could be a policy where there is relatively high ‘clean-up’ costs which mean the site is unviable (and so would not go ahead in the counterfactual) and, like a Garden City, a condition of funding could be that housing would need to be delivered on top of local plans. The site may also be located in an area of high housing need. General economic conditions might also be relatively muted, maximising any additional impacts on the demand side (if applicable).

Additionality for non-residential developments

4.13 As Section 3 explains, one way of accounting for potential displacement and deadweight is to adjust the gross land value uplift estimates of an intervention. To guide users on how this adjustment could be done, the following framework could be used in conjunction with sensitivity analysis in a non-residential appraisal. This framework should be read in conjunction with the market failure and counterfactual discussion in Section 1. Please note, the size of the adjustment factors are purely a guide. **If there is evidence on the appropriate size of these adjustment factors then this should be used in the first instance.** In the absence of this information, the illustrative figures can be used.

4.14 The framework sets out various criteria that would need to apply for there to be minimal displacement and deadweight from a particular intervention. For example, the existence of a market failure and strong strategic rationale for a development – such as a firm wishing to expand in an area where there is a clustering of industry but is unable to do so because of a market failure in the lending market - and if the industry under consideration has a relatively low level of displacement then we would expect relatively small levels of displacement and deadweight. Therefore, the net impact would be a relatively small adjustment to the gross land value e.g. 75% of the gross land value.

4.15 On the other extreme, where there is a weak market failure and strategic rationale for intervening, and where the industry under consideration suffers from significant displacement (such as retail), we would adjust the gross land value significantly, with the net impact being 25% or less of the gross land value created.

4.16 Users will need to exercise judgement on the appropriate size of the adjustment to use taking into account the criteria below. As part of any sensitivity analysis, it may be useful to calculate a 'switching value' i.e. the size of the additionality factor required to make the development NPPV positive.

4.17 The sensitivity analysis on the land value estimate, as well as the potential for non-monetised impacts and the externalities in Annex F, should inform the value for money category and 'adjusted' BCR. In particular, this sensitivity analysis will be useful in arriving to an overall judgement on the value for money category and whether the value for money category is highly sensitive to adjustments to the gross land value.

Figure 10: Additionality framework for non-residential development

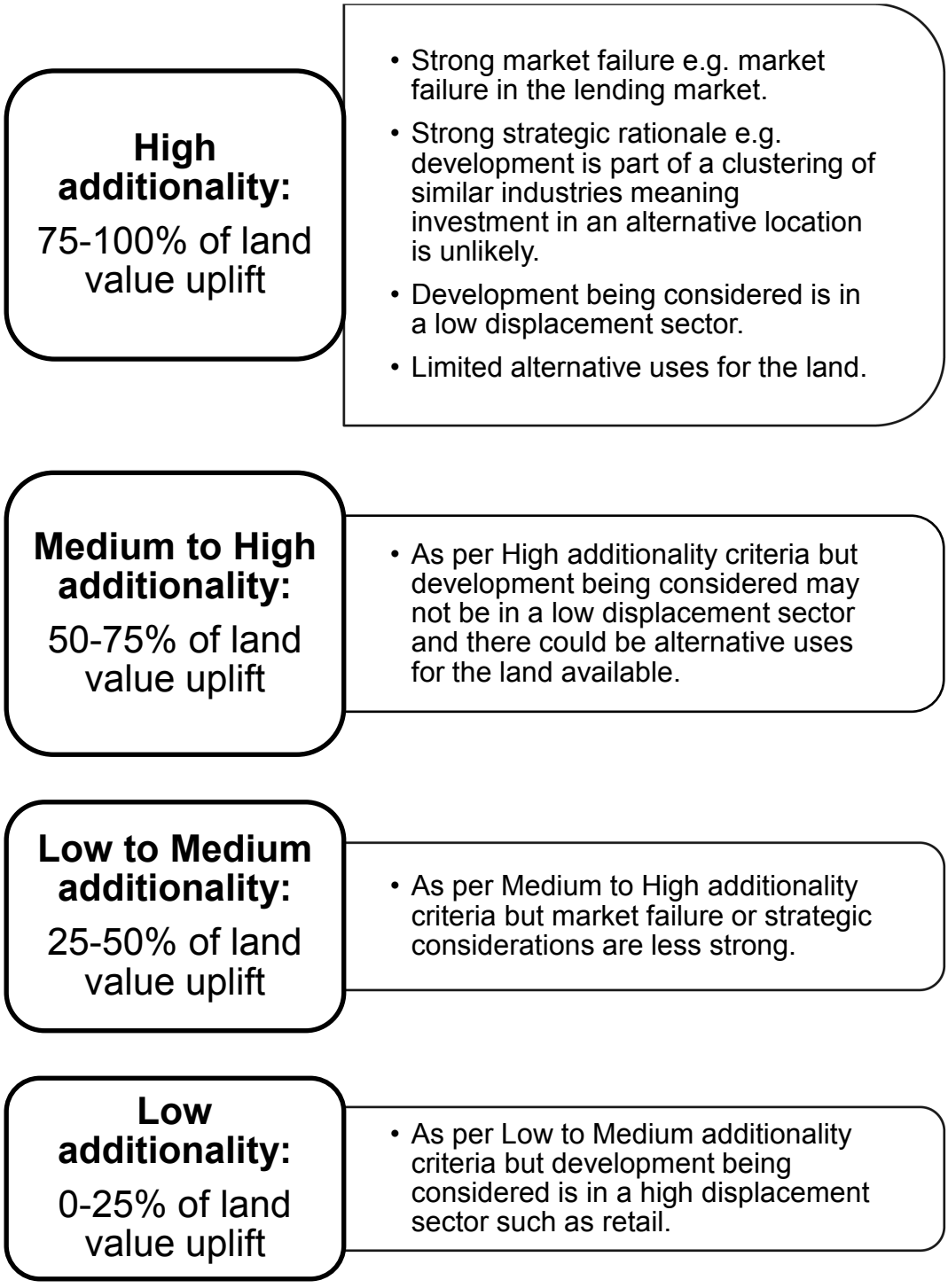


Figure 11: the link between additionality and BCRs

There is a direct link between the size of the additionality associated with a policy option and the estimated BCR. This is particularly important to note when private benefits represent a significant proportion of overall benefits. When this is the case, in the absence of a sound rationale for intervention such as a market failure, it would be reasonable to assume that in the absence of government intervention these private benefits would materialise anyway. This would suggest such a policy option would have significant deadweight and minimal additionality, and therefore a low BCR. However, where there is evidence of a market failure preventing a development from taking place in the absence of government intervention, it would be reasonable to assume there is less risk of deadweight and greater levels of additionality associated with the policy (meaning a higher BCR).

Administrative costs of regulation

4.18 Time costs can be measured using the Standard Cost Model.[41] In appraisal we will often be required to estimate the time costs to individuals and business. Common examples are familiarisation costs as a result of changes to regulations which require businesses to read and understand new rules. We may also be interested in policies which save individuals and business time, perhaps as a result of a deregulatory policy such as the Housing Standards Review. The Standard Cost model suggests valuing one hour of time using the Annual Survey of Hours and Earnings (ASHE) and adding 30% for overheads.[42] For some sectors, such as construction, the ASHE +30% may be considered an underestimate in which case sector specific data can be used, or a blended price between the industry data and ASHE+30%. Also see Regulatory Transition costs.

Appraisal period

4.19 This should be at the discretion of the user with a key objective being striking the right balance between capturing all material impacts in the cost-benefit analysis and maintaining a reasonable level of confidence in the results (given the exponential rise in uncertainty with respect to time). However, costs and benefits should normally be extended to cover the period of the useful lifetime of the assets under consideration. Recommended defaults should be 10 (a common appraisal period for IAs), 30 or 60 years depending on the intervention being considered.

[41] Data Book 4.1.2: http://webarchive.nationalarchives.gov.uk/20090609003228/http://www.berr.gov.uk/files/file44503.pdf
[42] http://www.ons.gov.uk/ons/rel/ashe/annual-survey-of-hours-and-earnings/index.html

4.20 Longer appraisal periods are likely to be required for environmental interventions while shorter appraisal periods may be more relevant to small regulatory changes as per Better Regulation Executive Guide which states that 'where the appropriate appraisal period is not identifiable, a ten-year period should be used for the analysis.'[43] It may also be appropriate to include an allowance for the on-going value of an asset where the appraisal period is truncated.

Distributional weights

4.21 The Green Book provides guidance on the use of distributional weights in cost benefit analysis. The use of distributional weights will be most relevant to policies that have a significant progressive element to them i.e. if the policy benefits low income individuals relatively more than high income individuals. If so, then distributional weights can be used in the calculation of the 'adjusted' BCR but the judgement made on the size of any distributional weights should be made clear for decision makers. Any distributional weighting of impacts should be presented alongside the 'unadjusted' cost benefit analysis. See Annex G for an example of how distributional weights have been applied in housing.

Employment

4.22 See employment section for recommended approach.

External impacts of development

4.23 Land value uplift aims to capture the net private benefit associated with a development. However, there are external impacts not accounted for in the land value uplift which should be considered in an appraisal. Some external impacts have well established methodologies - for example valuing carbon emissions - but others, particularly those specific to development, require further work so they can be operationalised into an economic appraisal. A selection of these external impacts is given Annex F. However, all external impacts should be considered in an appraisal and form part of the value for money assessment.

[43] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/421078/bis-13-1038-Better-regulation-framework-manual.pdf, p67.

GDP

4.24 If the appraisal involves using future GDP levels or requires the uprating of a variable in line with GDP, the default data to use should be the Office of Budget Responsibility's latest GDP forecast. This can be found on the OBRs website.[44]

House price index

4.25 The Office for Budget Responsibility (OBR) produces a forecast of the mix-adjusted house price index (based on the existing Office for National Statistics indices) at a national level. These are published as part of OBR's Economic and Fiscal Outlook, and can be found in their supplementary economy tables.[45] If necessary, future prices beyond the forecast period should be assumed to be in line with long term nominal income growth, consistent with OBR's forecasting methodology. The current long term nominal income growth is 4%. House price assumptions need to be internally consistent with assumptions made on house building rates. In some instances it may be appropriate to deviate and co-vary both sets of assumptions in sensitivity analysis.

4.26 Depending on the spatial distribution of the policy, it may not be appropriate to use national assumptions for house prices – especially if calculating future returns on investments through e.g. financial instruments in the near term. Users may wish to consider housing cycles at a sub-national level to convey divergences in house price growth at different spatial scales, within the bounds of the national forecast. However, price growth should be assumed to converge towards the long term growth rate of income, as before.

Indirect taxation correction factor

4.27 The indirect taxation correction factor is used to convert between market prices and factor prices. The latest estimate is published by the Department for Transport on WebTAG. This can be found by clicking here.

[44] Data Book 4.2.1 http://budgetresponsibility.org.uk/publications/
[45] See: http://budgetresponsibility.org.uk/efo/economic-fiscal-outlook-march-2016/

Inflation

4.28 The default should be the GDP deflator. This can be found on the HM Treasury website or by clicking here. For future years not covered by the GDP deflator the Bank of England inflation target (currently 2%) should be used.

Land value uplift

4.29 For quantitative assumptions see Annex C, Annex D and Annex E.

Learning rates

4.30 Where particular prices are expected to increase at significantly higher or lower rates than general inflation, the relative price change should be calculated and factored into the economic appraisals.

4.31 Cost and performance of different technologies can change over time as manufacturers and installers develop processes and technologies that improve performance and reduce costs through experience. For instance if the size of the market for a particular good or service increases, then there is a greater potential for economies of scale, and relative prices may then also be expected to reduce.

4.32 An evidenced estimate for appropriate learning rates for such technologies should be applied. An example is a 'Solar PV cost update' published by the Department of Business, Energy and Industrial Strategy.[46]

Optimism bias

4.33 Optimism bias (OB) is the systematic tendency for forecasts to underestimate costs and overestimate benefits. Costs and benefits need to be adjusted for OB to gauge the robustness of the value for money of a project. As the Green Book makes clear, the precise level of OB will vary according to the level of uncertainty (for example if you are at the early stages of designing a policy) and the quality of the data and research in the area.[47]

[46] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/43083/5381-solar-pv-cost-update.pdf (see paragraph 4.1.2). Also see Green Deal IA: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/42984/5533-final-stage-impact-assessment-for-the-green-deal-a.pdf

[47] Data Book 4.3.2 and 4.3.3

4.34 Optimism bias should be used to inform decision makers about the risks of costs being higher and benefits being lower than forecast. It is therefore a useful concept in assessing the robustness of a project's overall value for money. All value for money metrics – the NPPV and BCR – should be calculated with OB included. However, in the financial case of a spending proposal, the OB adjustment should be excluded and instead a reasonable level of contingency should be made (which will be linked to the final level of OB applied in the appraisal at Final Business Case stage - which should ideally be around 2% as per Green Book business case guidance).

4.35 In terms of the level of OB to apply to costs, these should be based on the Green Book supplementary guidance on OB. Alternatively, if there is more recent and local evidence on appropriate OB to apply, then these should be used.

4.36 There are a number of difficulties with applying OB to estimated benefits and users are free to decide the most appropriate way of accounting for the risk that the estimated benefits will not materialise. In the context of land value uplift, this includes recognising that some of the land value will not be realised due to atypical costs and inefficient firms. However, it should be recognised that when local land value data is used, these risks may, to a large extent, already be accounted for in the private valuation of the land.

Planning applications

4.37 Analysis of the relationship between the number of planning applications and real GDP growth suggests there is a cyclical relationship between the two. Ten year average growth rates (excluding an obvious anomaly in the planning application series in 2008/09) show a close to one-to-one relationship and our provisional modelling of this relationship also suggests a similar relationship. In light of this we recommend the assumption of a one-to-one relationship between real GDP growth and the number of planning applications.

Present Value year

4.38 All future impacts should be discounted back to a common year in order to calculate their present value. The discount rate should be Green Book consistent. The recommended default should be to discount impacts back to the earliest of the following: year in which the first public investment is made, year in which the project opens or year in which the policy takes effect. [48] For EANCB

[48] Data Book 4.4.1

estimates please consult the BRE guidance for the relevant year (and price base) to discount to.

Private sector cost of capital

4.39 The estimated cost of capital will depend on prevailing market conditions and sector under consideration, e.g. varying with the financing structure (debt / equity mix) of the firms and the riskiness of the business activity. In the absence of alternative data, a typical cost of capital of 10% can be used, though sensitivity analysis around this (7-15%) should be undertaken.

Rebound effects

4.40 Policies which improve energy efficiency may result in energy consumers choosing to use some of their financial savings to buy more energy, for instance for improved comfort. This is known as the 'rebound effect'. Guidance on valuing direct rebound effects can be found in supplementary green book guidance on 'Valuation of energy use and greenhouse gas (GHG) emissions'.[49]

Regulatory transition costs

4.41 Transient, or one-off costs or benefits that occur, which normally relate to the implementation of the measure, should be monetised in addition to on-going policy costs or benefits. One off administrative burdens includes costs associated with familiarisation with administrative requirements, training, record keeping and reporting, including inspection and enforcement of regulation. The Standard Cost model can also be used to estimate these impacts.

[49] Para 3.39 onwards in Sept 2014 edition https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal

Section 5: Useful sources of information and values

Better Regulation Executive guidance:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211981/bis-13-1038-better-regulation-framework-manual-guidance-for-officials.pdf

Department for Transport databook:

https://www.gov.uk/government/publications/webtag-tag-data-book-december-2015

English Housing Survey (EHS):

https://www.gov.uk/government/collections/english-housing-survey

Homes and Communities Agency Additionality guidance:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/191511/Additionality_Guide_0.pdf

Homes and Communities Agency employment densities guide:

https://www.homesandcommunities.co.uk/sites/default/files/employ-den.pdf

HM Treasury GDP deflator:

https://www.gov.uk/government/collections/gdp-deflators-at-market-prices-and-money-gdp

HM Treasury Green Book and Supplementary and Departmental guidance:

https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent

Office of Budget Responsibility macroeconomic forecasts:

http://budgetresponsibility.org.uk/category/topics/economic-forecasts/

Rural proofing:

https://www.gov.uk/rural-proofing-guidance

BEIS toolkit for valuing carbon emissions:

https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal

Section 6 - Annexes

Annex A – Appraisal Summary Table example and template

A1 A leading aerospace manufacturer is considering investing in an area but requires a government loan to address a market failure in the lending market. The development is on brownfield land and involves significant 'clean-up' costs. The manufacturer claims that without this government support they will invest abroad. This example considers two spending options. As this Annex is about how to complete an AST, we have assumed 100% additionality for simplicity.

Option 1 (preferred option)

A2 The preferred option is a large capital investment from the manufacturer which is forecast to create 1,000 high skilled jobs, 1,000 construction jobs and improve the amenity value of the brownfield land in the surrounding area. This amenity value is estimated to be around £10m over 30 years. The clean-up costs are estimated to be £30m. Illustrative Valuation Office Agency (VOA) data on land value uplift suggests such a development would result in a land value uplift of around £30m.[50] The manufacturer requires DCLG to fund the full £30m clean-up cost in 2016 but is willing to repay £20m of this over 30 years.

A3 However, as a consequence of this development, it is estimated that around 1,000 trees in the local area will be lost.

Option 2

A4 An alternative option is a smaller capital investment from the firm in a nearby area. There would be 500 high skilled jobs created and 500 construction jobs. The amenity value of the brownfield land would improve by £5m over 30 years. The clean-up costs are estimated to be £15m. Illustrative VOA data on land value uplift suggests such a development would result in a land value uplift of around £15m.[51] For this option, the manufacturer requires DCLG to fund the full £15m clean-up cost in 2016 but is willing to repay £5m of this over 30 years.

A5 An AST for these options would look like the following:

[50] Valuation Office Agency data provides illustrative land value uplift estimates based on typical development costs. In this example, the estimated 'clean up' costs are considered atypical and so should be accounted for separately.
[51] Ibid.

Figure 12: Example of an AST

		Option 1 relative to status quo (preferred option)	Option 2 relative to status quo (do minimum)
A	**Present Value Benefits [based on Green Book principles and Green Book Supplementary and Departmental Guidance (£m)]**	£10m	£10m
B	**Present Value Costs (£m)**	£10m	£10m
C	**Present Value of other quantified impacts (£m)**	£10m	£5m
D	**Net Present Public Value (£m) [A-B] or [A-B+C]**	£0-10m	£0-5m
E	**'Initial' Benefit-Cost Ratio [A / B]**	1	1
F	**'Adjusted' Benefit Cost Ratio [(A + C) / B]**	2	1.5
G	**Significant Non-monetised Impacts**	Loss of 1,000 trees in local area	
H	**Value for Money (VfM) Category**	ACCEPTABLE	ACCEPTABLE
I	**Switching Values & rationale for VfM category**	If non-monetised costs > £1 then 'adjusted' BCR is Acceptable Value for Money and if > £10m then Poor value for money. £10m equals £10k per tree so consider policy to be Acceptable VfM.	No significant non-monetised impacts so policy is Acceptable VfM
J	**DCLG Financial Cost (£m)**	£30m in 2016/17	£15m in 2016/17
K	**Risks**	Analysis only based on illustrative land value data	Analysis only based on illustrative land value data
L	**Other issues**	1,000 high skilled jobs and 1,000 gross construction jobs associated with policy	500 high skilled jobs and 500 gross construction jobs associated with policy

A6 The table below illustrates how these numbers have been derived.

Figure 13: Calculations underlying AST

	Option 1 relative to counterfactual (preferred option)	**Option 2 relative to counterfactual (low cost option)**
Land value uplift[52] (a)	30	15
Improved amenity value (b)	10	5
Clean-up cost (c)	30	15
Manufacturer payment to DCLG (d)	20	5
DCLG financial cost (e)	30	15
Present Value Benefits[53] (f) = (a) – (d)	10	10
Present Value Costs (g) = (c) – (d)	10	10
Other impacts (b)	10	5
Net Present Public Value (f) – (g) & (f) - (g) + (b)	0-10	0-5
Initial Benefit Cost Ratio (f) / (g)	1	1
Adjusted Benefit Cost Ratio [(f) + (b)] / (g)	2	1.5

[52] In practice this would be adjusted for additionality but have assumed 100% additionality for the purposes of illustrating an AST.
[53] For simplicity, we have not included here the clean-up costs because of the corresponding DCLG financial support which would just cancel out.

Figure 14: AST Template

		Option 1 relative to status quo (preferred option)	Option 2 relative to status quo (do minimum)	Option 3 relative to status quo
A	**Present Value Benefits [based on Green Book principles and Green Book Supplementary and Departmental Guidance (£m)]**			
B	**Present Value Costs (£m)**			
C	**Present Value of other quantified impacts (£m)**			
D	**Net Present Public Value (£m) [A-B] or [A-B+C]**			
E	**'Initial' Benefit-Cost Ratio [A / B]**			
F	**'Adjusted' Benefit Cost Ratio [(A + C) / B]**			
G	**Significant Non-monetised Impacts**			
H	**Value for Money (VfM) Category**			
I	**Switching Values & rationale for VfM category**			
J	**DCLG Financial Cost (£m)**			
K	**Risks**			
L	**Other issues**			

Annex B – GVA approach to appraising development

B1 This annex explains a previously used methodology for appraising non-residential development. This approach is no longer used by the Department and instead changes in land value are used as the primary means of appraising the net private impact of a potential development.

B2 It is important to note that social valuation of a policy or project undertaken to improve land use can be valued in principle either by estimated changes in land values or by estimated changes in the value of the factors that cause the land value to increase (or changes in the economic rent extracted from that land).

B3 In practice, a previous approach to appraising commercial development involved the following:

- Estimating new commercial floor space: The creation of new commercial floor space was assumed to directly increase economic output by enhancing the capital stock and through raising the productivity of workers. At the time, commercial land value data was considered of insufficient quality to accurately estimate the change in land values following the designation of land for commercial property. Instead, the value of the output of new commercial property was estimated by looking at the additional total value added within new commercial space.

- Estimating new commercial value: To estimate the additional commercial value, the appraisal sought to estimate the additional labour supported by the development. This was calculated using the employment density assumptions and additionality estimates set out in HCA publications (see Section 5). This employment estimate was then combined with Gross Value Added (GVA) data to estimate the net impact of the development. GVA data was used because it was considered more accurate than wages as it also incorporated returns to capital.

B4 Given the GVA of each job was unlikely to be known with precision, regional GVA data was used to provide an estimate of the annual value of jobs created. These employment outcomes were assumed to build up over a three year period following the creation of the floor space. Assumptions were also made about the persistence of each job (assumed to be 5 years).

B5 Therefore, this approach to valuing non-residential development relied on a number of assumptions, some of which were based on self-reported evaluation evidence. The approach also involved estimating a net employment impact which is now inconsistent with the guidance on monetising employment impacts.

B6 While there are drawbacks associated with the land value approach, the DCLG Appraisal Group considers it to be a more suitable and robust approach to appraising the potential private impacts of a development for DCLG policies. It has the unique advantage of being based on observable market data. This estimate can then be built on to include external impacts and other potential impacts.

Annex C – Land value uplift for residential development

C1 The methodology for appraising development is explained in detail in Section 3. This annex provides further detail on how this methodology can be applied in the appraisal of residential development. It should be noted that where local land value data is available, this should be used in the first instance. Where it is not available, the illustrative Valuation Office Agency (VOA) data referred to in this annex can be used. A worked step-by-step example is also provided. Please note this methodology is also set out in WebTAG.[54]

C2 The value to society of a planning decision to grant permission for residential development may be separated into:

- The private benefit associated with the change in land use, as represented by the change in land value arising from the land moving from its current use to a more productive use. This change is defined as the value of the land in its new use (in this case residential) minus the value of the land in its existing use (e.g. agriculture);

- The net external impact of the resulting development, including any loss or gain in amenity.

C3 The equation becomes:

$$Net\ private\ value\ of\ housing = Residential\ land\ value\ [1] - Existing\ land\ use\ value\ [2]$$

$$Net\ social\ value\ of\ housing = Net\ private\ value\ of\ housing + Net\ external\ impact\ of\ housing\ development\ [3]$$

C4 A range of non-transport infrastructure is required to facilitate new development, including water, sewerage and electricity connections. The impacts of granting planning permission may be attributed jointly to the land use development and any accompanying infrastructure improvements, including those relating to transport. It would not be appropriate to ascribe the impacts to the development, or to the transport intervention, in isolation.

[54] https://www.gov.uk/government/publications/webtag-tag-unit-a2-3-transport-appraisal-in-the-context-of-dependent-development

C5 Note that costs of infrastructure, whether borne by developers or by the exchequer, do not affect the overall valuation of the change in land use outlined above. However, the incidence of infrastructure costs does have distributional effects – to the extent that developers contribute towards these costs, we would expect the costs to be 'passed back' to landowners in the negotiated price of undeveloped land, so reducing the surplus that otherwise accrues to landowners on the grant of permission.

Residential land value [1]

$$\begin{aligned} &Residential\ land\ value \\ &\quad = hectarage\ of\ dependent\ housing \\ &\quad \times residential\ land\ value\ per\ hectare \end{aligned}$$

C6 Users must firstly calculate the hectarage of dependent housing. The total value of the land in planned residential use is then estimated by multiplying that hectarage by a per hectare residential land value.

C7 For appraisal, the Green Book advises that 'market prices may need to be adjusted for tax differences'.[55] Market land values are reduced by affordable housing requirements, which act as a tax that allocates a proportion of the total value to society of new housing towards building additional affordable housing. The DCLG 'Land value estimates for policy appraisal' (2015)[56] therefore provide residential land values (for each local authority in England) excluding affordable housing requirements, to provide values for appraisal which reflect the full value to society of new housing.

Existing land use value [2]

$$\begin{aligned} &Existing\ land\ use\ value \\ &\quad = \{hectarage\ of\ dependent\ housing\ on\ PDL \\ &\quad \times (per\ hectare\ value\ of\ land\ in\ industrial\ use\} \\ &\quad + \{hectarage\ of\ dependent\ housing\ on\ non-PDL \\ &\quad \times (per\ hectare)\ value\ of\ land\ in\ agricultural\ use\} \end{aligned}$$

Note PDL = previously developed land

[55] HM Treasury (2003, p19)
[56] Data Book C.0.1: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/488041/Land_values_2015.pdf or DCLG: Valuing the external benefits of undeveloped land, available from the National Web Archives.

C8 Users must then calculate the hectarage split between previously developed land (PDL, also known as 'brownfield') and undeveloped land (non-PDL, also known as 'greenfield'), of the land for residential development. The overall value of the land in existing use is then estimated by multiplying the PDL and non-PDL hectarages by corresponding per hectare values.

C9 For PDL, a regional-level per hectare value for industrial and warehouse land can be used; for non-PDL, a regional-level per hectare value for agricultural land in mixed use can be used. The DCLG 'Land value estimates for policy appraisal' publication (2015)' contains average value estimates for industrial and agricultural land in England, though users may draw upon alternative sources of evidence to inform estimation of land values in areas of dependent development.[57]

Net external impact of housing development [3]

$$\begin{aligned} &Net\ external\ impact\ of\ housing\ development \\ &\quad = \{hectarage\ of\ dependent\ housing\ on\ non-PDL \\ &\quad \times (per\ hectare)\ external\ impact\ of\ development\ on\ non-PDL\} \\ &\quad + transport\ related\ external\ impact\ of\ development \end{aligned}$$

C10 The existing hectarage split between PDL and non-PDL for development is also used to estimate the overall value of the external impact of the development. For non-PDL, estimates of the external benefits of undeveloped land, reported in Table 7.10 of the 2001 study 'Valuing the External Benefits of Undeveloped Land' can be used.[58] The mean average of the reported estimates of external benefits of 4 types of land: urban fringe (forested land), urban fringe (greenbelt), intensive agricultural land and extensive agricultural land can be used (see Annex F for values).

C11 For PDL, the external impact of development has not been monetised, though in certain circumstances redevelopment might bring external benefits through, for example, improving the aesthetic value of the area surrounding the development (see Annex F).

C12 Users may draw upon alternative sources of evidence to inform estimation of the external impacts of development.

C13 As noted earlier, there is a further external impact of development to be considered in the overall valuation - the transport costs imposed on existing

[57] Data Book C.0.2 and C.0.3

[58] http://webarchive.nationalarchives.gov.uk/+/http:/www.communities.gov.uk/archived/publications/planningandbuilding/valuingexternal

users of the network, by residents of the new development. These transport-related external impacts of development should be added to the non-transport-related external impacts discussed above (see Annex F for further details).

C14 For any additional housing that is expected to be delivered in future years, the values should be uprated by 5% each year in real terms to the relevant year. The 20 year average annual growth in residential land values is 7% (DCLG statistics published to 2010, extended to 2014 using latest unpublished data). The 20 year average growth in the GDP deflator is 2%. Therefore, the average annual real terms growth in residential land values is 5%. To simplify and in the absence of further data, we (conservatively) assume that this applies to all elements of net social land value uplift (i.e. agricultural land values, industrial land values, and externality values).

C15 When carrying out an appraisal of a housing scheme, the starting point should always be local data. This should include establishing a counterfactual and the number of additional dwellings the policy is then likely to 'unlock'. An estimate of when each additional dwelling is built and the land value uplift for that year can then be used to estimate the economic benefit of the scheme.

Worked example

C16 A hypothetical residential development delivers five hectares (50,000m^2) of greenfield land for residential use. There is evidence of a market failure in the lending market with developer and local agents unable to secure the financial capital to fund supporting infrastructures for the development (for example roads and waterworks). One policy option being considered is a public sector capital grant of £5m. The developer expects to deliver 40 units per hectare. A 'Medium' level of additionality of 50% has been applied to account for deadweight and displacement effects (see Additionality section).

$$\begin{aligned} &Net\ social\ value\ of\ housing\ development \\ &\quad = Net\ private\ value\ of\ housing\ development \\ &\quad + Net\ external\ impact\ of\ housing\ development \end{aligned}$$

C17 One hectare of residential land on a typical site in this area is estimated at around £4.3m[59] in 2013-14 prices which is around £108k per unit for this development.

[59] Further details on illustrative residential land values can be found at: https://www.gov.uk/government/publications/land-value-estimates-for-policy-appraisal

C18 Discounting at the recommended 3.5% rate and using the DCLG assumption of 5% for annual land value inflation means a present land value per unit of £111k when delivered.[60]

C19 The existing use land value is assumed to be typical of prior-use greenfield land in the same area. The VOA estimate a hectare of agricultural use land at around £21k or £540 per unit using the same assumptions above.[61]

C20 For the net external impact in this appraisal the fall in amenity value (external cost) related to greenfield development is estimated to be approximately £173,056[62] per hectare or £4,326 per unit. There are considered to be no external benefits associated with this development.

C21 In this example, the private benefit is equal to £111k – £540 while the external impact is £4,326.

C22 In this scenario the additionality was assumed to be 50% meaning that for five hectares, 100 of the 200 planned units is assumed net additional (a boost to national housing supply that would not have occurred without intervention). This means that the additional development's net private impact is around £110k x 100 = **£11m** while the net external impact is £4,326 x 100 = **£433k**.

C23 In present value terms, a £5 million public sector capital cost is equal to **£4.8m**. No revenue changes or transfer payments are assumed in this case. Therefore, the NPPV and 'initial' and 'adjusted' BCRs are as follows:

$$NPPV = £11m - £433k - £4.8m = £5.8m$$

$$'Initial' \text{ and } 'adjusted' BCR = \frac{£10.6m}{£4.8m} = 2.2$$

[60] The central 5% land value increase assumption is derived from estimates of the value of land accumulating overtime and is under constant review by DCLG analysts.
[61] DCLG analysis of VOA data as of January 1st 2014.
[62] Estimates in change in amenity value are assumed typically as one value per hectare for the whole of England which relates to the loss of green space and other factors. The estimates are based on a widely available DCLG publication - see: http://webarchive.nationalarchives.gov.uk/20120919132719/http://www.communities.gov.uk/documents/planningandbuilding/pdf/158136.pdf

C24 Therefore, the 'initial' and 'adjusted' BCRs suggest this hypothetical policy option represents ‘High’ value for money. Sensitivity analysis could estimate the case under different additionality assumptions as in the below table. Switching values show that assuming either a ‘Low’ or ‘High’ level of additionality substantially changes the value for money case, but even a low impact scenario would not 'tip' the value for money case into the ‘Poor’ category.

Figure 15: Worked example

	25% additionality	**75% additionality**
BCR	1.1	3.3

Annex D – Land value uplift for non-residential development (when local land value data is available)

D1 This note describes DCLG's preferred approach to valuing the impacts of non-residential development. The preferred approach involves the use of land value data to assess the private costs and benefits of a policy. In the absence of reliable land value data, Annex E can be followed which provides illustrative VOA land value data. These estimates may also be a useful cross-check to any locally derived land value data.

The approach

D2 The value to society of a planning decision to grant permission for new non-residential development may be separated into:

- The private benefit associated with the change in land use, as represented by the uplift in land value arising from the land moving from its current use to a more productive use. This uplift is defined as the value of the land in its new use (in this case commercial) minus the value of the land in its existing use (e.g. agriculture);

- The net external impact of the resulting development, including any loss or gain in amenity.

D3 The equation below summarises this:

$$Net\ private\ value\ of\ non-residential\ development = Commercial\ land\ value\ (1) - Existing\ land\ use\ value\ (2)$$

$$Net\ social\ value\ of\ non-residential\ development = Net\ private\ value\ of\ non-residential\ development + Net\ external\ impact\ of\ non-residential\ development\ (3)$$

The calculation

D4 Below is a discussion of the key elements of the appraisal, including the data inputs and underlying assumptions. Note that a number of data inputs must be specified by the user on a case-by-case basis as they relate to the nature of the development in question.

Non-residential land value

$$Non-residential\ land\ value = Hectarage \times Land\ value\ per\ hectare$$

D5 The total value of the land in planned non-residential use is estimated by multiplying the hectarage of land by a per hectare non-residential land value.

D6 The preference would be to use locally derived land value data to estimate the land value from post- development. In practice, land values vary substantially on a site-by-site basis, given differences in, for example, proximity to amenities or density of development. As land value estimates are one component of subjective residual valuations made by developers, it is important that an explanation for how these estimates are derived is clearly set out in the economic case and follow the recommendations set out in the Green Book[63] for site valuation:

- The valuation of a site should be based on the most valuable possible use, rather than the highest value that could be obtained for its current use;
- An assessment of the value of a site in the most valuable alternative use should be based on the advice of suitably qualified and experienced valuation surveyor. Either in-house valuers or external experts can be commissioned to carry out the valuation;
- Valuations should be based on the definitions of 'market value' (MV) used in the 'RICS Valuation of Professional Standards' (the Red Book). Valuations should take into consideration the prospects for development and the presence of any purchaser with a special interest, insofar as the market would do so;
- Site values used should follow the Green Book guidance on prices where 'market prices may need to be adjusted for tax differences'.[64]

D7 Users are encouraged to draw upon alternative sources of evidence to inform estimation of land values in areas of dependent development. Where any site values based on recent sales compare sites that are consistent with the intended development on:

[63] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf
[64] HM Treasury (2003, p19)

- Business use of site: represent values for sites that have the same business use. Commercial property can be used as an industrial plant, a logistics warehouse, a hi-tech lab or as office space and the value generated by each of these developments is very different.

- State of development of site: represent typical levels of value for sites that are ripe for development, in that they have the following conditions:

    - no abnormal site constraints;

    - a planning permission of a type generally found in the area;

    - services to the edge of the site.

- Measures: used to determine the size of the site should be consistent

Existing land use value [2]

$$Existing\ land\ use\ value = Hectarage\ \times Land\ value\ per\ hectare$$

D8 Again, users may draw upon alternative sources of evidence to inform estimation of land values.

Net external impact of housing development [3]

$$\begin{aligned} &Net\ external\ impact\ of\ non-residential\ development \\ &\quad = [Hectarage\ \times\ (per\ hectare)\ External\ impact\ of\ a\ development] \\ &\quad + Transport\ related\ external\ impact\ of\ a\ development \end{aligned}$$

D9 Users may draw upon alternative sources of evidence to inform estimation of external impacts of development. A conservative assumption may be to assume that the net external impact of non-residential development is zero even though redevelopment may bring external benefits through, for example, improved aesthetic value of the area surrounding the development.

D10 The overall benefits related to the development are therefore:

$$\begin{aligned}&\textit{The net social value of the development is}\\&\quad = \textit{Net private value of non} - \textit{residential development } (1-2)\\&\quad + \textit{Net external impact of non} - \textit{residential development } (3)\end{aligned}$$

D11 In which the land value uplift estimate captures the net private benefits and the net external impact captures externalities such as changes in amenity.

Costs

D12 All public sector costs should be included. If the land is owned by the public sector then the public sector will be incurring holding costs assumed to be 2 per cent of the existing value of the land per year. Should the land be used for non-residential development these holding costs will be avoided. This needs to be reflected in the appraisal as a negative cost. Any private costs associated with the development should be included in the appraisal as a dis-benefit and therefore feature in the numerator of the BCR calculation.

Appraisal period

D13 We would expect this to be 10, 30 or 60 years depending on the intervention being appraised.

Timing

D14 The land value uplift is assumed to happen at the same time as a change in land use. There is no assumption that benefits are built slowly over a specified time period. All other costs and benefits will need to be discounted at 3.5 per cent in line with the Green Book.

Multiple sites

D15 Where there are multiple sites an overall BCR may be calculated provided there is a positive uplift on all sites.

Additionality

D16 Not all economic activity associated with the land value uplift of an intervention will be additional i.e. some will be displaced from other locations and some might have occurred in the absence of the intervention (deadweight). As a result, in an

economic appraisal the land value uplift associated with an intervention should be adjusted for additionality.

D17 We would expect, for example, that an intervention where there is strong market failure (e.g. access to finance), a strong strategic rationale (e.g. clustering of similar industries meaning investment in an alternative location is unlikely), where the development is in a low displacement sector and where there is limited alternative uses for the land, then the additionality of the land value created would be relatively high (the additionality section provides some illustrative values which in this case might be around 75 per cent of the gross land value uplift). Where these considerations do not hold we would expect additionality to be significantly lower.

A worked example

D18 Assume a policy option being appraised is a grant of £3.7m for the second phase of works at a 39 acre site owned by the public sector. The land is highly contaminated and the grant is to be used to remediate the land. The remediation of the land would enable businesses to move to an area where there is an existing cluster of businesses in a highly productive sector. Also assume that an additional £4.2m of infrastructure works including road and electricity works simultaneously goes ahead to increase the site's commercial viability. These costs were incurred by the public sector. The land is publicly owned with holding costs of approximately £65,000 per year.

D19 There is data available on the current value of the land and the value of the land post remediation. The future land value estimate is based on the sale of a piece of land in a similar state of development and to be used for the same business use.

Figure 16: Worked example for non-residential development

Factor	Detail
Site area	39 acre (≈ 15 hectares)
Primary cost	£3.7m
Other costs	£4.2m infrastructure works in the first year. A negative holding cost to the public sector without intervention (assumed £65k per year)
Existing use land value estimate	£30,659 per acre
Future use land value estimate	£200,000 per acre

D20 **Costs:** the costs are valued as the net present value costs to the public sector. The costs include the £4.2m infrastructure works and the £3.7m grant less the negative (avoided) annual public holding cost of £65k. Using the 3.5% discount rate this gives a net present public sector cost of £7.1m (appraised over 10 years for simplicity).

D21 **Net private value:** the net private value is calculated using the land value estimates set out above. The new use land value of £200k per acre gives a total value of £7.8 million over 39 acres.[65] Subtracting the £1.2 million[66] existing land (before remediation) gives a net present private value of £6.4m rounded to the nearest hundred thousand and after discounting by 3.5 per cent.[67]

D22 **Net external impact:** the net external impact is estimated to be zero. This is a conservative estimate since there may be an amenity value from the redevelopment. Therefore, the net present social value of the development is £6.4m.

D23 **'Initial' and 'adjusted' BCR:** the 'initial' and 'adjusted' BCR before an additionality factor is applied is:

$$BCR = \frac{Net\ present\ social\ value\ (£6.4m)}{Net\ present\ public\ sector\ cost\ (£7.1m)} = 0.9$$

D24 **Additionality:** the above calculation assumes 100% additionality i.e. that the firm who 'takes over' the site only does so as a result of the intervention and that there is no displacement of economic activity elsewhere. However, although it is reasonable to argue that there would be no deadweight (given the BCR is less than one indicating such an investment by the private sector would not happen given it would not be commercially viable), there may still be some displacement of economic activity from elsewhere.

D25 **Sensitivity analysis:** sensitivity analysis can be used to see how the BCR might change if assumptions were altered, particularly with respect to additionality. For example, a reduction in benefits of 10% reduces the BCR to 0.8.

[65] 39 x £200,000 = £7.8m
[66] 39 x £30,659 = £1,195,701
[67] £7.8m - £1.2m = £6.6m = £6.4m discounted at 3.5% as recommended by the Green Book.

Figure 17: BCRs with varying levels of optimism bias

	10% lower benefits	40% higher costs	51% higher costs	150% higher costs
BCR	0.80	0.65	0.60	0.36

D26 **Sensitivity analysis:** sensitivity analysis can also be used to identify a 'switching value' on the potential amenity benefit of the development i.e. how big does this amenity benefit need to be for the BCR to be 1, 1.5 or 2 for example.

Figure 18: Switching Values using estimates of alternative land values and net external impact

	BCR = 1	BCR = 1.5	BCR = 2
Per acre value of the post-remediated land	£220,000 (+£20k)	£310,000 (+110k)	£410,000 (+210k)
Value of the net external impact needed:[68]	£19k per acre	£112k per acre	£205k per acre

D27 As the sensitivity analysis shows, the BCR of the development could fall to as low as 0.65 if optimism bias of 40% was applied to the costs of the remediation. The BCR could be 1 if the post-remediation value of the land was £220,000 per acre rather than the £200,000 it has been estimated at, or if the value of the net external impact of development was valued positively at 11% of the value of the private benefit instead of being valued at zero. With no other impacts to consider, and given the size of the amenity benefits needs to be relatively large even if 100% additionality is assumed, then this policy option could be considered Poor value for money.

Further example - Enterprise Zone

D28 An Enterprise Zone covering an area of land near an airport is being considered. Evidence suggests there is a need for greater investment in the area to meet the potentially large growth in aerospace firms. However, the existence of market failures - imperfect information and coordination failures around fragmented land ownership – has meant potentially desirable investment has not materialised. It is expected that the policy would enable development to take place by providing an income stream which could repay initial investment costs over time.

[68] Assuming the value of the post remediation land is held constant at its original estimate again.

D29 The land value uplift of the proposal is estimated to be £540m (excluding the effect of any government support). The public cost is the estimated capital costs of £146m and business rate changes which are estimated to be £144m (meaning a £290m total public sector cost). Given (a) there is limited alternative uses for the land (b) there are strategic arguments for any investment to be near an airport and (c) the aerospace sector being appraised (which is likely to suffer from relatively small displacement), a 90% additionality factor is assumed. This level of additionality gives a net land value uplift of £486m (£540m x 90%). The present value benefits are therefore the additional land value uplift created of £486m plus the private benefit of the business rate changes, £144m. This gives a total benefit of £630m. The total costs are estimated to be £290m. Therefore, the NPPV is £340m and the BCR is 2.17.

Further example - Retail and Office development

D30 A new commercial development consisting of retail and office space is expected in an urban area. This investment is forecast to be unlocked by a transport scheme. Analysis of local land value data suggests the non-transport development costs to be around £2.4bn, the estimated profit to firms be £0.7bn and the GDV to be £3.3bn.

D31 The land value before the development is £200k suggesting the change in land value from the development to be £0.18bn (£3.3bn-£2.4bn-£0.7bn-£200k). However, given the transport appraisal captures the transport benefits of the proposal, a significant amount of the land value uplift is likely to be reflected in these transport benefits. Therefore, a low level of additionality is applied to the welfare impact of the number of houses unlocked (25%) and to the level of commercial development (10%). The weighted average level of the additionality is 21%. Given these assumptions, the additional land value created is therefore estimated to be £37.8m (£0.18bn x 21%). The external benefit of this unlocked development is estimated to be £22.2m suggesting a net social value for this development to be around £60m.

Annex E – Estimating value for money for non-residential development using land value uplift numbers where available

E1 This annex provides an approach to valuing the impacts of non-residential development in the absence of local data and is aligned to transport guidance on assessing dependent development.

The approach

E2 The value to society of a planning decision to grant permission for new non-residential development may be separated into two elements:

- The private benefit associated with the change in land use, as represented by the uplift in land value arising from the land moving from its current use to a more productive use. This uplift is defined as the value of the land in its new use (in this case commercial) minus the value of the land in its existing use (e.g. agriculture);

- net external impact of the resulting development, including any loss or gain in amenity.

E3 The equation below summarises this:

$$Net\ private\ value\ of\ non-residential\ development = Commercial\ land\ value\ (1) - Existing\ land\ use\ value\ (2)$$

$$Net\ social\ value\ of\ non-residential\ development = Net\ private\ value\ of\ non-residential\ development + Net\ external\ impact\ of\ non-residential\ development\ (3)$$

The calculation

E4 Below is a discussion of the key elements of the appraisal, including the data inputs and underlying assumptions. Note that a number of data inputs must be specified by the user on a case-by-case basis as they relate to the nature of the development in question.

Non-residential land value

$$Non - residential\ land\ value = Hectarage\ \times Land\ value\ per\ hectare$$

E5 The total value of the land in planned non-residential use is estimated by multiplying the hectarage of land by a per hectare non-residential land value.

OR

$$Non - residential\ land\ value = Square\ metres\ of\ Gross\ Internal\ Area \times Land\ value\ per\ square\ metre^{69}$$

Existing land use value [2]

$$Existing\ land\ use\ value = Hectarage\ \times Land\ value\ per\ hectare$$

OR

$$Existing\ land\ use\ value = Square\ metres\ of\ Gross\ Internal\ Area \times Land\ value\ per\ square\ metre$$

E6 The preference would be to use locally derived land value data to estimate both the existing land value and future non-residential land value. Where these are not available, typical values estimated by the VOA can be used and these are presented in Figure 19. These can also be used to sense check local land value data where this is available.

E7 The VOA provided non-residential land value estimates per square metre for a range of sample areas as of January 1st 2014. The sample values are deemed to be typical of land for commercial use in the given Local Authority. Sample local authorities are two per region and contain a 'Business Park' value and a 'City Centre' value to reflect diversity of locations across a settlement. The exception is London, which has four sample authorities but only 'City Centre' values.

[69] Gross Internal Area (GIA) – this refers to the entire area inside the external walls of a building and includes corridors, lifts, plant rooms, service accommodation (e.g. toilets). It is a widely used metric in calculating building costs, marketing, valuation, property management and rating (in England and Wales) of industrial buildings (including ancillary offices), warehouses and leisure units and also the valuation of new residential developments. Other measures include:
Gross External Area (GEA) – this measurement includes walls, plant rooms and outbuildings, but excludes external space such as balconies and terraces. It has a narrow field of use mostly limited to calculating building costs for large industrial and warehouse buildings, planning applications and approvals, council tax banding, and rating in Scotland for industrial buildings.
Net Internal Area (NIA) – this is commonly referred to as the net lettable or 'usable' area of offices and retail units. It includes entrance halls, kitchens and cleaners' cupboards, but excludes corridors, internal walls, stairwells, lifts, WCs and other communal areas. It is a widely used metric and is the recognised method for marketing, valuation, property management and rating for offices, shops and supermarkets.

E8 The VOA also provides existing use land value estimates for each region: an agricultural use land value (for greenfield development) and an industrial use value (for brownfield).

Figure 19: Net Social Value of typical non-residential development (2014 estimates)[70]

Region	Business Park 'Greenfield uplift' per m^2	Business Park 'Brownfield uplift' per m^2	City Centre 'Greenfield uplift' per m^2	City Centre 'Brownfield uplift' per m^2
East				
Cambridge	£278	£229	£2,538	£2,489
Peterborough	£38	(£11)*	£263	£214
East Midlands				
Nottingham	£43	£12	£238	£207
Leicester	£43	£12	£238	£207
London				
Victoria			£3,455	£3,244
Croydon			£239	£28
Southwark			£1,770	£1,559
Harrow			£186	(£26)*
North East				
Newcastle-u-Tyne	£18	£6	£175	£163
Middlesbrough	£13	£1	£161	£149
North West				
Manchester	£62	£46	£1,772	£1,756
Preston	£33	£16	£178	£162
South East				
Southampton	£43	(£23)*	£161	£94
Reading	£649	£583	£3,294	£3,227
South West				
Bristol	£69	£45	£1,745	£1,721
Exeter	£48	£24	£499	£474
West Midlands				
Birmingham	£62	£40	£1,754	£1,733
Coventry	£33	£12	£188	£167
Yorkshire / Humber				
Leeds	£55	£38	£1,741	£1,724
Sheffield	£23	£7	£238	£222

* these negative values should be set to zero in an appraisal

[70] The greenfield uplift figures include the amenity cost of development.

E9 VOA's non- residential land values should be regarded as illustrative, and represent typical levels of value for sites for development, in that they have the following conditions:

- no abnormal site constraints;
- a residential planning permission of a type generally found in the area;
- services to the edge of the site

E10 VOA's reported land values should be regarded as being at market prices (i.e. gross of indirect tax).

E11 In practice, land values vary substantially on a site-by-site basis, given differences in, for example, proximity to amenities or density of development. Users are therefore encouraged to draw upon alternative sources of evidence to inform estimates of land values.

E12 In using these values, users will need to make a choice from:

- Two site values per region or four in the case of London;
- Site value based on whether the land was brownfield or greenfield;
- Site value based on whether the non-residential development is in the city centre or business park.

E13 The economic case should clearly set out the justification for choices made.

Net external impact of non-residential development [3]

$$\begin{aligned} &Net\ external\ impact\ of\ non-residential\ development \\ &\quad = [Hectarage\ \times\ (per\ hectare)\ External\ impact\ of\ a\ development] \\ &\quad + Transport\ related\ external\ impact\ of\ a\ development \end{aligned}$$

E14 Users may draw upon alternative sources of evidence to inform estimation of external impacts of development. For greenfield site developments a value per square metre is attributed to the development based on the estimated change in amenity value from developing a greenfield site.

E15 The overall benefits related to the development are therefore:

$$\begin{aligned} &The\ net\ social\ value\ of\ the\ development \\ &= Net\ private\ value\ of\ non-residential\ development\ (1-2) \\ &+ Net\ external\ impact\ of\ non-residential\ development\ (3) \end{aligned}$$

E16 In which the land value uplift estimate captures the net private benefits and the net external impact captures externalities such as changes in amenity.

Costs

E17 All public sector costs should be included in the present value costs. If the land is owned by the public sector then the public sector will be incurring holding costs assumed to be 2 per cent of the existing value of the land per year. Should the land be used for non-residential development these holding costs will be avoided. This needs to be reflected in the appraisal as a negative cost. Any private costs associated with the development should be included in the appraisal as a dis-benefit and therefore feature in the numerator of the BCR calculation.

Appraisal period

E18 We would expect this to be 10, 30 or 60 years depending on the intervention being appraised.

Timing

E19 The land value uplift is assumed to happen at the same time as a change in land use. There is no assumption that benefits are built slowly over a specified time period. As the land value figures provided by the VOA are likely to be for a fixed time in the year these will need to be inflated to reflect prices at the time of the change in land use. The current assumption is 5 per cent per year.

E20 All other costs and benefits will need to be discounted at 3.5 per cent in line with the Green Book.

Multiple sites

E21 Where there are multiple sites an overall BCR may be calculated provided there is a positive uplift on all sites.

Calculating a Benefit Cost Ratio where land value numbers are provided

E22 A hypothetical City Deal involves a capital investment of £20.5 million into sites near a marina to finance 23,000m^2 of floor space for non-residential (commercial) development in an area that has a cluster of firms in marine science, commercial docks and yacht manufacturing. There is evidence of market failure in the lending market which has restricted firms' access to finance. Much of the land was formerly owned by Ministry of Defence (MoD). The development would continue to be in proximity to MoD land and required significant investment for it to be used for commercial development in line with MoD guidelines. The specific design of the development requires close proximity to the marina and very few other properties, if any, could be considered as suitable alternatives.

Figure 20: Worked example of a non-residential appraisal

Factor	Detail
Site area	23,074m^2 (Gross Internal Area) delivered over 8 years beginning in 2017/18.
Primary cost	£20.5m
Other costs	-
Existing use land value estimate	Not provided
Non-residential (commercial) use land value estimate	Not provided

E23 **Costs:** the costs are valued as the net present value cost to the public sector. The capital cost of £20.5m discounted at the 3.5% discount rate gives a net present public sector cost of £19.8m

E24 **Benefits:** if we hypothetically assume this City Deal is in the South West and that the land had previously been developed and was likely to attract relatively high value added businesses and jobs compared to the rest of the South West region, then the Bristol 'City Centre' Brownfield net social value could be used. Using this value the estimated net present benefits are £43.6m.[71]

[71] 23,074 x £1,721 = £54.9m = £43.6m discounted at 3.5% per year as guided by the Green Book.

E25 **Additionality:** the market failure in the lending market would suggest the development is unlikely to happen in the absence of the intervention. Furthermore, the strong strategic considerations of clustering and the type of sector being appraised suggest displacement of economic activity is unlikely to be significant. Therefore, an illustrative 75% additionality factor is assumed. This would suggest the additional net present value benefit is £32.7m i.e. £43.6m x 75%.

E26 **'Initial' and 'adjusted' BCR:** as discussed, costs and benefits are discounted at the standard 3.5% discount rate set out in the Green Book and the appraisal period is assumed to be 10 years for simplicity. Given the above assumptions, the 'initial' and 'adjusted' BCR would therefore be calculated like so:

$$BCR = \frac{Present\ value\ benefits\ (£32.7m)}{Present\ value\ costs\ (£19.8m)} = 1.7$$

E27 **Sensitivity analysis:** a number of sensitivity tests could be undertaken to assess the robustness and value for money category of this policy option. In this example, one sensitivity test is the 'switching level' of additionality i.e. the level of additionality required for the BCR to equal 1. In this instance the additionality factor needs to be around 45% for the policy to 'break even'.

E28 Judgement will ultimately be required on the appropriate sensitivity analysis to undertake, and in particular, the degree to which land value uplift estimates should be adjusted in light of the market failure and rationale for intervention (see additionality section).

Annex F – Externalities associated with development

Background

F1 An economic appraisal should seek to capture all the benefits and costs of an intervention. Therefore, any external benefits and external costs should be included **in addition** to the estimated net private impacts. To account for such impacts, users should draw on appropriate evidence and guidance to value these impacts.

F2 For DCLG appraisals, to ensure consistency and transparency on what is included in an economic appraisal, only impacts that can be robustly valued using (Supplementary and Departmental) Green Book guidance should be included in the estimate of an 'initial' BCR. Examples of such impacts include greenhouse gas emissions and other environmental impacts such as amenity costs of development as well as crime, transport and health impacts.[72] Distributional impacts and other impacts should be monetised separately and included in an 'adjusted' BCR.

F3 For many DCLG appraisals, land value uplift will represent a significant proportion of private benefits. However, as with all methods, there is a need to account for external impacts, preferably through monetisation.

F4 There are a number of external impacts that are likely to result from a development including potential agglomeration impacts on third parties, health impacts of additional affordable housing and brownfield land clean-up, educational impacts of additional housing, transport externalities, public realm impacts, environmental impacts, and cultural and amenity impacts of development.

F5 However, the evidence base for some of these externalities needs developing and so further research is needed before they can be included in the 'initial' BCR. However, estimates for these externalities should still form part of the appraisal and be included in the 'adjusted' BCR.

F6 To help guide users, this annex provides an illustrative external impact for the external benefit of additional affordable housing. This estimate could feature in the 'adjusted' BCR. However, this externality is 'in development' and is therefore subject to change as further evidence becomes available.

[72] See the following link for supplementary Green Book guidance: https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent

F7 We plan to develop appraisal values for agglomeration impacts on third parties and transport externalities associated with development. However, given DfT are updating their wider economic benefits guidance (which includes agglomeration impacts) the department has concluded that it would be more appropriate to develop an estimate of the potential agglomeration impact of new development in line with this update. It will therefore feature in a future version of the DCLG Appraisal Guide.

Determining whether an impact is an externality

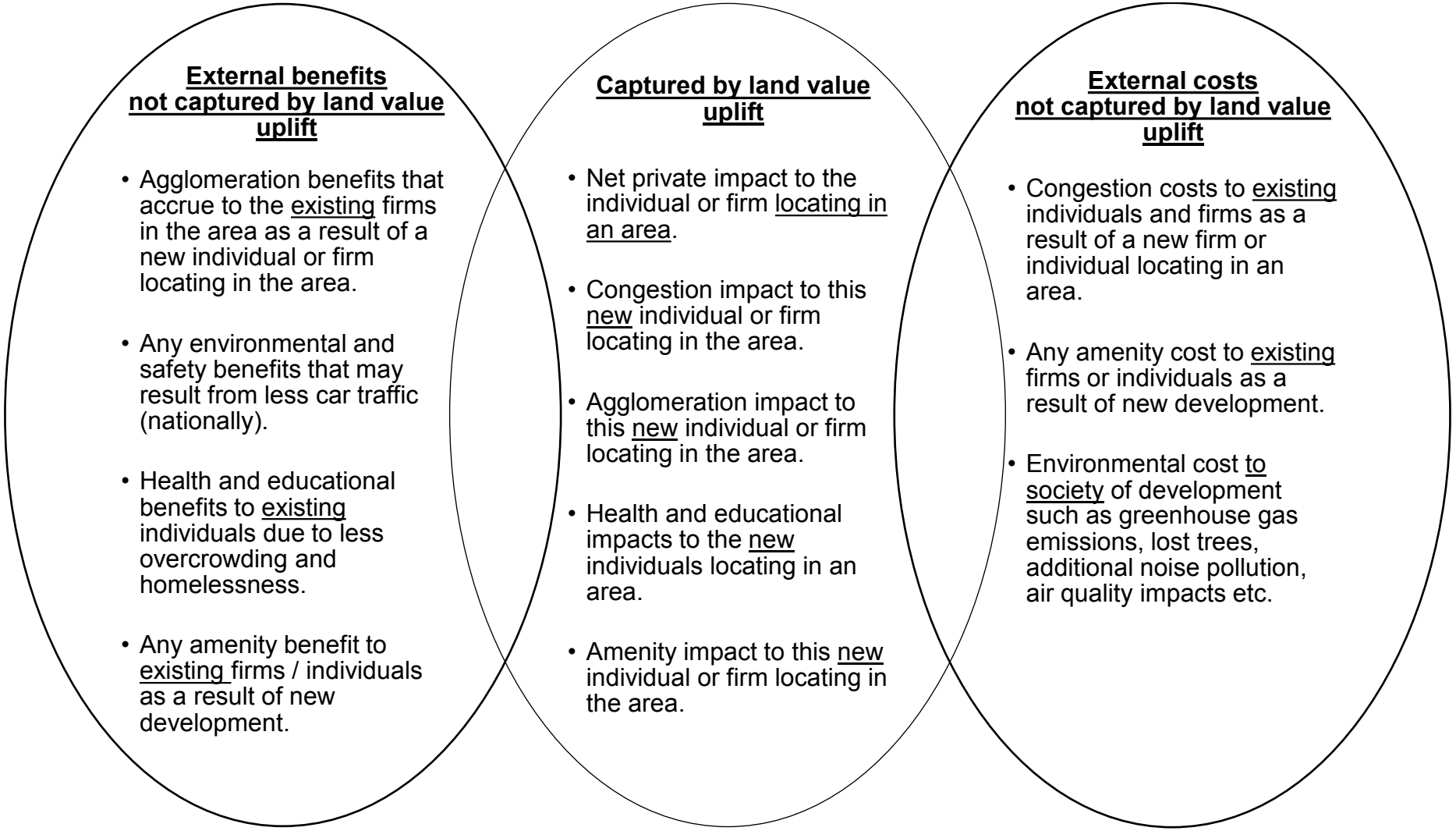
F8 When assessing externalities, it is important to consider whether an impact is already captured in land value uplift and therefore an additional impact which needs to be monetised. The framework below in Figure 21 sets out an approach to do this.

F9 The key question to ask of a potential impact is "who does it affect?" If the impact affects the welfare of an individual or firm moving to an area, then this impact may be fully reflected in price they pay for the land. Where this is the case, these impacts should not be considered an externality. If the impact affects the welfare of individuals or firms already in the area, then this impact will not be accounted for in land value uplift and is therefore an externality. If the impact affects society as a whole (so not exclusively existing individuals or firms in an area), then this impact will not be accounted for in land value uplift and is therefore an externality.

F10 The basis for this is that a firm will consider the returns from all factors of production when making a decision to locate in a particular area. It will therefore consider whether there are any potential spill-over benefits to them from co-location with other firms (agglomeration impacts) and the costs to the firm from higher congestion. For individuals moving to an area, they will also factor in any potential congestion costs and any health, education or amenity benefits they may derive from such a move so this may also already be factored into land value uplift.

F11 However, land value uplift will not account for impacts which affect existing firms or individuals in an area (or society as a whole). These are externalities. For example, any knowledge spill-over impacts enjoyed by other firms will not be taken into account by the firm deciding to locate in an area so are in addition to land value uplift. Similarly, the firm or individual deciding to locate in an area will not take into account the congestion cost they impose on others or the environmental impact of their decisions. These impacts are externalities which need to be accounted for in addition to land value uplift.

Figure 21: Framework for assessing externalities



Illustrative external impacts

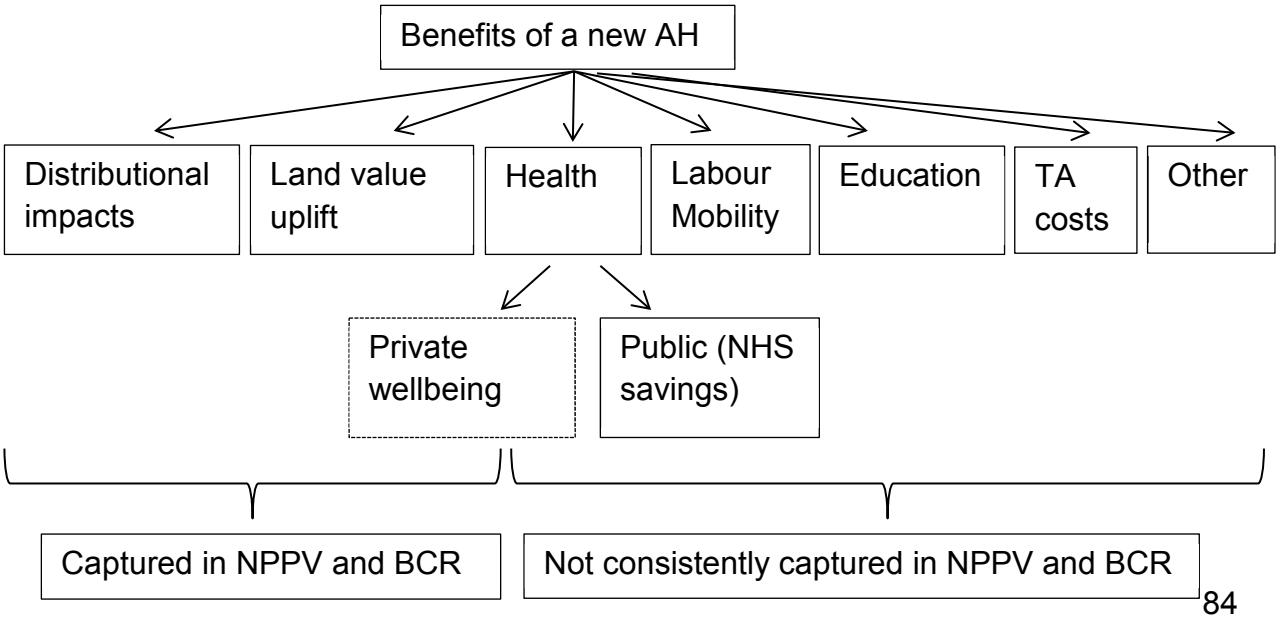
F12 We plan to develop appraisal values for several potential external impacts that are likely to result from a development. These include agglomeration impacts on third parties, the environmental impact of development, the external benefit of developing on previously developed land and the transport costs associated with new development.

F13 As part of this work, we would welcome receiving any evidence and analysis that can help inform this work or on quantification of other external impacts. The following section set out our **working assumptions** on the potential external health impact of additional affordable housing. This work is still **work-in-progress and therefore the assumptions and values should be viewed as illustrative and subject to change**. Users will need to consider under what circumstances these values should be applied and whether the assumptions underpinning the estimates need to be altered according to the intervention being appraised. We would welcome receiving any evidence on the assumptions used.

Health impact of additional rented affordable housing

F14 There are both external impacts and private impacts associated with health improvements. To some extent, the (private) health impact is already captured in land value uplift which will reflect the private consumption benefits of additional rented Affordable Housing (AH). However, there are potential impacts not captured. How far they overlap - and therefore the extent to which they are potentially additional to the private health benefit - is discussed below.

Figure 22: Potential benefits of additional rented affordable housing



84

F15 As the diagram above illustrates, there are a number of benefits associated with an additional rented AH unit. There is the private benefit – as measured by land value uplift which captures the efficiency benefit of converting land into a more productive use – and a potential distributional impact associated with the progressive nature of AH (see Annex G). Both these impacts are captured separately in an appraisal.

F16 However, there are also several impacts which are not monetised. These include fiscal savings from the potential savings on health care, improved labour mobility – increased housing supply lowers housing costs and therefore enables people to live in areas they might otherwise not be able to live – and potentially improved educational outcomes by reducing overcrowding. Finally it can result in savings to exchequer from avoiding expensive temporary accommodation (TA) costs.

F17 This section focuses only on potential health impacts. Assessing the potential significance of these impacts is problematic as these impacts are only likely to materialise if a new rented AH unit (a) enables a household to move away from a housing situation that was imposing an external cost and (b) another household does **not** then move into the same housing situation and instead this property is made either more habitable or could even be demolished (if the latter there may not be any land value uplift associated with the new rented AH unit as it would not be an additional housing unit).

F18 Therefore, in order to estimate the potential health impact of additional rented affordable housing, the probability of a new tenant that had previously been living in a poor condition or overcrowded property needs to be calculated. In addition, as there are large negative health impacts from rough sleeping, an additional house that is allocated to a rough sleeper can be expected to deliver relatively large health impacts (currently around 1% of new lets go to previous rough sleepers). This should be factored into the probability calculations.[73]

Estimating probabilities

F19 In order to estimate the probability that a new tenant had previously been living in either poor or overcrowded conditions, the following working assumptions have been made:

[73] We have focussed on the impact of an additional affordable housing unit so have not accounted for the potential benefits of improving the condition of existing poor quality housing.

- Within the social rented sector (SRS), it has been assumed that those living in overcrowded accommodation are prioritised first;

- 10% of vacated properties are filled by a newly formed household (HH); and

- 1% of new lets go to rough sleepers (CORE data for 2014/15 shows around 1% of new lets to General Needs Private Registered Providers (PRP) are to those who say they were previously rough sleeping).

F20 The formula for estimating the probability that an additional dwelling reduces overcrowding is:

$$Probability\ new\ unit\ reduces\ overcrowding = \\ = (99\% - 10\%\ household\ formation)$$

F21 The 99% assumption is derived from 100% less 1% of new lets going to rough sleepers. The 10% HH formation assumption is the assumed proportion of new households forming as a result of building the new unit. Therefore, an additional house will, to some extent, lead to reduced overcrowding except where there is new HH formation.

Estimating the size of the external impacts

F22 The Building Research Establishment (TBRE) has developed a model to estimate the impact of poor housing on the NHS. This is well established and their 2010 report has been widely quoted including by the World Health Organisation (WHO), National Housing Federation and Age UK. TBRE estimates the number of homes with Category 1 Housing Health and Safety Rating System (HHSRS) hazards and then estimates the cost to the NHS associated with them. There are 29 identified HHSRS hazards, including the risks from cold, damp, falls on stairs etc.

F23 The study estimates the direct (medical) costs to the NHS that are likely to result from the presence of these hazards, using NHS data on costs of treating and caring for related health conditions up to a year following a health incident.

F24 TBRE updated the model in 2014 and their briefing paper on the revised findings published in 2015 reveals that leaving vulnerable people in the poorest 15% of England's housing costs the NHS £1.4 billion per annum in first year treatment costs. The full report of the findings to be published in 2016 will contain findings on the impact of all substandard dwellings, and include wider impacts on peoples' life chances following a housing related incident, as well as the immediate medical costs. Initial estimates imply that the medical costs above are at best 40% of the total cost of society – which are given as £3.5bn. The methodology of the 2010 model is outlined in the TBRE Information Paper 'Quantifying the cost of poor housing.'

F25 Although the TBRE's method is well known, these are impacts for improving the conditions of the worst 15% of housing, which is different to building a new unit. This is where the probability section becomes relevant. Using unit impacts from the table below with some example probabilities gives some indicative health impacts:

Figure 23: TBRE cost estimates[74]

Hazard	No. of Cat 1 Hazards	NHS annual saving if hazard fixed	per unit annual saving (DCLG estimate)
Excess cold	1,325,088	£848,398,538	£640
Falls on stairs	1,352,837	£207,099,936	£153
Falls on the level	543,848	£127,832,318	£235
Falls between levels	239,930	£84,308,287	£351
Fire	128,590	£25,082,026	£195
Collision and entrapment	74,054	£15,789,110	£213
Falls - baths	78,132	£15,739,628	£201
Dampness	53,349	£15,585,129	£292
Hot surfaces	107,168	£15,061,744	£141
Lead	112,051	£13,883,487	£124
Entry by intruders	47,284	£13,179,469	£279
Radon	107,603	£9,028,719	£84
Sanitation (Personal hygiene)	35,222	£4,086,230	£116
Food safety	32,283	£3,742,720	£116
Pests (Domestic hygiene)	28,355	£3,401,754	£120
Overcrowding	23,871	£2,295,332	£96
Noise	6,161	£1,751,983	£284
Carbon monoxide	15,336	£1,489,008	£97
Structural collapse	15,394	£1,324,343	£86
Electrical problems	9,204	£1,230,900	£134
Ergonomics	8,201	£985,487	£120
Un-combusted fuel gas	7,545	£713,935	£95
Lighting	5,453	£624,548	£115
Water supply	4,894	£606,428	£124
Excess heat	1,369	£129,321	£94
Explosions	-	£ -	
Any	3,472,765	£1,413,370,381	£407
Any (excluding overcrowding)	3,448,894	1,411,075,049	£409

F26 An annual saving of £96 over 30 years from overcrowding is equal to around £1.8k over 30 years.

[74] Data Book F.2.1: Taken from https://www.bre.co.uk/filelibrary/pdf/87741-Cost-of-Poor-Housing-Briefing-Paper-v3.pdf

Homelessness evidence

F27 Estimates for the typical per-person cost of the health impacts of homelessness vary, as do estimates of the costs that remain even if they are housed.

F28 There is evidence on health costs for rough sleepers and for those with severe and multiple deprivation. Whilst we only account for the health benefits from rough sleepers here, some of the estimates used are for a broader definition of homeless than just rough sleepers, who may be expected to have higher health costs than other homelessness types which would mean these estimates may be an underestimate. There may also be additional health costs for other types of homeless people accessing social housing that could be considered on top of these.

F29 Estimates for the costs per person per year range from £2,000 to £19,000, with an average of around £7,500.[75] Sources vary, from incidence rates and illustrative scenarios combined with unit costs, to survey data of particular interventions.

F30 Some of these costs are likely to remain even once someone is housed. We have considered two approaches for how to account for this. The first is to subtract the average cost of the general population's use of the same health services, which is around £1,000 per person per year, suggesting a net saving on health of around £6,500. This is likely to be to an overestimate of the savings, as former rough sleepers may be expected to have more health problems than the general population.

F31 The second approach is to only count 27% of the gross costs as being avoided once the rough sleeper is housed, in line with Larimer et al (2009) which would give a net saving on health of around £2,200 per person per year in this case. This may be an underestimate of savings, as the source for the 27% estimate was a study of the chronically homeless with severe alcohol problems (whereas those rough sleepers accessing social housing are likely to have fewer problems than that group). Our working assumption is to take the average of the two approaches which gives a net saving on health costs of around £4,000.

Final calculation

F32 The formula for estimating the external health impacts from additional rented affordable housing is therefore:

[75] Data Book F.2.2: A list of sources is given in the bibliography and in the Data Book

$$
\begin{aligned}
&Annual\ health\ impact \\
&\quad = Impact\ of\ reduced\ overcrowding \\
&\quad \times probability\ of\ new\ unit\ reduces\ overcrowding \\
&\quad + Impact\ of\ reduced\ rough\ sleeping \\
&\quad \times probability\ new\ unit\ reduces\ homelessness \\
&\quad = £96 \times (99\% - 10\%\ household\ formation) + £4{,}000 \\
&\quad \times 1\%\ reduced\ homelessness
\end{aligned}
$$

F33 Essentially the annual health impact is the annual £4,000 health care cost multiplied by the probability that someone is a former rough sleeper (1%) plus the probability of a new rented AH unit reducing overcrowding (89%) multiplied by the annual impact of reduced overcrowding (£96).

F34 **With the above assumptions, this is equal to £125 per year or £2,400 in present value terms over 30 years**. This value aims to capture the external health impact of additional rented AH. This value can be incorporated into the 'adjusted' BCR and applied to an additional affordable or social rented house.

Amenity cost of development

F35 Estimates by consultants Eftec and Entec valued the external amenity benefits associated with different land types.[76] These estimates included values associated with recreation, landscape, ecology and tranquillity. These values can be used to estimate the loss of amenity benefits from development on different types of land. This externality should feature in the 'initial' BCR.

F36 If VOA land value uplift estimates for greenfield land already account for these amenity costs - such as those in Annex E - users may wish to separate out the private land value uplift and amenity impact. If VOA land value data does not account for amenity costs or if local land value data is being used, the amenity costs given in the table below could be included in the appraisal and form part of the 'initial' BCR calculation.

F37 The real annual amenity benefits across different land types are shown below. These values are different to those in the Eftec report as they have been adjusted for inflation and GDP and so are in 2016 prices and on a per hectare basis.

[76] Available from: http://webarchive.nationalarchives.gov.uk/20120919132719/http://www.communities.gov.uk/documents/planningandbuilding/pdf/158136.pdf

Figure 24: Amenity cost values

Land Type	***Amenity Benefit (Real values, 2016 prices/ha)***
Urban Core	£109,138
Urban Fringe (Greenbelt)	£1,797
Urban Fringe (Forested Land)	£5,457
Rural	£13,392
Agricultural (Extensive)	£6,366
Agricultural (Intensive)	£208
Natural & Semi-Natural	£13,371

Amenity benefit of development

F38 Where a site is derelict or contaminated, it may have a potential environmental and amenity impact on local communities. We plan to develop potential appraisal values for the external amenity impact of developing on brownfield land and we would welcome receiving evidence in this area.

Annex G – Distributional impacts

G1 For a detailed discussion on distributional weights please see HM Treasury's Green Book. This annex sets out an example on how distributional weights have been used in DCLG appraisals in the past, and how the results of such analysis should be presented in an appraisal. It is important that the size of any distributional weighting should be made transparent.

Theoretical derivation

G2 The objective of welfare weights is to accurately evaluate willingness to pay. To accurately estimate willingness to pay, we need to understand the value of money to each income group under consideration. We do this by looking at the utility function.

G2 To calculate the distributional impact of a policy we first calculate the weights for individual deciles. The rationale for welfare weighting is based on the difference in marginal utility of consumption. The classic utility function is the logarithm function:

$$U(C) = \log(C)$$

G3 In marginal terms:

$$U'(C) = {}^{1}/_{c}$$

G4 The marginal utility can be derived by dividing 1 by income (which we use interchangeably with consumption) for each of the deciles:

$$U'(I) = {}^{1}/_{I}$$

G5 Distributional weights can then be derived using the marginal utility of each decile as a percentage of average marginal utility:

$$WW = \left[\left({}^{1}/_{\mathrm{I}_d} \right) \Big/ \left({}^{1}/_{M} \right) \right]$$

$$WW = \left({}^{M}/_{I_d} \right)$$

G6 However, the form of the utility function used in the Green Book assumes the elasticity of marginal utility of consumption is equal to 1. More recent studies have shown different estimates of elasticity of marginal utility. A DWP (2010) study concludes that a reasonable elasticity value η is 1.3. This changes the form of the utility function from that used in the Green Book (where U(C) = log(C) due to an assumption of η = 1) to:

$$U(C) = \frac{C^{1-\eta} - 1}{1 - \eta}$$

G7 The marginal utility is therefore:

$$U'(C) = \frac{1}{C^{\eta}}$$

G8 This gives the following formula to calculate gross weights by income decile:

$$WW = \left({}^{M}/_{\mathrm{I}_d}\right)^{1.3}$$

G9 Therefore we recommend using the above utility function instead of the Green Book version, particularly where you can justify where an elasticity of marginal utility of consumption differs from 1.

Practical implementation

G10 The following calculations of distributional weights are illustrative. The use and calculation of distributional weightings should be viewed in the context of the rationale for the policy proposals being considered and whether they are suitable or not in that light. The HMT Green Book provides further guidance on this.

G11 Consider an intervention that benefits residents in the social housing tenure. Using DWP data on median household income before housing costs, per decile, for all households[77] in England (but outside of London) gives the following gross weights per decile:

[77] DWP publish the data as part of the Household below average income series. The data is taken from HBAI 2008/09.

Figure 25: Gross welfare weights by income decile

Deciles	1	2	3	4	5	6	7	8	9	10	Median (M)
Income per week (I_d)	145	224	275	322	374	431	500	588	730	1,082	402
Weight $(M/I_d)^{1.3}$	3.76	2.14	1.64	1.33	1.10	0.91	0.75	0.61	0.46	0.28	1.00

G12 The gross weights vary from 3.76 to 0.28. For a person in the lowest income decile, a £1 benefit increases utility by 3.76 relative to the average marginal utility for all households, whereas for the highest decile, there is a marginal increase in utility of 0.28 relative to the average marginal utility for all households.

G13 The next step is to calculate an average weight for the policy based on the gross weights above. In this example, the intervention benefits residents in the social housing tenure. To calculate the average welfare weight for tenants in the social housing tenure, the gross weights by decile are multiplied by the percentage of social tenants that are in that income decile. The distribution of social tenants (before housing costs) between income deciles of all households is as follows[78]:

Figure 267: Distribution of social tenants by income decile

Income Decile	1	2	3	4	5	6	7	8	9	10	Total
Proportion of SRS	13%	20%	19%	17%	11%	8%	6%	4%	1%	0%	100%

G14 This shows, for example, 13% of social tenants are in the bottom income decile for all households. Multiplying the gross welfare weights by each percentage gives the following weights:

Figure 27: Gross welfare weight adjusted for housing costs

Deciles	1	2	3	4	5	6	7	8	9	10	Sum
Weight	0.49	0.43	0.31	0.23	0.12	0.07	0.05	0.02	0.005	0	1.72

[78] Based on DWP's Households Below Average Income data, 2008/09

G15 Summing across all the weights gives an average weight for all social households of 1.72.

G16 We then calculate welfare weights **net** of the cost to taxpayers (to reflect the negative marginal utility for households arising from paying taxes and other revenue raising activities). So we subtract the £1 of transfer from the £1.72 benefit, leaving only £0.72 of pure welfare gain. In other words, spending £1 on a social housing tenant has an additional welfare equity effect of 72 pence on top of the direct £1 benefit which they receive from the spending.

Practical example

G17 The current (2003) version of the Green Book recommends multiplying benefits by a welfare weight. For business cases relating to affordable housing (and thus, social tenants), the rent subsidy that tenants would receive has been calculated as the difference between average market rents and the affordable rent post-intervention. In effect, this calculates the amount of additional money these tenants would have in their pocket compared to if they had to pay a market rent.

G18 In 2014, the average market rent was £595 per month, whereas the average affordable rent was £513, the difference therefore being £82 per month. The difference is funded by direct government subsidy. If no welfare weights were applied, only the difference of £82 would be included in the NPPV or BCR.

G19 However, assuming that the subsidy is distributed in accordance with the existing distribution of income of social tenants, welfare weights could be used to calculate the additional distributional benefit of the changes. This means multiplying £82 by 0.72, which gives an additional £56 benefit per month per tenant.

Bibliography

Bramley, G., Fitzpatrick, S. et al. (2015), *Hard Edges – Mapping severe and multiple disadvantage*. LankellyChase Foundation.

BRE (2015), *Briefing paper: The cost of poor housing to the NHS*.

Bretherton, J & Pleace, N. (2015) 'Housing First in England', *Centre for Housing Policy*, University of York.

Cabinet Office (2014), *Fair Chance Fund – will improving outcomes make savings across the public sector?*

The Department for Transport (2014), *Transport Appraisal Guidance: Webtag*.

Eftec & Entec (2001), *Valuing the external benefits of undeveloped land: main document*.

DCLG (2015), *Cost of rough sleeping*. Working paper.

DCLG/CapGemini (2009), *Research into the financial benefits of the Supporting People programme*.

Department of Health (2010), *Healthcare for single homeless people*. Office of the Chief Analyst.

Department for Work and Pensions (2010), *The Department for Work and Pensions Social Cost-Benefit Analysis Framework*, Working Paper No 86

De Sousa C (2002), 'Measuring the public costs and benefits of brownfield versus greenfield development in the Greater Toronto area', *Environment and Planning B: Planning and Design 2002*, volume 29.

European Observatory on Homelessness (2013), 'The Costs of Homelessness in Europe – An Assessment of the Current Evidence Base', *Comparative Studies on Homelessness No. 3*.

FTI Consulting & Compass Lexecon (2014), *Evaluation of the MEAM pilots*.

Graham D, Gibbons S, Martin R (2009), 'Transport Investment and the Distance Decay of Agglomeration Benefits', *Centre for Transport Studies*.

HM Treasury (2013), ‘Public Sector Business Cases’, *Green Book Supplementary Guidance on Delivering Public Value from Spending Proposals*.

HM Treasury (2003), *The Green Book: Appraisal and Evaluation in Central Government*.

Larimer, M.E., Malone, D.K., Garner, M.D. et al. (2009), 'Health care and public service use and costs before and after provision of housing for chronically homeless persons with severe alcohol problems', *JAMA,* 301(13): 1349-1357.

New Policy Institute (2003), *How Many, How Much? Single homelessness and the question of numbers and cost*, Crisis.

Rossi-Hansberg and Sarte (2012), *Economics of Housing Externalities*.

Rossi-Hansberg, Sarte and Owens (2010), 'Housing Externalities', *Journal of Political Economy*, vol. 118, no. 3.

Venables, A., Overman, H., Laird, J. (2014), *Transport investment and economic performance: Implications for project appraisal*.

Zaretzky, K., Flatau, P. & Brady, M. (2008), 'What is the (Net) Cost to Government of Homelessness Programmes?,' *Australian Journal of Social Issues*, Vol.43 No.2.

GOV.UK

Ministry of Housing,
Communities &
Local Government

Guidance

Land value estimates for policy appraisal 2019: guidelines for use

Published 18 August 2020

Applies to England

Contents

This publication is available at https://www.gov.uk/government/publications/land-value-estimates-for-policy-appraisal-2019/land-value-estimates-for-policy-appraisal-2019-guidelines-for-use

Overview

The land values presented here have been provided specifically for the purpose of policy appraisal and are based on the assumptions set out in this document. In particular they are envisaged to be used in conjunction with the MHCLG Appraisal Guide in accordance with the HMT Green Book.

Users should familiarise themselves with the methodology and assumptions made by the Valuation Office Agency (VOA) set out below. The approach used in the production of these values differs from those used previously in the VOA's now discontinued Property Market Reports.

Whilst the model adopted by the Valuation Office Agency is designed to provide a consistent approach to valuations across local authorities in England, it should be noted that residual valuations are highly sensitive to small changes in model parameters and inputs. As a result the values of a specific site may vary significantly from the typical residential site value for the local authority that is provided in this publication; where land values for a specific site under appraisal are known these should therefore be used over the typical values presented in this document.

Additionally these values are not indicative of the market value of land, for example they exclude any developer contributions which would be required in order to develop a residential site. Therefore we would expect the market price to be substantially lower than the values in the spreadsheet. Further details are set out in the annex and should be consulted before using these values.

These values were made via desk based surveys of typical sites in 2019, therefore they do not account for any impact on land values arising from COVID-19.

Note on methodology from the Valuation Office Agency

Residential land values

The valuations have been undertaken using a truncated residual valuation model. Essentially, this involves valuing the proposed development (the sale price of the proposed scheme) and deducting the development costs, including allowances for base build cost, developer profit, marketing costs, fees, finance etc., to leave a "residual" for the site value.

As instructed, residential land values have been produced ignoring any planning policy compliant levels of affordable housing and assuming 100% private housing. These are analysed per hectare, per unit and per square metre Gross Internal Area (GIA) (in London also per habitable room).

The figures provided assume no affordable housing provision and are, therefore, hypothetical, as in the majority of local authorities it is likely that such a scheme would not obtain planning consent. **The figures on this basis may be significantly higher than could reasonably be obtained for land in the actual market.**

- Any liability for the Community Infrastructure Levy (CIL), even where it was planning policy as at 1 April 2019, has been excluded.
- It has been assumed that full planning consent is already in place; that no grants are available and that no major allowances need to be made for other s106/s278 costs.
- The figures provided are appropriate to a single, hypothetical site and should not be taken as appropriate for all sites in the locality.

- In a small number of cases schemes do not produce a positive land value in the Model. A ‘floor value’ of £370,000 (outside London) has been adopted to represent a figure at less than which it is unlikely (although possible in some cases) that 1 hectare of land would be released for residential development.
- This has been taken on a national basis and clearly there will be instances where the figure in a particular locality will differ based on supply and demand, values in the area, potential alternative uses etc. and other factors in that area.

Additionally we have assumed that:

- Each site is 1 hectare in area, of regular shape, with services provided up to the boundary, without contamination or abnormal development costs, not in an underground mining area, with road frontage, without risk of flooding, with planning permission granted and that no grant funding is available.
- The site will have a net developable area equal to 80% of the gross area (excluding London).
- For those local authorities outside London, the hypothetical scheme is for a development of 35, two storey, 2/3/4 bed dwellings with a total floor area of 3,150 square metres.
- For those local authorities in London, the hypothetical scheme varies by local authority area and reflects the type/scale of development expected in that locality. The attached schedules provide details of gross/net floor areas together with number of units and habitable rooms.

These densities are taken as reasonable in the context of this exercise and with a view to a consistent national assumption. However, individual schemes in many localities are likely to differ from this and different densities will impact on values achievable.

Commercial land values

These are provided for hypothetical sites outside of London on two bases:

- Out of town offices – assumed to be in business park type location; 1 hectare site; 3 storey offices; 10,187 sq. metres net (11,984 sq. metres gross).
- City centre offices – edge of the CBD; 0.12 hectares; 4 storey construction; 4,106 sq. metres net (4,831 sq. metres gross).

In London the valuations are on the basis of: 0.12 hectares, Grade A space; 12,077 sq. metres gross – 9,662 sq. metres net (Inner London), 10,266 sq. metres net (Outer London).

- The valuations have been undertaken desk based without inspections of the locality.
- Any liability for the Community Infrastructure Levy (CIL), even where it was planning policy as at 1 April 2019, has been excluded.
- Planning consent is assumed to already be in place.
- These are analysed per hectare and per square metre GIA (with and without common areas).
- Figures are based on typical development areas in the authority.

Industrial land

These are provided for hypothetical sites, assuming:

- A typical urban, brownfield location, with nearby uses likely to include later, modern residential developments.
- All services are assumed available to the edge of the site.

- Use is restricted to industrial/warehouse and full planning consent is in place.
- We have assumed that there are no abnormal site constraints or contamination and/or remediation issues.

Agricultural land

These are provided for hypothetical sites, assuming:

- A typical location within the region.
- Figures exclude and uplift from ‘pony paddock’ market or hope value, as appropriate for a commercial agricultural user.
- We have provided one representative land value per LEP.

↑ Back to top

Residential Land

April 2019

Region	Local Authority	£/ha
East Midlands	Amber Valley	£550,000
East Midlands	Ashfield	£400,000
East Midlands	Bassetlaw	£680,000
East Midlands	Blaby	£2,150,000
East Midlands	Bolsover	£370,000
East Midlands	Boston	£500,000
East Midlands	Broxtowe	£1,200,000
East Midlands	Charnwood	£1,370,000
East Midlands	Chesterfield	£970,000
East Midlands	Corby	£620,000
East Midlands	Daventry	£1,880,000
East Midlands	Derby	£1,000,000
East Midlands	Derbyshire Dales	£2,100,000
East Midlands	East Northamptonshire	£1,100,000
East Midlands	Erewash	£370,000
East Midlands	Gedling	£550,000
East Midlands	Harborough	£2,650,000
East Midlands	High Peak	£1,100,000
East Midlands	Hinckley and Bosworth	£1,530,000
East Midlands	Kettering	£1,350,000
East Midlands	Leicester	£1,460,000
East Midlands	Lincoln	£1,200,000
East Midlands	Mansfield	£1,100,000
East Midlands	Melton	£950,000
East Midlands	Newark and Sherwood	£1,130,000
East Midlands	North East Derbyshire	£670,000
East Midlands	North West Leicestershire	£1,230,000
East Midlands	Northampton	£2,040,000
East Midlands	Nottingham	£1,200,000
East Midlands	Oadby and Wigston	£1,710,000
East Midlands	Rushcliffe	£1,700,000
East Midlands	Rutland	£2,000,000
East Midlands	South Derbyshire	£1,000,000
East Midlands	South Holland	£450,000
East Midlands	South Kesteven	£920,000
East Midlands	South Northamptonshire	£2,850,000
East Midlands	Wellingborough	£1,700,000
West Midlands	Birmingham	£1,700,000
West Midlands	Bromsgrove	£2,850,000
West Midlands	Cannock Chase	£1,140,000
West Midlands	Coventry	£1,810,000
West Midlands	Dudley	£1,900,000

All non-London developments are are calculated on the basis of 35 units for a total floorspace of 3150 sq. meters

	Residential Land												
	April 2019												
	Region	Local Authority	£/ha		All non-London developments are are calculated on the basis of 35 units for a total floorspace of 3150 sq. meters								
	West Midlands	East Staffordshire	£1,800,000										
	West Midlands	Herefordshire, County of	£2,300,000										
	West Midlands	Lichfield	£2,650,000										
	West Midlands	Malvern Hills	£1,800,000										
	West Midlands	Newcastle-under-Lyme	£1,000,000										
	West Midlands	North Warwickshire	£1,700,000										
	West Midlands	Nuneaton and Bedworth	£1,370,000										
	West Midlands	Redditch	£2,450,000										
	West Midlands	Rugby	£2,250,000										
	West Midlands	Sandwell	£1,770,000										
	West Midlands	Shropshire	£1,500,000										
	West Midlands	Solihull	£4,270,000										
	West Midlands	South Staffordshire	£2,340,000										
	West Midlands	Stafford	£1,600,000										
	West Midlands	Staffordshire Moorlands	£780,000										
	West Midlands	Stoke-on-Trent	£820,000										
	West Midlands	Stratford-on-Avon	£4,130,000										
	West Midlands	Tamworth	£2,100,000										
	West Midlands	Telford and Wrekin	£1,230,000										
	West Midlands	Walsall	£1,110,000										
	West Midlands	Warwick	£3,850,000										
	West Midlands	Wolverhampton	£1,165,000										
	West Midlands	Worcester	£2,650,000										
	West Midlands	Wychavon	£2,230,000										
	West Midlands	Wyre Forest	£1,450,000										
	East	Babergh	£2,330,000										
	East	Basildon	£4,000,000										
	East	Bedford	£3,190,000										
	East	Braintree	£3,785,000										
	East	Breckland	£1,870,000										
	East	Brentwood	£7,000,000										
	East	Broadland	£2,120,000										
	East	Broxbourne	£5,000,000										
	East	Cambridge	£6,250,000										
	East	Castle Point	£3,850,000										
	East	Central Bedfordshire	£3,700,000										
	East	Chelmsford	£5,160,000										
	East	Colchester	£2,475,000										
	East	Dacorum	£7,000,000										
	East	East Cambridgeshire	£2,300,000										
	East	East Hertfordshire	£7,550,000										
	East	East Lindsey	£800,000										
	East	Epping Forest	£7,600,000										
	East	Fenland	£370,000										

	Residential Land												
	April 2019												
	Region	Local Authority	£/ha		All non-London developments are are calculated on the basis of 35 units for a total floorspace of 3150 sq. meters								
	East	West Suffolk	£1,700,000										
	East	Great Yarmouth	£1,100,000										
	East	Harlow	£4,500,000										
	East	Hertsmere	£7,100,000										
	East	Huntingdonshire	£2,700,000										
	East	Ipswich	£2,350,000										
	East	King's Lynn and West Norfolk	£1,150,000										
	East	Luton	£3,060,000										
	East	Maldon	£3,790,000										
	East	Mid Suffolk	£2,100,000										
	East	North Hertfordshire	£6,100,000										
	East	North Kesteven	£850,000										
	East	North Norfolk	£2,460,000										
	East	Norwich	£2,400,000										
	East	Peterborough	£1,600,000										
	East	Rochford	£4,300,000										
	East	South Cambridgeshire	£5,390,000										
	East	South Norfolk	£2,250,000										
	East	Southend-on-Sea	£3,650,000										
	East	St Albans	£8,900,000										
	East	St. Edmundsbury	£3,300,000										
	East	Stevenage	£4,200,000										
	East	East Suffolk	£2,150,000										
	East	Tendring	£1,750,000										
	East	Three Rivers	£6,900,000										
	East	Thurrock	£3,510,000										
	East	Uttlesford	£4,580,000										
	East	Watford	£6,800,000										
	East	Waveney (now merged with East Suffolk)	£1,150,000										
	East	Welwyn Hatfield	£6,050,000										
	East	West Lindsey	£370,000										
	Yorkshire and The Humber	Barnsley	£760,000										
	Yorkshire and The Humber	Bradford	£700,000										
	Yorkshire and The Humber	Calderdale	£1,140,000										
	Yorkshire and The Humber	Craven	£2,050,000										
	Yorkshire and The Humber	Doncaster	£750,000										
	Yorkshire and The Humber	East Riding of Yorkshire	£1,945,000										
	Yorkshire and The Humber	Hambleton	£2,150,000										
	Yorkshire and The Humber	Harrogate	£2,940,000										
	Yorkshire and The Humber	Kingston upon Hull, City of	£550,000										
	Yorkshire and The Humber	Kirklees	£1,500,000										
	Yorkshire and The Humber	Leeds	£2,150,000										
	Yorkshire and The Humber	North East Lincolnshire	£750,000										
	Yorkshire and The Humber	North Lincolnshire	£370,000										

	Residential Land												
	April 2019												
	Region	Local Authority	£/ha		All non-London developments are are calculated on the basis of 35 units for a total floorspace of 3150 sq. meters								
	Yorkshire and The Humber	Richmondshire	£1,680,000										
	Yorkshire and The Humber	Rotherham	£900,000										
	Yorkshire and The Humber	Ryedale	£1,800,000										
	Yorkshire and The Humber	Scarborough	£1,570,000										
	Yorkshire and The Humber	Selby	£1,000,000										
	Yorkshire and The Humber	Sheffield	£870,000										
	Yorkshire and The Humber	Wakefield	£1,200,000										
	Yorkshire and The Humber	York	£2,750,000										
	North East	Darlington	£640,000										
	North East	County Durham	£700,000										
	North East	Gateshead	£720,000										
	North East	Hartlepool	£615,000										
	North East	Middlesbrough	£600,000										
	North East	Newcastle upon Tyne	£850,000										
	North East	North Tyneside	£1,150,000										
	North East	Northumberland	£650,000										
	North East	Redcar and Cleveland	£400,000										
	North East	South Tyneside	£400,000										
	North East	Stockton-on-Tees	£600,000										
	North East	Sunderland	£600,000										
	North West	Allerdale	£370,000										
	North West	Barrow-in-Furness	£1,100,000										
	North West	Blackburn with Darwen	£450,000										
	North West	Blackpool	£1,120,000										
	North West	Bolton	£1,110,000										
	North West	Burnley	£370,000										
	North West	Bury	£1,380,000										
	North West	Carlisle	£370,000										
	North West	Cheshire East	£1,300,000										
	North West	Cheshire West and Chester	£2,760,000										
	North West	Chorley	£1,245,000										
	North West	Copeland	£370,000										
	North West	Eden	£1,430,000										
	North West	Fylde	£1,700,000										
	North West	Halton	£1,830,000										
	North West	Hyndburn	£1,100,000										
	North West	Knowsley	£870,000										
	North West	Lancaster	£1,650,000										
	North West	Liverpool	£815,000										
	North West	Manchester	£2,130,000										
	North West	Oldham	£850,000										
	North West	Pendle	£710,000										
	North West	Preston	£1,175,000										
	North West	Ribble Valley	£1,770,000										

	Residential Land												
	April 2019												
	Region	Local Authority	£/ha		All non-London developments are are calculated on the basis of 35 units for a total floorspace of 3150 sq. meters								
	North West	Rochdale	£900,000										
	North West	Rossendale	£1,160,000										
	North West	Salford	£1,500,000										
	North West	Sefton	£1,450,481										
	North West	South Lakeland	£1,750,000										
	North West	South Ribble	£1,250,000										
	North West	St. Helens	£1,120,000										
	North West	Stockport	£2,400,000										
	North West	Tameside	£1,950,000										
	North West	Trafford	£2,240,000										
	North West	Warrington	£1,400,000										
	North West	West Lancashire	£1,390,000										
	North West	Wigan	£900,000										
	North West	Wirral	£1,170,000										
	North West	Wyre	£1,500,000										
	South East	Adur	£4,100,000										
	South East	Arun	£3,350,000										
	South East	Ashford	£2,510,000										
	South East	Aylesbury Vale	£3,450,000										
	South East	Basingstoke and Deane	£2,900,000										
	South East	Bracknell Forest	£5,100,000										
	South East	Brighton and Hove	£7,160,000										
	South East	Canterbury	£5,450,000										
	South East	Cherwell	£4,100,000										
	South East	Chichester	£4,800,000										
	South East	Chiltern	£8,210,000										
	South East	Crawley	£4,840,000										
	South East	Dartford	£4,100,000										
	South East	Dover	£2,350,000										
	South East	East Hampshire	£6,000,000										
	South East	Eastbourne	£3,750,000										
	South East	Eastleigh	£3,800,000										
	South East	Elmbridge	£9,280,000										
	South East	Epsom and Ewell	£7,350,000										
	South East	Fareham	£3,725,000										
	South East	Gosport	£1,820,000										
	South East	Gravesham	£3,850,000										
	South East	Guildford	£7,625,000										
	South East	Hart	£5,730,000										
	South East	Hastings	£2,360,000										
	South East	Havant	£3,910,000										
	South East	Horsham	£5,330,000										
	South East	Isle of Wight	£1,600,000										
	South East	Lewes	£4,450,000										

	Residential Land												
	April 2019												
	Region	Local Authority	£/ha		All non-London developments are are calculated on the basis of 35 units for a total floorspace of 3150 sq. meters								
	South East	Maidstone	£2,800,000										
	South East	Medway	£3,370,000										
	South East	Mid Sussex	£5,150,000										
	South East	Milton Keynes	£3,050,000										
	South East	Mole Valley	£7,200,000										
	South East	New Forest	£5,750,000										
	South East	Oxford	£5,090,000										
	South East	Portsmouth	£3,000,000										
	South East	Reading	£4,800,000										
	South East	Reigate and Banstead	£6,500,000										
	South East	Rother	£2,950,000										
	South East	Runnymede	£7,780,000										
	South East	Rushmoor	£4,300,000										
	South East	Sevenoaks	£8,300,000										
	South East	Folkestone and Hythe	£2,270,000										
	South East	Slough	£5,450,000										
	South East	South Bucks	£6,150,000										
	South East	South Oxfordshire	£5,630,000										
	South East	Southampton	£2,700,000										
	South East	Spelthorne	£6,000,000										
	South East	Surrey Heath	£5,800,000										
	South East	Swale	£3,280,000										
	South East	Tandridge	£6,100,000										
	South East	Test Valley	£2,550,000										
	South East	Thanet	£2,850,000										
	South East	Tonbridge and Malling	£4,250,000										
	South East	Tunbridge Wells	£4,700,000										
	South East	Vale of White Horse	£3,930,000										
	South East	Waverley	£6,200,000										
	South East	Wealden	£4,380,000										
	South East	West Berkshire	£4,250,000										
	South East	West Oxfordshire	£3,070,000										
	South East	Winchester	£6,070,000										
	South East	Windsor and Maidenhead	£7,050,000										
	South East	Woking	£6,850,000										
	South East	Wokingham	£5,370,000										
	South East	Worthing	£4,500,000										
	South East	Wycombe	£5,540,000										
	South West	Bath and North East Somerset	£3,000,000										
	South West	Bournemouth	£3,400,000										
	South West	Bristol, City of	£3,250,000										
	South West	Cheltenham	£3,380,000										
	South West	Christchurch	£4,500,000										
	South West	Cornwall	£1,995,000										

	Residential Land												
	April 2019												
	Region	**Local Authority**	**£/ha**		**All non-London developments are are calculated on the basis of 35 units for a total floorspace of 3150 sq. meters**								
	South West	Cotswold	£3,750,000										
	South West	East Devon	£2,510,000										
	South West	East Dorset	£3,450,000										
	South West	Exeter	£2,900,000										
	South West	Forest of Dean	£850,000										
	South West	Gloucester	£2,300,000										
	South West	Isles of Scilly	£3,480,000										
	South West	Mendip	£1,650,000										
	South West	Mid Devon	£2,050,000										
	South West	North Devon	£1,770,000										
	South West	North Dorset	£2,200,000										
	South West	North Somerset	£2,310,000										
	South West	Plymouth	£1,600,000										
	South West	Poole	£3,400,000										
	South West	Purbeck	£3,820,000										
	South West	Sedgemoor	£1,600,000										
	South West	South Gloucestershire	£2,900,000										
	South West	South Hams	£2,170,000										
	South West	South Somerset	£1,800,000										
	South West	Stroud	£2,350,000										
	South West	Swindon	£2,000,000										
	South West	Taunton Deane	£1,800,000										
	South West	Teignbridge	£2,000,000										
	South West	Tewkesbury	£2,130,000										
	South West	Torbay	£1,500,000										
	South West	Torridge	£1,490,000										
	South West	West Devon	£3,100,000										
	South West	West Dorset	£2,900,000										
	South West	West Somerset	£2,350,000										
	South West	Weymouth and Portland	£2,200,000										
	South West	Wiltshire	£1,920,000										
						Assumptions used							

	Residential Land												
	April 2019												
	Region	Local Authority	£/ha		All non-London developments are are calculated on the basis of 35 units for a total floorspace of 3150 sq. meters								
			£/ha 2019	Number of units	Habitable rooms	Net area of units, sq m	GIA of building, sq m						
	London	Barking and Dagenham	£8,110,000	120	350	7,800	8,970						
	London	Barnet	£14,520,000	150	450	9,750	11,213						
	London	Bexley	£7,640,000	120	350	7,800	8,970						
	London	Brent	£24,080,000	150	450	9,750	11,213						
	London	Bromley London	£12,860,000	120	350	7,800	8,970						
	London	Camden	£74,020,000	250	700	16,250	18,688						
	London	City of London	£128,050,000	400	1,100	26,000	29,900						
	London	Croydon	£12,315,000	120	350	7,800	8,970						
	London	Ealing	£21,310,000	150	450	9,750	11,213						
	London	Enfield	£11,220,000	120	350	7,800	8,970						
	London	Greenwich	£20,400,000	150	450	9,750	11,213						
	London	Hackney	£39,690,000	250	700	16,250	18,688						
	London	Hammersmith & Fulham	£56,455,000	250	700	16,250	18,688						
	London	Haringey	£24,310,000	150	450	9,750	11,213						
	London	Harrow	£14,540,000	150	450	9,750	11,213						
	London	Havering	£7,610,000	120	350	7,800	8,970						
	London	Hillingdon	£11,650,000	150	450	9,750	11,213						
	London	Hounslow	£16,365,000	150	450	9,750	11,213						
	London	Islington	£53,025,000	250	700	16,250	18,688						
	London	Kensington & Chelsea	£161,475,000	400	1,100	26,000	29,900						
	London	Kingston upon Thames	£21,235,000	150	450	9,750	11,213						
	London	Lambeth	£36,295,000	250	700	16,250	18,688						
	London	Lewisham	£32,800,000	250	700	16,250	18,688						
	London	Merton	£21,465,000	150	450	9,750	11,213						
	London	Newham	£19,530,000	150	450	9,750	11,213						
	London	Redbridge	£11,800,000	150	450	9,750	11,213						
	London	Richmond upon Thames	£24,600,000	150	450	9,750	11,213						
	London	Southwark	£38,670,000	250	700	16,250	18,688						
	London	Sutton	£10,980,000	120	350	7,800	8,970						
	London	Tower Hamlets	£39,885,000	250	700	16,250	18,688						
	London	Waltham Forest	£16,000,000	120	350	7,800	8,970						
	London	Wandsworth	£44,575,000	250	700	16,250	18,688						
	London	Westminster	£135,715,000	400	1,100	26,000	29,900						

Industrial Land
April 2019

Region	Local Authority	£/ha
East Midlands	Amber Valley	£300,000
East Midlands	Ashfield	£360,000
East Midlands	Bassetlaw	£500,000
East Midlands	Blaby	£525,000
East Midlands	Bolsover	£400,000
East Midlands	Boston	£230,000
East Midlands	Broxtowe	£340,000
East Midlands	Charnwood	£525,000
East Midlands	Chesterfield	£375,000
East Midlands	Corby	£600,000
East Midlands	Daventry	£850,000
East Midlands	Derby	£545,000
East Midlands	Derbyshire Dales	£375,000
East Midlands	East Northamptonshire	£800,000
East Midlands	Erewash	£250,000
East Midlands	Gedling	£500,000
East Midlands	Harborough	£575,000
East Midlands	High Peak	£425,000
East Midlands	Hinckley and Bosworth	£475,000
East Midlands	Kettering	£775,000
East Midlands	Leicester	£650,000
East Midlands	Lincoln	£450,000
East Midlands	Mansfield	£325,000
East Midlands	Melton	£450,000
East Midlands	Newark and Sherwood	£360,000
East Midlands	North East Derbyshire	£350,000
East Midlands	North West Leicestershire	£450,000
East Midlands	Northampton	£850,000
East Midlands	Nottingham	£500,000
East Midlands	Oadby and Wigston	£575,000
East Midlands	Rushcliffe	£400,000
East Midlands	Rutland	£400,000
East Midlands	South Derbyshire	£500,000
East Midlands	South Holland	£325,000
East Midlands	South Kesteven	£350,000
East Midlands	South Northamptonshire	£850,000
East Midlands	Wellingborough	£800,000
West Midlands	Birmingham	£1,000,000
West Midlands	Bromsgrove	£705,000
West Midlands	Cannock Chase	£650,000
West Midlands	Coventry	£825,000
West Midlands	Dudley	£550,000
West Midlands	East Staffordshire	£625,000

West Midlands	Herefordshire, County of	£550,000
West Midlands	Lichfield	£600,000
West Midlands	Malvern Hills	£625,000
West Midlands	Newcastle-under-Lyme	£500,000
West Midlands	North Warwickshire	£720,000
West Midlands	Nuneaton and Bedworth	£720,000
West Midlands	Redditch	£800,000
West Midlands	Rugby	£775,000
West Midlands	Sandwell	£550,000
West Midlands	Shropshire	£500,000
West Midlands	Solihull	£650,000
West Midlands	South Staffordshire	£520,000
West Midlands	Stafford	£500,000
West Midlands	Staffordshire Moorlands	£410,000
West Midlands	Stoke-on-Trent	£475,000
West Midlands	Stratford-on-Avon	£800,000
West Midlands	Tamworth	£520,000
West Midlands	Telford and Wrekin	£500,000
West Midlands	Walsall	£550,000
West Midlands	Warwick	£775,000
West Midlands	Wolverhampton	£550,000
West Midlands	Worcester	£705,000
West Midlands	Wychavon	£630,000
West Midlands	Wyre Forest	£675,000
East	Babergh	£305,000
East	Basildon	£1,500,000
East	Bedford	£825,000
East	Braintree	£600,000
East	Breckland	£395,000
East	Brentwood	£850,000
East	Broadland	£350,000
East	Broxbourne	£1,700,000
East	Cambridge	£1,100,000
East	Castle Point	£550,000
East	Central Bedfordshire	£825,000
East	Chelmsford	£800,000
East	Colchester	£650,000
East	Dacorum	£1,800,000
East	East Cambridgeshire	£475,000
East	East Hertfordshire	£1,275,000
East	East Lindsey	£300,000
East	Epping Forest	£1,000,000
East	Fenland	£325,000
East	West Suffolk	£495,000
East	Great Yarmouth	£350,000
East	Harlow	£1,200,000
East	Hertsmere	£1,200,000
East	Huntingdonshire	£960,000
East	Ipswich	£720,000
East	King's Lynn and West Norfolk	£450,000

East	Luton	£1,365,000
East	Maldon	£500,000
East	Mid Suffolk	£340,000
East	North Hertfordshire	£1,500,000
East	North Kesteven	£400,000
East	North Norfolk	£250,000
East	Norwich	£600,000
East	Peterborough	£800,000
East	Rochford	£525,000
East	South Cambridgeshire	£1,100,000
East	South Norfolk	£395,000
East	Southend-on-Sea	£1,350,000
East	St Albans	£1,300,000
East	St. Edmundsbury	£450,000
East	Stevenage	£1,500,000
East	East Suffolk	£280,000
East	Tendring	£515,000
East	Three Rivers	£1,800,000
East	Thurrock	£1,900,000
East	Uttlesford	£800,000
East	Watford	£1,500,000
East	Waveney (now merged with East Suffolk)	£340,000
East	Welwyn Hatfield	£1,500,000
East	West Lindsey	£275,000
Yorkshire and The Humber	Barnsley	£500,000
Yorkshire and The Humber	Bradford	£500,000
Yorkshire and The Humber	Calderdale	£490,000
Yorkshire and The Humber	Craven	£600,000
Yorkshire and The Humber	Doncaster	£550,000
Yorkshire and The Humber	East Riding of Yorkshire	£615,000
Yorkshire and The Humber	Hambleton	£350,000
Yorkshire and The Humber	Harrogate	£575,000
Yorkshire and The Humber	Kingston upon Hull, City of	£470,000
Yorkshire and The Humber	Kirklees	£500,000
Yorkshire and The Humber	Leeds	£800,000
Yorkshire and The Humber	North East Lincolnshire	£335,000
Yorkshire and The Humber	North Lincolnshire	£225,000
Yorkshire and The Humber	Richmondshire	£400,000
Yorkshire and The Humber	Rotherham	£550,000
Yorkshire and The Humber	Ryedale	£310,000
Yorkshire and The Humber	Scarborough	£370,000
Yorkshire and The Humber	Selby	£425,000
Yorkshire and The Humber	Sheffield	£600,000
Yorkshire and The Humber	Wakefield	£550,000
Yorkshire and The Humber	York	£550,000
North East	Darlington	£175,000
North East	County Durham	£180,000
North East	Gateshead	£220,000
North East	Hartlepool	£180,000
North East	Middlesbrough	£195,000

North East	Newcastle upon Tyne	£250,000
North East	North Tyneside	£195,000
North East	Northumberland	£135,000
North East	Redcar and Cleveland	£150,000
North East	South Tyneside	£210,000
North East	Stockton-on-Tees	£175,000
North East	Sunderland	£220,000
North West	Allerdale	£150,000
North West	Barrow-in-Furness	£275,000
North West	Blackburn with Darwen	£500,000
North West	Blackpool	£400,000
North West	Bolton	£575,000
North West	Burnley	£450,000
North West	Bury	£600,000
North West	Carlisle	£400,000
North West	Cheshire East	£425,000
North West	Cheshire West and Chester	£325,000
North West	Chorley	£600,000
North West	Copeland	£150,000
North West	Eden	£300,000
North West	Fylde	£400,000
North West	Halton	£290,000
North West	Hyndburn	£475,000
North West	Knowsley	£440,000
North West	Lancaster	£525,000
North West	Liverpool	£440,000
North West	Manchester	£675,000
North West	Oldham	£525,000
North West	Pendle	£425,000
North West	Preston	£600,000
North West	Ribble Valley	£550,000
North West	Rochdale	£525,000
North West	Rossendale	£500,000
North West	Salford	£550,000
North West	Sefton	£370,000
North West	South Lakeland	£500,000
North West	South Ribble	£600,000
North West	St. Helens	£310,000
North West	Stockport	£575,000
North West	Tameside	£525,000
North West	Trafford	£850,000
North West	Warrington	£800,000
North West	West Lancashire	£395,000
North West	Wigan	£500,000
North West	Wirral	£325,000
North West	Wyre	£400,000
South East	Adur	£1,450,000
South East	Arun	£1,450,000
South East	Ashford	£1,100,000
South East	Aylesbury Vale	£900,000

South East	Basingstoke and Deane	£1,700,000
South East	Bracknell Forest	£1,900,000
South East	Brighton and Hove	£1,750,000
South East	Canterbury	£1,000,000
South East	Cherwell	£1,250,000
South East	Chichester	£1,550,000
South East	Chiltern	£925,000
South East	Crawley	£2,300,000
South East	Dartford	£2,000,000
South East	Dover	£500,000
South East	East Hampshire	£1,450,000
South East	Eastbourne	£1,200,000
South East	Eastleigh	£1,400,000
South East	Elmbridge	£2,700,000
South East	Epsom and Ewell	£2,350,000
South East	Fareham	£1,200,000
South East	Gosport	£1,000,000
South East	Gravesham	£1,650,000
South East	Guildford	£2,300,000
South East	Hart	£1,400,000
South East	Hastings	£750,000
South East	Havant	£1,200,000
South East	Horsham	£1,550,000
South East	Isle of Wight	£750,000
South East	Lewes	£1,200,000
South East	Maidstone	£1,350,000
South East	Medway	£1,500,000
South East	Mid Sussex	£1,550,000
South East	Milton Keynes	£1,050,000
South East	Mole Valley	£2,200,000
South East	New Forest	£1,000,000
South East	Oxford	£2,000,000
South East	Portsmouth	£1,500,000
South East	Reading	£2,000,000
South East	Reigate and Banstead	£2,200,000
South East	Rother	£1,000,000
South East	Runnymede	£2,600,000
South East	Rushmoor	£1,700,000
South East	Sevenoaks	£1,900,000
South East	Folkestone and Hythe	£850,000
South East	Slough	£2,250,000
South East	South Bucks	£2,500,000
South East	South Oxfordshire	£1,250,000
South East	Southampton	£1,500,000
South East	Spelthorne	£2,700,000
South East	Surrey Heath	£1,900,000
South East	Swale	£1,100,000
South East	Tandridge	£2,000,000
South East	Test Valley	£1,100,000
South East	Thanet	£800,000

South East	Tonbridge and Malling	£1,800,000
South East	Tunbridge Wells	£1,350,000
South East	Vale of White Horse	£650,000
South East	Waverley	£1,900,000
South East	Wealden	£1,350,000
South East	West Berkshire	£1,400,000
South East	West Oxfordshire	£1,250,000
South East	Winchester	£1,500,000
South East	Windsor and Maidenhead	£2,200,000
South East	Woking	£2,100,000
South East	Wokingham	£1,800,000
South East	Worthing	£1,450,000
South East	Wycombe	£2,000,000
South West	Bath and North East Somerset	£1,175,000
South West	Bournemouth	£1,000,000
South West	Bristol, City of	£1,075,000
South West	Cheltenham	£1,000,000
South West	Christchurch	£825,000
South West	Cornwall	£350,000
South West	Cotswold	£850,000
South West	East Devon	£425,000
South West	East Dorset	£600,000
South West	Exeter	£900,000
South West	Forest of Dean	£250,000
South West	Gloucester	£900,000
South West	Isles of Scilly	£370,000
South West	Mendip	£450,000
South West	Mid Devon	£425,000
South West	North Devon	£400,000
South West	North Dorset	£600,000
South West	North Somerset	£725,000
South West	Plymouth	£400,000
South West	Poole	£1,000,000
South West	Purbeck	£750,000
South West	Sedgemoor	£780,000
South West	South Gloucestershire	£1,075,000
South West	South Hams	£400,000
South West	South Somerset	£900,000
South West	Stroud	£915,000
South West	Swindon	£850,000
South West	Taunton Deane	£975,000
South West	Teignbridge	£400,000
South West	Tewkesbury	£975,000
South West	Torbay	£400,000
South West	Torridge	£375,000
South West	West Devon	£375,000
South West	West Dorset	£600,000
South West	West Somerset	£400,000
South West	Weymouth and Portland	£750,000
South West	Wiltshire	£775,000

London	Barking and Dagenham	£4,500,000
London	Barnet	£6,000,000
London	Bexley	£4,250,000
London	Brent	£6,000,000
London	Bromley London	£4,250,000
London	Camden	£6,000,000
London	City of London	£6,000,000
London	Croydon	£4,250,000
London	Ealing	£6,000,000
London	Enfield	£4,500,000
London	Greenwich	£4,250,000
London	Hackney	£4,500,000
London	Hammersmith & Fulham	£6,000,000
London	Haringey	£4,500,000
London	Harrow	£6,000,000
London	Havering	£4,500,000
London	Hillingdon	£6,000,000
London	Hounslow	£6,000,000
London	Islington	£6,000,000
London	Kensington & Chelsea	£6,000,000
London	Kingston upon Thames	£4,000,000
London	Lambeth	£6,000,000
London	Lewisham	£4,250,000
London	Merton	£4,000,000
London	Newham	£4,500,000
London	Redbridge	£4,500,000
London	Richmond upon Thames	£4,000,000
London	Southwark	£6,000,000
London	Sutton	£4,000,000
London	Tower Hamlets	£4,500,000
London	Waltham Forest	£4,500,000
London	Wandsworth	£6,000,000
London	Westminster	£6,000,000

Agricultural land
April 2019

Local Enterprise Partnership (LEP)	£/ha
Black Country	£25,000
Buckinghamshire Thames Valley	£26,000
Cheshire and Warrington	£23,000
Coast to Capital	£25,000
Cornwall and Isles of Scilly	£21,000
Coventry and Warwickshire	£24,000
Cumbria	£26,000
Derby, Derbyshire, Nottingham and Nottinghamshire	£21,750
Dorset	£24,750
Enterprise M3	£26,000
Gloucestershire	£21,000
Greater Birmingham and Solihull	£25,000
Greater Cambridge and Greater Peterborough	£21,000
Greater Lincolnshire	£20,000
Greater Manchester	£23,000
Heart of the South West	£23,000
Hertfordshire	£26,000
Humber	£22,000
Lancashire	£25,000
Leeds City Region	£20,000
Leicester and Leicestershire	£22,000
Liverpool City Region	£23,000
London	£25,000
New Anglia	£21,000
North East	£16,000
Oxfordshire	£26,000
Sheffield City Region	£22,750
Solent	£25,000
South East	£25,000
South East Midlands	£23,000
Stoke-on-Trent and Staffordshire	£22,000
Swindon and Wiltshire	£25,000
Tees Valley	£16,000
Thames Valley Berkshire	£26,000
The Marches	£22,000
West of England	£25,000
Worcestershire	£22,000
York, North Yorkshire and East Riding	£20,000

Commercial : Edge of City Centre
April 2019

Local Enterprise Partnership (LEP)	Town (Largest First)	£/ha	Site Value Per Sq.M. Office Space Only	Including all Common Areas
Black Country	Dudley	£865,000	£210.65	£179.06
Buckinghamshire Thames Valley	Aylesbury	£865,000	£210.65	£179.06
Cheshire and Warrington	Warrington	£865,000	£210.65	£179.06
	Chester	£865,000	£210.65	£179.06
Coast to Capital	Croydon	£43,890,000	£4,275.40	£3,634.09
	Brighton and Hove	£2,210,000	£538.20	£457.47
Cornwall and Isles of Scilly	St Austell	£865,000	£210.65	£179.06
Coventry and Warwickshire	Coventry	£1,000,000	£243.53	£207.00
	Nuneaton	£865,000	£210.65	£179.06
Cumbria	Carlisle	£865,000	£210.65	£179.06
Derby, Derbyshire, Nottingham and Nottinghamshire	Sheffield	£1,200,000	£292.23	£248.40
	Nottingham	£1,240,000	£301.98	£256.68
Dorset	Bournemouth	£1,010,000	£245.96	£209.07
	Poole	£865,000	£210.65	£179.06
Enterprise M3	Kingston upon Thames	£5,400,000	£1,315.05	£1,117.80
	Basingstoke	£1,740,000	£423.74	£360.18
Gloucestershire	Gloucester	£865,000	£210.65	£179.06
	Cheltenham	£1,095,000	£266.66	£226.67
Greater Birmingham and Solihull	Birmingham	£13,770,000	£3,353.38	£2,850.40
	Solihull	£865,000	£210.65	£179.06
Greater Cambridge and Greater Peterborough	Peterborough	£865,000	£210.65	£179.06
	Cambridge	£24,360,000	£5,932.35	£5,042.54
Greater Lincolnshire	Lincoln	£865,000	£210.65	£179.06
	Grimsby	£865,000	£210.65	£179.06
Greater Manchester	Manchester	£12,960,000	£3,156.13	£2,682.73
	Bolton	£865,000	£210.65	£179.06
Heart of the South West	Plymouth	£865,000	£210.65	£179.06
	Exeter	£2,500,000	£608.82	£517.50
Hertfordshire	Watford	£5,245,000	£1,277.31	£1,085.72
	Hemel Hempstead	£1,575,000	£383.56	£326.03
Humber	Kingston upon Hull	£865,000	£210.65	£179.06
Lancashire	Blackpool	£865,000	£210.65	£179.06
	Blackburn	£865,000	£210.65	£179.06
Leeds City Region	Leeds	£11,120,000	£2,708.03	£2,301.85
	Bradford	£865,000	£210.65	£179.06
Leicester and Leicestershire	Leicester	£865,000	£210.65	£179.06
Liverpool City Region	Liverpool	£865,000	£210.65	£179.06
	Birkenhead	£865,000	£210.65	£179.06
London	Victoria	£480,680,000	£49,750.56	£39,800.29
	Southwark	£282,000,000	£29,187.11	£23,349.59
	Harrow	£6,270,000	£610.77	£519.16
	Bromley	£2,470,000	£240.61	£204.52
New Anglia	Norwich	£865,000	£210.65	£179.06
	Ipswich	£865,000	£210.65	£179.06
North East	Newcastle upon Tyne	£1,380,000	£336.07	£285.66
	Sunderland	£865,000	£210.65	£179.06
Oxfordshire	Oxford	£4,830,000	£1,176.24	£999.81
Sheffield City Region	Doncaster	£865,000	£210.65	£179.06
	Rotherham	£865,000	£210.65	£179.06
Solent	Southampton	£1,010,000	£245.96	£209.07
	Portsmouth	£865,000	£210.65	£179.06
South East	Redbridge	£2,470,000	£601.51	£511.29
	Bexley	£2,470,000	£601.51	£511.29
South East Midlands	Northampton	£865,000	£210.65	£179.06
	Luton	£1,250,000	£304.41	£258.75
Stoke-on-Trent and Staffordshire	Stoke-on-Trent	£865,000	£210.65	£179.06
	Wolverhampton	£865,000	£210.65	£179.06
Swindon and Wiltshire	Swindon	£865,000	£210.65	£179.06
Tees Valley	Middlesbrough	£865,000	£210.65	£179.06
	Darlington	£865,000	£210.65	£179.06
Thames Valley Berkshire	Reading	£26,200,000	£6,380.44	£5,423.42
	Slough	£15,580,000	£3,794.17	£3,225.07
The Marches	Telford	£865,000	£210.65	£179.06
West of England	Bristol	£14,030,000	£3,416.70	£2,904.22
	Bath	£3,700,000	£901.05	£765.90
Worcestershire	Worcester	£865,000	£210.65	£179.06
York, North Yorkshire and East Riding	Scarborough	£865,000	£210.65	£179.06

Commercial : Out of Town/Business Park
April 2019

LEP	Town (Largest First)	£/ha	Site Value Per Sq.M. (GIA) Office Space Only	including all Common Areas
Black Country	Dudley	£550,000	£53.99	£45.89
Buckinghamshire Thames Valley	Aylesbury	£900,000	£88.35	£75.10
Cheshire and Warrington	Warrington	£800,000	£78.53	£66.75
	Chester	£325,000	£31.90	£27.12
Coast to Capital	Croydon	N/A		
	Brighton and Hove	£1,750,000	£171.79	£146.02
Cornwall and Isles of Scilly	St Austell	£350,000	£34.36	£29.20
Coventry and Warwickshire	Coventry	£825,000	£80.99	£68.84
	Nuneaton	£720,000	£70.68	£60.08
Cumbria	Carlisle	£400,000	£39.27	£33.38
Derby, Derbyshire, Nottingham and Nottinghamshire	Sheffield	£600,000	£58.90	£50.07
	Nottingham	£740,000	£72.64	£61.75
Dorset	Bournemouth	£1,000,000	£98.17	£83.44
	Poole	£1,000,000	£98.17	£83.44
Enterprise M3	Kingston upon Thames	£4,000,000	£392.67	£333.77
	Basingstoke	£1,700,000	£166.88	£141.85
Gloucestershire	Gloucester	£900,000	£88.35	£75.10
	Cheltenham	£1,000,000	£98.17	£83.44
Greater Birmingham and Solihull	Birmingham	£1,100,000	£107.98	£91.79
	Solihull	£750,000	£73.63	£62.58
Greater Cambridge and Greater Peterborough	Peterborough	£800,000	£78.53	£66.75
	Cambridge	£3,940,000	£386.78	£328.76
Greater Lincolnshire	Lincoln	£225,000	£22.09	£18.77
	Grimsby	£335,000	£32.89	£27.95
Greater Manchester	Manchester	£1,170,000	£114.86	£97.63
	Bolton	£575,000	£56.45	£47.98
Heart of the South West	Plymouth	£400,000	£39.27	£33.38
	Exeter	£990,000	£97.19	£82.61
Hertfordshire	Watford	£1,910,000	£187.50	£159.37
	Hemel Hempstead	£1,800,000	£176.70	£150.20
Humber	Kingston upon Hull	£470,000	£46.14	£39.22
Lancashire	Blackpool	£400,000	£39.27	£33.38
	Blackburn	£500,000	£49.08	£41.72
Leeds City Region	Leeds	£835,000	£81.97	£69.67
	Bradford	£500,000	£49.08	£41.72
Leicester and Leicestershire	Leicester	£740,000	£72.64	£61.75
Liverpool City Region	Liverpool	£440,000	£43.19	£36.71
	Birkenhead	£325,000	£31.90	£27.12
London	Victoria	N/A		
	Southwark	N/A		
	Harrow	N/A		
	Bromley	N/A		
New Anglia	Norwich	£600,000	£58.90	£50.07
	Ipswich	£720,000	£70.68	£60.08
North East	Newcastle upon Tyne	£370,000	£36.32	£30.87
	Sunderland	£220,000	£21.60	£18.36
Oxfordshire	Oxford	£3,805,000	£373.53	£317.50
Sheffield City Region	Doncaster	£550,000	£53.99	£45.89
	Rotherham	£550,000	£53.99	£45.89
Solent	Southampton	£1,500,000	£147.25	£125.16
	Portsmouth	£1,500,000	£147.25	£125.16
South East	Redbridge	£4,500,000	£441.75	£375.49
	Bexley	£4,250,000	£417.21	£354.63
South East Midlands	Northampton	£800,000	£78.53	£66.75
	Luton	£1,610,000	£158.05	£134.34
Stoke-on-Trent and Staffordshire	Stoke-on-Trent	£475,000	£46.63	£39.63
	Wolverhampton	£550,000	£53.99	£45.89
Swindon and Wiltshire	Swindon	£850,000	£83.44	£70.93
Tees Valley	Middlesbrough	£285,000	£27.98	£23.78
	Darlington	£175,000	£17.18	£14.60
Thames Valley Berkshire	Reading	£8,250,000	£809.88	£688.39
	Slough	£2,250,000	£220.88	£187.74
The Marches	Telford	£500,000	£49.08	£41.72
West of England	Bristol	£1,100,000	£107.98	£91.79
	Bath	£1,305,000	£128.11	£108.89
Worcestershire	Worcester	£705,000	£69.21	£58.83
York, North Yorkshire and East Riding	Scarborough	£370,000	£36.32	£30.87

GDP DEFLATORS AT MARKET PRICES, AND MONEY GDP

Outturn data are as at the First Quarterly Estimate of GDP from the ONS - last updated 11 February 2022.
Forecast data are consistent with OBR Spring Statement EFO data as at 23 March 2022.

Financial year	GDP deflator at market prices 2020-21 = 100	GDP deflator at market prices per cent change on previous year	Money GDP [3], [4] Cash £ million Non-Seasonally Adjusted	Money GDP [3], [4] Cash £ million Seasonally Adjusted
1955-56	3.687		19,565	19,579
1956-57	3.918	6.26	21,149	21,125
1957-58	4.099	4.61	22,499	22,514
1958-59	4.198	2.42	23,325	23,296
1959-60	4.218	0.49	24,862	24,916
1960-61	4.304	2.04	26,628	26,646
1961-62	4.462	3.66	28,128	28,157
1962-63	4.602	3.14	29,440	29,457
1963-64	4.678	1.66	31,913	31,869
1964-65	4.899	4.71	34,844	34,912
1965-66	5.163	5.39	37,451	37,406
1966-67	5.426	5.10	39,939	39,935
1967-68	5.574	2.73	42,498	42,606
1968-69	5.866	5.23	46,753	46,775
1969-70	6.271	6.90	50,834	50,889
1970-71	6.890	9.87	57,698	57,781
1971-72	7.410	7.56	64,537	64,444
1972-73	8.040	8.49	73,843	73,945
1973-74	8.747	8.79	82,737	82,761
1974-75	10.522	20.29	98,039	98,210
1975-76	13.100	24.50	120,680	120,564
1976-77	14.923	13.92	141,863	142,376
1977-78	16.977	13.76	165,822	165,605
1978-79	18.888	11.26	192,026	192,145
1979-80	22.073	16.86	232,168	232,203
1980-81	26.294	19.12	267,048	267,330
1981-82	29.063	10.53	297,719	297,165
1982-83	31.201	7.36	326,894	327,154
1983-84	32.691	4.78	357,532	356,789
1984-85	34.552	5.69	385,441	384,649
1985-86	36.475	5.57	423,319	423,888
1986-87	37.993	4.16	455,208	455,919
1987-88	40.161	5.71	511,132	511,489
1988-89	42.858	6.72	570,568	571,496
1989-90	46.250	7.91	629,075	628,782
1990-91	50.127	8.38	679,572	681,140
1991-92	53.106	5.94	716,288	714,934
1992-93	54.561	2.74	738,955	740,734
1993-94	55.986	2.61	783,211	780,764
1994-95	56.777	1.41	821,875	821,678
1995-96	58.527	3.08	866,242	865,562
1996-97	60.616	3.57	924,297	923,925
1997-98	60.360	-0.42	962,708	962,216
1998-99	61.738	2.28	1,012,210	1,013,206
1999-00	62.089	0.57	1,054,714	1,053,779
2000-01	63.322	1.99	1,110,346	1,108,412
2001-02	64.644	2.09	1,151,245	1,153,602
2002-03	66.014	2.12	1,208,514	1,206,447
2003-04	67.693	2.54	1,275,904	1,275,183
2004-05	69.703	2.97	1,341,848	1,339,834
2005-06	71.769	2.96	1,423,370	1,421,392
2006-07	73.897	2.97	1,494,225	1,495,935
2007-08	75.963	2.80	1,572,772	1,573,173
2008-09	78.213	2.96	1,583,849	1,584,008
2009-10	79.442	1.57	1,566,720	1,566,126
2010-11	80.767	1.67	1,631,224	1,632,907
2011-12	81.987	1.51	1,678,775	1,676,778
2012-13	83.640	2.02	1,734,589	1,736,377
2013-14	85.556	2.29	1,817,879	1,816,590
2014-15	86.541	1.15	1,888,390	1,891,462
2015-16	87.078	0.62	1,953,366	1,951,685
2016-17	89.026	2.24	2,039,801	2,040,653
2017-18	90.559	1.72	2,111,738	2,114,634
2018-19	92.326	1.95	2,199,704	2,195,745
2019-20	94.486	2.34	2,261,200	2,260,252
2020-21	100.000	5.84	2,141,857	2,146,744
2021-22 [1], [2]	-	-1.02	2,364,402	2,363,009
2022-23 [1], [2]	-	4.05	2,513,171	2,512,583
2023-24 [1], [2]	-	2.41	2,621,534	2,622,335
2024-25 [1], [2]	-	1.85	2,726,167	2,725,709
2025-26 [1], [2]	-	1.95	2,826,172	2,826,096
2026-27 [1], [2]	-	2.00	2,931,226	2,931,334

Calendar year	GDP deflator at market prices 2021 = 100	GDP deflator at market prices per cent change on previous year	Money GDP [3] Cash £ million Non-Seasonally Adjusted
1955	3.670		19,160
1956	3.924	6.93	20,832
1957	4.081	4.00	22,093
1958	4.231	3.66	23,210
1959	4.262	0.73	24,378
1960	4.306	1.04	26,189
1961	4.469	3.79	27,905
1962	4.630	3.60	29,224
1963	4.698	1.46	31,090
1964	4.866	3.58	34,038
1965	5.155	5.95	36,818
1966	5.430	5.34	39,383
1967	5.590	2.95	41,666
1968	5.825	4.20	45,786
1969	6.211	6.62	49,754
1970	6.808	9.61	56,020
1971	7.372	8.28	62,841
1972	7.929	7.55	70,502
1973	8.632	8.86	81,687
1974	10.026	16.15	92,534
1975	12.648	26.15	114,936
1976	14.604	15.47	136,800
1977	16.629	13.87	159,524
1978	18.593	11.81	185,837
1979	21.278	14.44	220,586
1980	25.578	20.21	259,499
1981	28.731	12.33	289,653
1982	31.031	8.01	318,999
1983	32.751	5.54	350,813
1984	34.461	5.22	377,386
1985	36.317	5.39	414,161
1986	37.946	4.48	446,361
1987	40.018	5.46	496,226
1988	42.461	6.11	555,980
1989	45.866	8.02	615,125
1990	49.641	8.23	669,873
1991	53.004	6.77	706,821
1992	54.741	3.28	732,295
1993	56.312	2.87	771,414
1994	57.143	1.48	812,289
1995	58.590	2.53	853,228
1996	61.084	4.26	911,191
1997	60.876	-0.34	952,585
1998	61.843	1.59	998,318
1999	62.681	1.36	1,041,970
2000	63.737	1.68	1,098,500
2001	64.917	1.85	1,142,023
2002	66.254	2.06	1,190,336
2003	68.066	2.74	1,259,970
2004	69.818	2.57	1,322,795
2005	72.004	3.13	1,399,656
2006	74.059	2.85	1,476,722
2007	76.130	2.80	1,552,470
2008	78.603	3.25	1,598,752
2009	79.940	1.70	1,557,120
2010	81.038	1.37	1,612,195
2011	82.714	2.07	1,669,509
2012	84.045	1.61	1,721,355
2013	85.924	2.24	1,793,155
2014	87.295	1.60	1,876,162
2015	87.743	0.51	1,935,212
2016	89.407	1.90	2,016,638
2017	91.035	1.82	2,097,143
2018	92.855	2.00	2,174,380
2019	94.727	2.02	2,255,283
2020	100.010	5.58	2,152,646
2021	100.000	-0.01	2,317,667
2022 [1], [2]	-	2.85	2,473,978
2023 [1], [2]	-	3.14	2,596,609
2024 [1], [2]	-	1.86	2,700,903
2025 [1], [2]	-	1.89	2,800,966
2026 [1], [2]	-	2.00	2,904,268

Sources and footnotes:

GDP Deflator: Financial years 1955-56 to 2020-21 taken from ONS series L8GG in data tables: Table N.
https://www.ons.gov.uk/file?uri=%2feconomy%2fgrossdomesticproductgdp%2fdatasets%2fuksecondestimateofgdpdatatables%2fquarter4octtodec2021firstestimate/firstquarterlyestimateofgdpdatatables.xls
Calendar years 1955 to 2021 taken from ONS series MNF2 directly from their website. Data as per the First Quarterly Estimate of GDP 11 February 2022.
https://www.ons.gov.uk/economy/grossdomesticproductgdp/timeseries/mnf2/pn2?referrer=search&searchTerm=mnf2
For years 2021-22 to 2026-27 (2022 to 2026): taken from the Office for Budget Responsibility (OBR) forecasts for GDP deflator increases as of March 2022 Economy Supplementary tables.
https://obr.uk/efo/economic-and-fiscal-outlook-march-2022/

Money GDP: For years 1955-56 to 2020-21 (1955 to 2021): ONS data for money GDP not seasonally adjusted series BKTL in data tables: Table N.
https://www.ons.gov.uk/file?uri=%2feconomy%2fgrossdomesticproductgdp%2fdatasets%2fuksecondestimateofgdpdatatables%2fquarter4octtodec2021firstestimate/firstquarterlyestimateofgdpdatatables.xls
For years 1955-56 to 2020-21: ONS data for money GDP seasonally adjusted series YBHA in data tables: Table N.
https://www.ons.gov.uk/file?uri=%2feconomy%2fgrossdomesticproductgdp%2fdatasets%2fuksecondestimateofgdpdatatables%2fquarter4octtodec2021firstestimate/firstquarterlyestimateofgdpdatatables.xls
For years 2021-22 to 2026-27 (2022 to 2026): taken from the Office for Budget Responsibility (OBR) forecasts for GDP deflator increases as of March 2022 Economy Supplementary tables.
https://obr.uk/efo/economic-and-fiscal-outlook-march-2022/

Footnotes:

(1) For years 2021-22 to 2026-27 (2022 to 2026), this presentation only shows percentage changes in line with OBR data as of the Spring Statement, March 2022.

(2) For years 2021-22 to 2026-27 (2022 to 2026), money GDP forecasts from the OBR as of the Spring Statement, March 2022.

(3) Non-Seasonally adjusted money GDP (BKTL) from 1955-56 to 2020-21 (1955 to 2021) consistent with ONS First Quarterly Estimate of GDP release of 11 February 2022.

(4) Seasonally adjusted money GDP (YBHA) from 1955-56 to 2020-21 consistent with ONS First Quarterly Estimate of GDP release of 11 February 2022.

(5) For further information and the 'User's Guide' to these series, please visit the following page on the GOV.UK website at:
https://www.gov.uk/government/publications/gross-domestic-product-gdp-deflators-user-guide

(6) For practical examples of how to use the GDP deflator series, please visit the following page on the GOV.UK website at:
https://www.gov.uk/government/publications/how-to-use-the-gdp-deflator-series-practical-examples

MSCI DATSCHA

													Number of premises (less exclus	62	Total	752,325								
															Average	34,197								
Title Number	**Building Name**	**Address/Building**	**Address Type**	**Street**	**Town**	**Postcode**	**Description**	**Owned Since**	**Owner**	**Company Registration N**	**Correspondence addres**	**Ultimate owner**	**Tenure**	**Premises I**	**Special Cas**	**Value (£)**	**Area (m²)**	**Area (ft²)**	**Area (ft²)**	**Area (acres)**	**Number of related leaseholds**				
SYK269223		4		WEST STREET	Doncaster	DN1 3AA	Shop And Premises						Freehold	Retail	249G Shops	1,775	56	608	437	0.01	0				
SYK507140					Doncaster				19/09/2005 DONCASTER BOROUGH COUNCIL		Civic Centre, Waterdale, Don	DONCASTER BOROUGH COU	Freehold						1,121	0.03	0				
SYK21229		UNIT 6		TRAFFORD COURT	Doncaster	DN1 1PN	Offices And Premises		19/02/2016 DONCASTER ASSETS (NO 2) 09856210		1st Floor, Rico House, Georg	FD SECRETARIAL LIMITED	Freehold	Offices	043G Car Sp	190,150	1,704	18,352	26,560	0.61	4				
SYK339072	PLUMB CENTER	PLUMB CENTER		WEST STREET	Doncaster	DN1 3AA	Warehouse And Premises		01/02/1994 WOLSELEY CENTRES LIMITE 00406888		PO Box 21, Boroughbridge R	FERGUSON PLC	Freehold	Industrial	096G Factor	25,750	1,301	14,008	19,099	0.44	0				
SYK352316	RAILWAY HOTEL	RAILWAY HOTEL		WEST STREET	Doncaster	DN1 3AA			13/05/1999 UNIQUE PUB PROPERTIES LI 03726292		(Co. Regn. No. 3726292) of	TDR CAPITAL LLP	Freehold						2,514	0.06	0				
SYK507020					Doncaster				DONCASTER BOROUGH COUNCIL		Civic Centre, Waterdale, Don	DONCASTER BOROUGH COU	Freehold						2,634	0.06	0				
SYK618610		4		TRAFFORD COURT	Doncaster	DN1 1PN			02/07/2014 TASKMASTER RESOURCES L 03289148		8 Leodis Court, David Street	RECRUITEX LIMITED	Leasehold						2,270	0.05					
SYK516090					Doncaster				03/03/2006 DONCASTER BOROUGH COUNCIL		Civic Centre, Waterdale, Don	DONCASTER BOROUGH COU	Freehold						5,252	0.12	0				
SYK592393					Doncaster				30/11/2011 DONCASTER BOROUGH COUNCIL		Civic Centre, Waterdale, Don	DONCASTER BOROUGH COU	Freehold						131		0				
SYK269217					Doncaster				02/06/2016 PALIGAP PROPERTIES LIMITI 05062268		1 Churchgate, Retford DN22	PALIGAP PROPERTIES LIMITI	Freehold						1,570	0.04	0				
SYK437947		COMMUNITY DENTAL SERVICES THE FLYING SCOTSMAN		ST SEPULCHRE GATE WEST	Doncaster	DN1 3AP	Surgery And Premises		01/04/2010 DONCASTER FUNDCO 3 LIMI 06963235			EQUITIX FUND II LP	Freehold	Public Prope	425G Pharm	160,000	1,957	21,069	10,100	0.23	6				
SYK512677					Doncaster				22/12/2005 BRITISH TRANSPORT POLICE AUTHORITY		14 Pentonville Road, London	BRITISH TRANSPORT POLICI	Leasehold						1,755	0.04					
SYK558011					Doncaster				30/09/2008 DONCASTER BOROUGH COUNCIL		Civic Centre, Waterdale, Don	DONCASTER BOROUGH COU	Freehold						660	0.02	0				
SYK575430	ELECTRICITY SUB STATION	ELECTRICITY SUB STATION 2		ST SEPULCHRE GATE WEST	Doncaster	DN1 3AH	Car Park And Premises		01/04/2010 DONCASTER FUNDCO 3 LIMI 06963235			EQUITIX FUND II LP	Freehold	Sui Generis	040G Car Pa	4,250	11	118	6,339	0.15	6				
SYK569527		7 - 8		TRAFFORD COURT	Doncaster	DN1 1PN			29/07/2009 BRITISH TRANSPORT POLICE AUTHORITY		14 Pentonville Road, London	BRITISH TRANSPORT POLICI	Leasehold						1,863	0.04					
SYK519300		156		ST SEPULCHRE GATE WEST	Doncaster	DN1 3AQ	Hall And Premises		15/05/2006 DONCASTER BOROUGH COUNCIL		Civic Centre, Waterdale, Don	DONCASTER BOROUGH COU	Freehold	Public Prope	293G Village	3,850	194	2,093	11,882	0.27	0				
SYK107455		88 - 90		ST SEPULCHRE GATE	Doncaster	DN1 1SD	Shop And Premises		03/09/2019 ONE CALL ESTATES LIMITED 04695861		Saturn, Balby Carr Bank, Do	ONE CALL ESTATES LIMITED	Freehold	Retail	249G Shops	19,500	282	3,042	1,335	0.03	0				
SYK139481					Doncaster								Freehold						779	0.02	0				
SYK255456					Doncaster				18/11/2019 RENT DONCASTER LIMITED 09963388		18 Boyce Gardens, Nottingh	RENT DONCASTER LIMITED	Freehold						1,371	0.03	0				
SYK276095					Doncaster								Freehold						834	0.02	0				
SYK133607					Doncaster								Freehold						902	0.02	0				
SYK163309		1/3		WEST LAITH GATE	Doncaster	DN1 1SF	Shop And Premises						Freehold	Retail	249G Shops	9,600	169	1,824	932	0.02	0				
SYK173059		5/7		WEST LAITH GATE	Doncaster	DN1 1SF	Shop And Premises		10/05/1983 STAVELEY BROTHERS LIMITI 00535519		10 West Laith Gate, Doncast	STAVELEY BROTHERS LIMIT	Freehold	Retail	249G Shops	10,750	273	2,940	1,691	0.04	0				
SYK190429		82/84		ST SEPULCHRE GATE	Doncaster	DN1 1SD	Surgery And Premises						Freehold	Public Prope	409G Cafes	31,750	370	3,989	5,106	0.12	3				
SYK209923		VEHICLE PANELS AND PAINTS		ST SEPULCHRE GATE WEST	Doncaster	DN1 3AQ			20/02/2020 JKWW LIMITED 12258860		Sidings House, Sidings Cour	JKWW LIMITED	Freehold						5,572	0.13	0				
SYK234525		35/37		GORDON STREET	Doncaster	DN1 3AA	Store And Premises		18/02/1987 H S HARBON AND SONS LIMITED		Gordon Street, Doncaster, S	H S HARBON AND SONS LIM	Freehold	Retail	268G Stores	5,100	252	2,717	1,692	0.04	0				
SYK255464		MALLARD 2 CAR PARK 122		ST SEPULCHRE GATE WEST	Doncaster	DN1 3AQ			23/12/2019 ACUTE DISPUTES CONSULTI 11786649		46 Main Street, Mexborough	ACUTE DISPUTES CONSULTI	Freehold						596	0.01	0				
SYK314088	THE LEOPARD HOTEL	THE LEOPARD HOTEL, 2		WEST STREET	Doncaster	DN1 3AA	PUBLIC HOUSE AND PREMIS		09/08/2021 SUN INN PROPERTIES LIMIT 09974514		Trafalgar Works, Wallace Ro	SUN INN PROPERTIES LIMIT	Freehold	Retail	203G Office	17,550	84	912	8,089	0.19	1				
SYK673798		7 - 8		TRAFFORD COURT	Doncaster	DN1 1PN			08/07/2019 BRITISH TRANSPORT POLICE AUTHORITY		14 Pentonville Road, London	BRITISH TRANSPORT POLICI	Leasehold						3,706	0.09					
SYK654920		82 - 84		ST SEPULCHRE GATE	Doncaster	DN1 1SD							Leasehold						2,934	0.07					
SYK676290		82 - 84		ST SEPULCHRE GATE	Doncaster	DN1 1SD			24/09/2019 DONCASTER DENTAL LIMITE 11547785		14 David Mews, London W1U	APRIL HOLDINGS LIMITED	Leasehold						2,934	0.07					
SYK519605		118		ST SEPULCHRE GATE WEST	Doncaster	DN1 3AQ	Shop And Premises		19/05/2006 DONCASTER BOROUGH COUNCIL		Civic Centre, Waterdale, Don	DONCASTER BOROUGH COU	Freehold	Retail	249G Shops	6,700	266	2,865	2,079	0.05	0				
SYK507239					Doncaster				DONCASTER BOROUGH COUNCIL		Civic Centre, Waterdale, Don	DONCASTER BOROUGH COU	Freehold						60,316	1.38	0				
SYK625795					Doncaster								Freehold						4,095	0.09	0				
SYK422919					Doncaster				14/06/2016 PALIGAP PROPERTIES LIMITI 05062268		1 Churchgate, Retford DN22	PALIGAP PROPERTIES LIMITI	Freehold						2,334	0.05	0				
SYK661263					Doncaster				23/05/2018 DONCASTER BOROUGH COUNCIL		Civic Centre, Waterdale, Don	DONCASTER BOROUGH COU	Freehold						135		0				
SYK667146					Doncaster								Freehold						2,359	0.05	0				
SYK165533		5		GORDON STREET	Doncaster	DN1 1RS							Freehold						607	0.01	0				
SYK221658		R/O 127/133		ST SEPULCHRE GATE WEST	Doncaster	DN1 3AH	Shop And Premises		16/10/1991 DONCASTER BOROUGH COUNCIL		Civic Centre, Waterdale, Don	DONCASTER BOROUGH COU	Freehold	Retail	249G Shops	7,700	199	2,150	1,606	0.04	0				
SYK233886		85		ST SEPULCHRE GATE	Doncaster	DN1 1RU	Shop And Premises						Freehold	Retail	249G Shops	5,000	68	736	5,803	0.13	2				
SYK264083					Doncaster								Freehold						614	0.01	0				
SYK267811					Doncaster				13/02/1989 GREGORY'S (LEATHER) LIMI 00461913		81 St Sepulchre Gate, Donca	GREGORY'S (LEATHER) LIMI	Freehold						77		0				
SYK31369	SOUTH MALL FRENCHGATE (	SOUTH MALL FRENCHGATE CENTRE		ST SEPULCHRE GATE	Doncaster	DN1 1TT			21/03/2002 K/S FRENCHGATE			K/S FRENCHGATE	Leasehold						21,935	0.5					
SYK317058		UNIT 3		ST SEPULCHRE GATE	Doncaster	DN1 1AN	Shop And Premises		16/03/2012 ADMIRAL TAVERNS LIMITED 05438628		Milton Gate 60 Chiswell Stre	PSSF BRADY (CAYMAN) LIMI	Freehold	Retail	249G Shops	4,800	80	871	2,225	0.05	0				
SYK356854	LNER CAR PARK	LNER CAR PARK		WEST STREET	Doncaster	DN1 3AA	Car Park And Premises		02/06/1995 DONCASTER BOROUGH COUNCIL		Civic Centre, Waterdale, Don	DONCASTER BOROUGH COU	Freehold	Sui Generis	040G Car Pa	70,000	70	753	21,379	0.49	1				
SYK37467					Doncaster				19/01/2010 NORTHERN POWERGRID (YC 04112320		Lloyds Cort, 78 Grey Street,	BERKSHIRE HATHAWAY INC	Leasehold						90						
SYK397912					Doncaster				29/07/1998 GREGORY'S (LEATHER) LIMI 00461913		81 St Sepulchre Gate, Donca	GREGORY'S (LEATHER) LIMI	Freehold						24		0				
SYK450231		1ST FLR 7		PORTLAND PLACE	Doncaster	DN1 3DF	Car Park And Premises		03/01/2018 PORTLAND HOLDINGS (DON 10961170			EMPIRE PROPERTY GROUP H	Freehold	Offices	040G Car Pa	135,150	1,126	12,130	20,622	0.47	0				
SYK453888					Doncaster				07/04/2003 NETWORK RAIL INFRASTRUC 02904587		1 Eversholt Street, London N	BRITISH GOVERNMENT	Freehold						9,974	0.23	1				
SYK462844	CAR PARK ADJACENT	CAR PARK ADJACENT, 79 - 80		SPRING GARDENS	Doncaster	DN1 3DP	Car Park And Premises						Freehold	Sui Generis	040G Car Pa	3,000	5	53	5,724	0.13	0				
SYK478139					Doncaster				01/04/2010 DONCASTER FUNDCO 3 LIMI 06963235			EQUITIX FUND II LP	Freehold						10,488	0.24	2				
SYK623587	THE LEOPARD HOTEL	THE LEOPARD HOTEL, 2		WEST STREET	Doncaster	DN1 3AA			18/12/2014 DONCASTER CONFERENCES, 04373252			DONCASTER CULTURE AND	Leasehold						8,089	0.19					
SYK483975		80		ST SEPULCHRE GATE	Doncaster	DN1 1SD	Shop And Premises		11/08/2017 LUKE HOLDINGS LIMITED 10848810		13-15 Nether Hall Road, Don	LUKE HOLDINGS LIMITED	Freehold	Retail	249G Shops	11,600	114	1,230	2,150	0.05	1				
SYK504167					Doncaster				19/07/2005 DONCASTER BOROUGH COUNCIL		Civic Centre, Waterdale, Don	DONCASTER BOROUGH COU	Freehold						9,591	0.22	0				
SYK530178		1A		GORDON STREET	Doncaster	DN1 1RS							Freehold						626	0.01	0				
SYK166957	SOUTH MALL FRENCHGATE (	SOUTH MALL FRENCHGATE CENTRE		ST SEPULCHRE GATE	Doncaster	DN1 1TT			05/03/1998 SAINSBURY'S SUPERMARKE 03261722			SAINSBURY (J) PLC	Leasehold						22,051	0.51					
SYK529543		82 - 84		ST SEPULCHRE GATE	Doncaster	DN1 1SD			25/01/2007 INSTANT CASH LOANS LIMI 02685515		42 Alie street, London E1 8D	EAVF INTERMEDIARY HOLDI	Leasehold						5,106	0.12					
SYK626046		10		WEST LAITH GATE	Doncaster	DN1 1SF	Shop And Premises		13/02/2018 INDIGO PROPERTY ASSOCIA 09314601		138 Wilderspool Causeway,	INDIGO PROPERTY ASSOCIA	Freehold	Retail	249G Shops	7,100	199	2,146	1,626	0.04	0				
SYK632216		85		ST SEPULCHRE GATE	Doncaster	DN1 1RU							Leasehold						5,803	0.13					
SYK639285					Doncaster				17/05/2016 EAST COAST MAIN LINE COI 04659708		41-45 Blackfriars Road, Lon	STAGECOACH GROUP PLC	Leasehold						9,971	0.23					
SYK565693		80		ST SEPULCHRE GATE	Doncaster	DN1 1SD							Leasehold						2,150	0.05					
SYK671115	DONCASTER RAILWAY STAT	DONCASTER RAILWAY STATION		TRAFFORD WAY	Doncaster	DN1 1PN			12/04/2019 SUBWAY REALTY LIMITED 04174473		1 Chalston House, Mill Court	SUBWAY INTERNATIONAL H	Leasehold						14,534	0.33					
SYK671215	DONCASTER RAILWAY STAT	DONCASTER RAILWAY STATION		TRAFFORD WAY	Doncaster	DN1 1PN							Leasehold						14,534	0.33					
SYK286325		94 - 95		SPRING GARDENS	Doncaster	DN1 3DJ	Gymnasium And Premises		05/02/1990 HARTRIGG HOTEL LIMITED		30 Westmoreland Street, Wi	HARTRIGG HOTEL LIMITED	Freehold	Offices	203G Office	21,250	375	4,040	2,165	0.05	1				
SYK275080		9		STEWART STREET	Doncaster	DN1 1RT							Freehold						1,260	0.03	0				
SYK631164	KINGS ARCADE	KINGS ARCADE		ST SEPULCHRE GATE	Doncaster	DN1 1AN			11/01/2019 LONDON NORTH EASTERN R 04659712		25 Skeldergate, York YO1 6	BRITISH GOVERNMENT	Leasehold						197,790	4.54					
SYK482851		94 - 95		SPRING GARDENS	Doncaster	DN1 3DJ			05/05/2004 TCS (DONCASTER) LIMITED 04842709		85 St Sepulchre Gate, Donca	TCS (DONCASTER) LIMITED	Leasehold						1,821	0.04					
SYK664551	LNER CAR PARK	LNER CAR PARK		WEST STREET	Doncaster	DN1 3AA			14/09/2018 LONDON NORTH EASTERN R 04659712		25 Skeldergate, York YO1 6	BRITISH GOVERNMENT	Leasehold						20,407	0.47					
SYK628820		85		ST SEPULCHRE GATE	Doncaster	DN1 1RU			12/06/2015 FUNERAL SERVICES LIMITEI IP030808		1 Angel Square, Manchester	FUNERAL SERVICES LIMITEI	Leasehold						5,803	0.13					

Is the UK commercial property market well poised for a stronger 2022?

4.93%
The UK average prime yield

£57 billion
2021 UK commercial investment volume – in line with the five-year average

3 sectors
saw yields move lower in December

Rising commercial property investment levels in the UK, with yields beginning to trend downwards again, the market is poised for a positive 2022. The occupational drivers, notably hiring intentions by companies and lower unemployment figures, is positive news. However, political issues, energy costs and rising prices more generally have dominated the conversations for the start of this year.

Looking through these (hopefully) transitory issues, which will pass sooner rather than later, there are pockets of good news. In the retail warehouse sector, with no major insolvencies, growing consumer spending and the additional sales driven by click and collect, the sector is showing much lower yields compared to 12 months earlier. Despite the onset and

some very strong locations, such as

demand data was relatively positive for

Source: Savills Research

Share

In terms of investment volumes, the latest data for 2021 shows that c.£57bn was invested in the UK last year, which is slightly above the five-year average, but a 21% increase on 2020. We expect a 10% increase, compared to 2021, this year.

A strong finish to 2021 *Looking at the UK commercial investment volumes, there were*

five months in 2021 at or above the five-year average

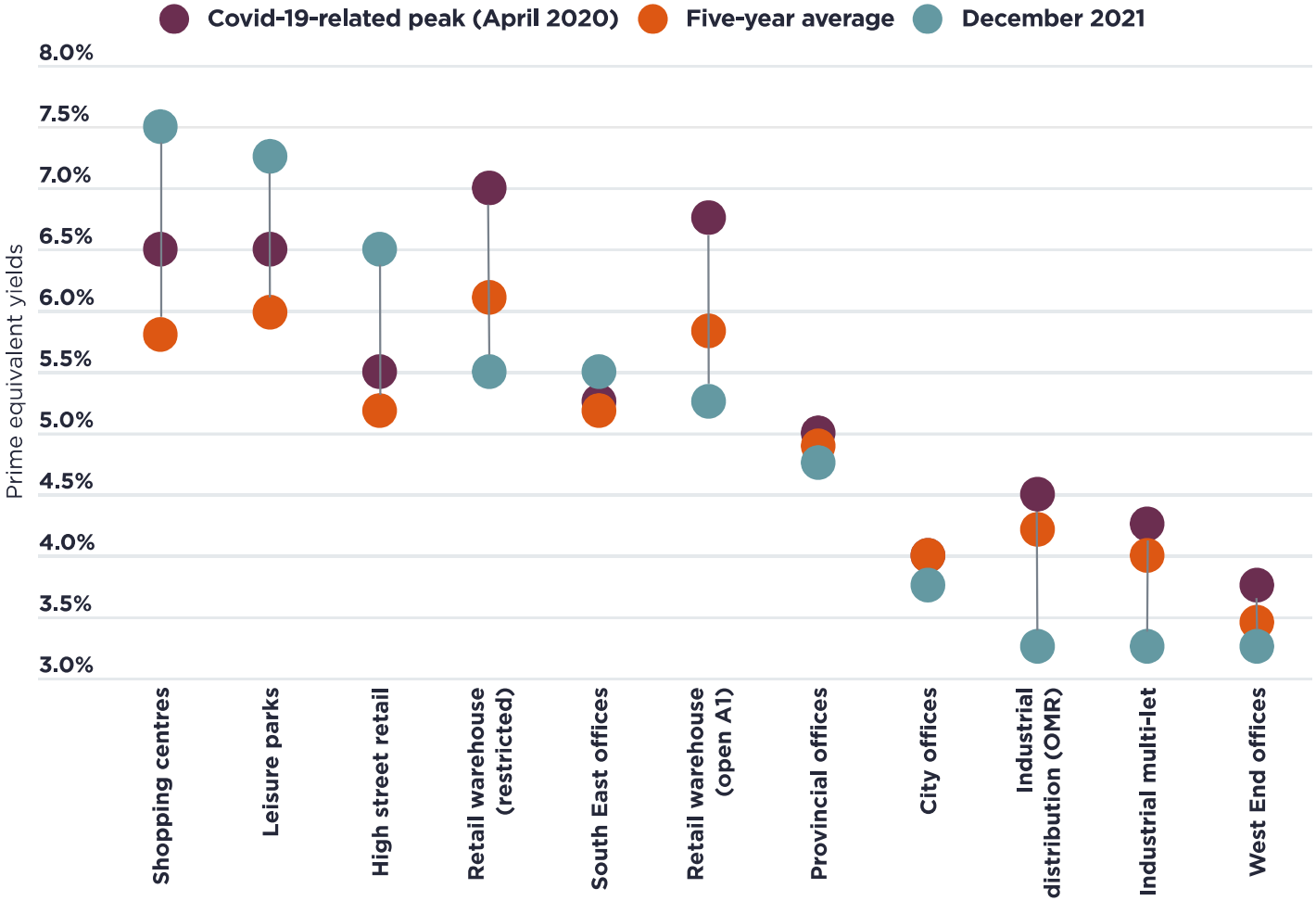
Share

At the start of the year, it is sensible to examine where we believe we are in the current cycle. A review of the recent prime yield shifts is especially relevant.

Before diving into this analysis, it is worth noting that the UK commercial property market is supported by relatively healthy demand and supply fundamentals. As we all know, there remain headwinds on many fronts, but investors remain vigilant for the best opportunities to meet their investment objectives. Their strategies will have been reviewed in the past 24 months, but will now form the backbone of their intentions for the next few years.

> **Office yields, mainly at the prime end of the spectrum, have remained broadly unchanged despite the commentary in 2020 regarding the death of the office**
>
> - Steven Lang, Director, Commercial Research

As was discussed above, the investment volumes for 2021 were more positive than would have been expected at the start of last year. This reflects the more positive investors' sentiment towards the commercial property sector following the significant upward yield shift in April 2020. The chart presents the highest to lowest sector in terms of the current prime yield, and the comparison is to both the 'Covid peak' and the preceding five-year average.



Source: Savills Research

The first three sectors are showing current yields much higher than both the peak and the five-year average.

The retail warehouse sectors were discussed above, but the chart does show the extent of relative attractiveness of the sector with the yields now currently below the five-year average.

Office yields, mainly at the prime end of the spectrum, have remained broadly unchanged despite the commentary in 2020 regarding the death of the office.

The industrial sector, driven by another record-breaking year of occupational demand, has seen yields move significantly and are currently well below the five-year average, in line with West End offices.

As shown in the recently published **Savills UK Cross Sector Outlook 2022** report, the sectors covered in this report have return expectations ranging from 4% (shopping centres) to 11.5% (London industrials), per annum on average, during the next five years. Assuming inflation recedes during the course of 2022, which is very likely, this shows commercial property to be an attractive investment.

Any metric that helps us to understand the future drivers and/or scale of demand is, of course, important. There are many metrics available, but an analysis of the venture capital (VC) raising activity in the UK is of particular interest. For the recipient companies, VC is often the vital first step to get its business on a stronger growth trajectory. There is corresponding headcount and revenue growth, which results in real estate demand.

, there was a 59% increase in the total
:- to medium-term demand for
on, but there is also a 'rippling out' to
ace in the regional markets.

Source: Savills Research, Pitchbook

COMMERCIAL INVESTMENT

Authors

Steven Lang
Director
Offices & Life Sciences Commercial Research
CONTACT NOW

Related Research

INDUSTRIAL AND LOGISTICS | 18 MARCH 2024

Future Space: shedding light on industrial & logistics through our 2023 census

RCH 2024

tate Capital Markets Annual Review

COMMERCIAL LEASING | 12 MARCH 2024

Download PDF

Subscribe to Research

Residential Property

FOR SALE

Property for sale

FOR RENT

Property to rent i...

Commercial Property

FOR SALE

Commercial p...

FOR RENT

Office propert...

Rural Property

Rural property for sale
Farms for sale
Equestrian property for sale

Services & Sectors

SERVICES

Asset Man...
Buying or ...
Consultan...
Developm...
Finance
Investment
Letting or ...
Occupier ...
Planning

SECTORS

Affordable...
Central Lo...
Education
Energy & ...
Food and ...
Healthcare
Hotels
Industrial ...
Infrastruct...

More Information

Fraud Alerts
Sitemap
RSS Feeds
Accessibility
Feedback
TDS Explained
Provision of Services
Slavery & Human Traffickі...
Terms & Conditions
Privacy & Cookies
Manage Cookies
Client Money Protection

Property for sale in France
Property for sale in the US
Property for sale in Italy
Property for sale in Australia
Property for sale in Spain

Offices

All UK offices
UK offices by county
London Offices
Find an office worldwide

Residential
Retail
Rural
Senior Livi...
Serviced ...
Student A...
Telecoms
Trade-Rel...
Utilities
Waste Ma...

Rental Yield Calculator
Land & Buildings Transac...
ESG at Savills

Fees & Charges

Residential Tenant Fees &...
Residential Landlord Fee...

Talk to Us

Find a Savills Office
Find a Savills Employee
Book a Property Valuation
Careers with Savills
Ask a Question
Investor Relations

RESEARCH ARTICLE

The value of land

04 JUNE 2015

RESEARCH ARTICLE | CONTACTS & RELATED ARTICLES

A leveraged bet on house prices?

Land is the fundamental ingredient in the construction of new homes. Many of the issues limiting the rate of new home building can be traced back to the pricing and availability of land for residential development.

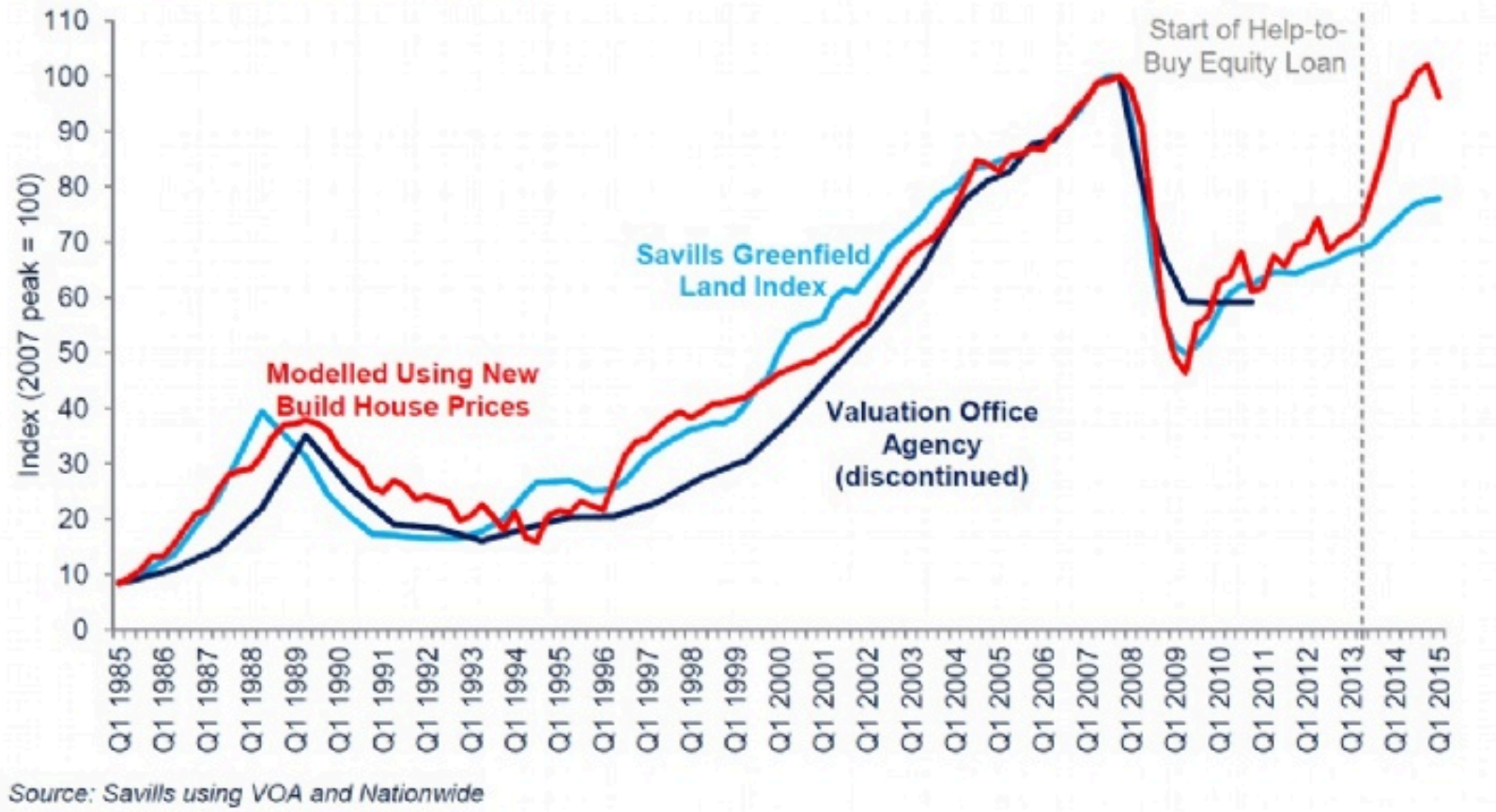
The availability of development land is constrained by the planning system but also by other factors. Land is generally an appreciating asset and many landowners' price expectations will be firmly set. Even if planning regulations were eased further, there are limited incentives for landowners to sell at a faster rate than they are currently as that might compromise the price they achieve. That is particularly the case where the land is already generating an income through other uses.

Development land is typically valued using a residual approach with reference to comparable transactions. A developer assesses what new build house price is achievable in that location with reference to prices and sales rates in the second hand market and on nearby comparable new build sites. At a very basic level (assuming no affordable housing, S106 or CIL), multiply that new build house price by the number of homes to be built on the land and you arrive at the gross development value (GDV) of the site. The underlying value of the land is then the GDV less the cost of development and less an appropriate allowance for profit as the formula opposite shows.

When in competition with other developers and assuming discipline on appropriate profit margins, the winning bidder will typically be the one that pushes for a combination of the highest new build price, the highest density (subject to planning) and the lowest build cost (unless one offsets the other). With land typically bought up front, this approach sets the target new build house price in stone. Developers will then only

We can demonstrate the link between house prices and land values using a simple model. It uses Nationwide new build house prices as a proxy for GDV and the only input. It is based on an old land buyer's rule of thumb: land is 1/3rd of GDV. Therefore the modelled land value is 1/3rd of the house price. The volatility in land prices is accounted for by assuming that the remaining 2/3rds (effectively costs and profit) are sticky and do not fall. Therefore land values absorb the full impact of any falls in house price and the full benefit from any rises while house prices are below their previous peak. The model output (red line) does a reasonable job of tracing actual land values up until two years ago.

Fig 1 – Residential Development Land Values



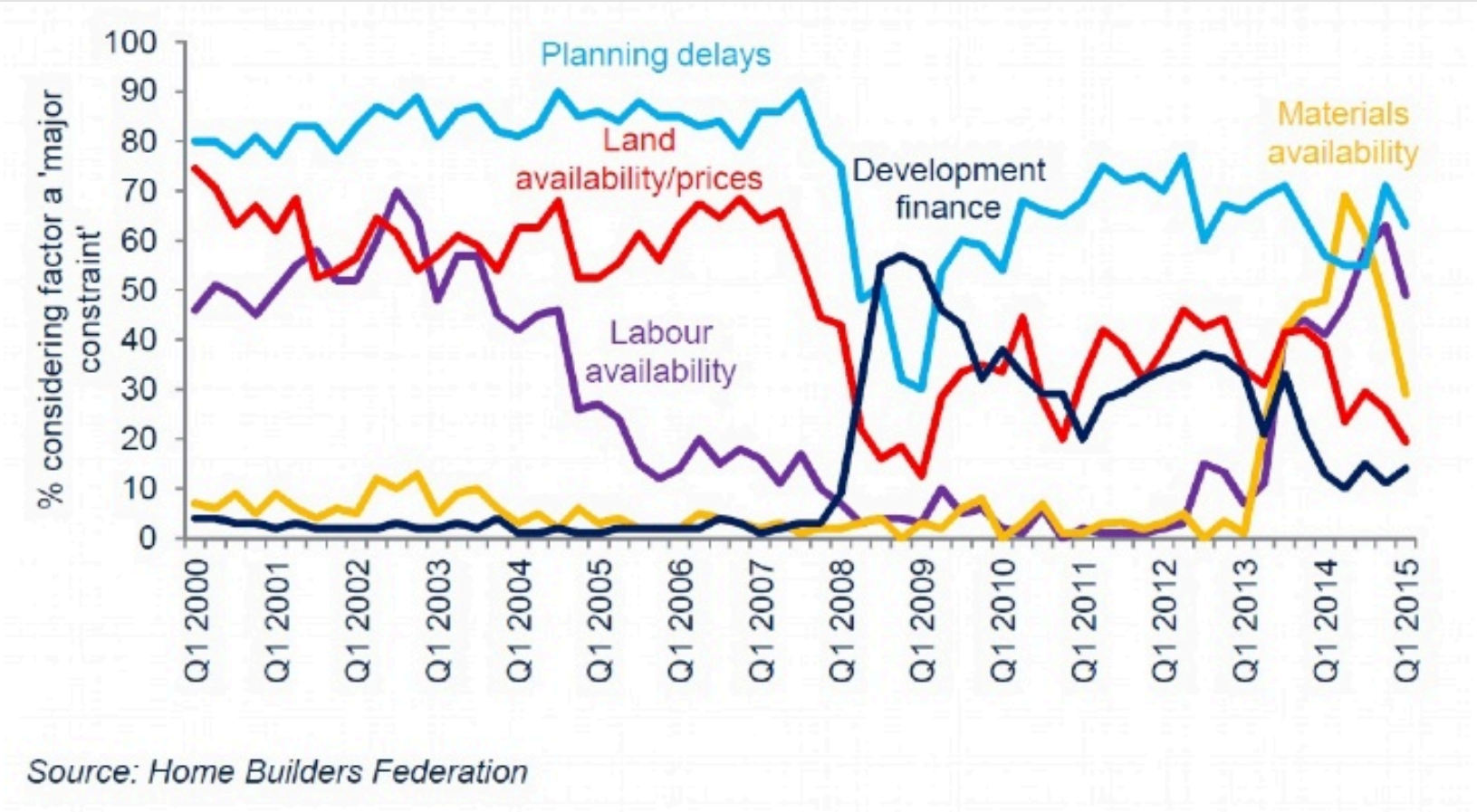
Source: Savills using VOA and Nationwide

OTHER FACTORS

At first sight, the model's output suggests that there is substantial room for uplift in land values. However, the model is oversimplified by intention and the reality is more complex and varies by local market. Calculating actual land values has to account for a mix of property use

Many developers and housebuilders will remain cautious despite the current strength of the new build sales market. Housebuilders' profit margins may be returning to pre-recession levels but there are other potential economic, political and market risks that warrant some caution. Build cost inflation and labour availability have been top of the constraints list recently and explain some of the underperformance. The need to absorb CIL and the lower value of affordable housing will continue to contribute to the gap between the model and actual land values in some markets. With large scale Government support of the housebuilding sector through the likes of Help-to-Buy, there will be political uncertainty created by the election cycle and a lack of long-term cross-party strategic planning for the provision of new homes.

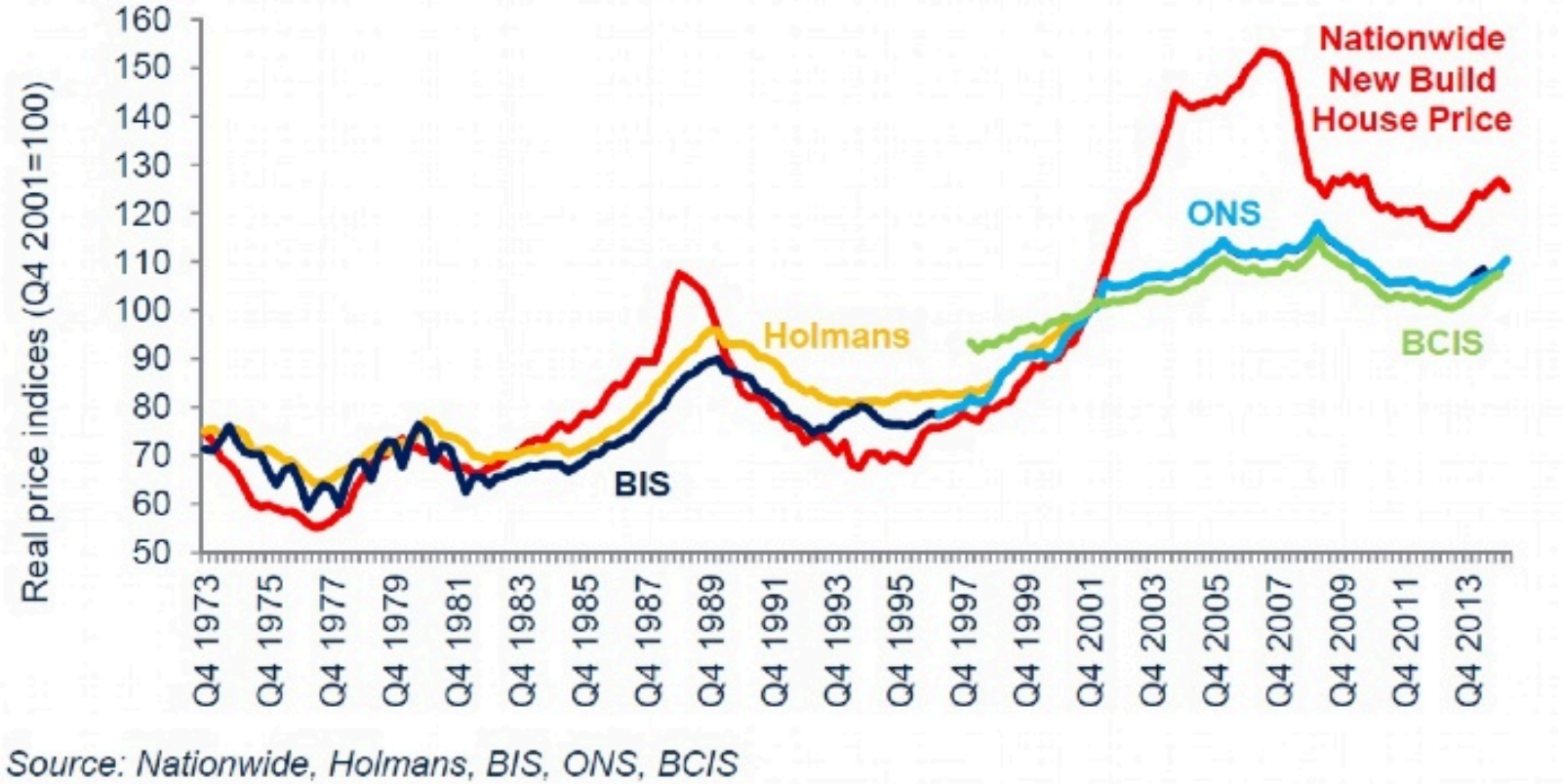
Our house view is more balanced and suggests that the full uplift in land values will only be realised in markets with high housing demand and constrained land availability. There are currently a relatively high number of consents coming through the planning system compared to new housing starts although they are unevenly distributed across the country. Where starts exceed planning consents, this could lead to increased demand for land and an associated rise in land values. Thanks to the mechanisms detailed in this note, higher land values could then limit sales rates in markets unable to absorb higher new build prices. This approach means that developers and housebuilders will continue to build homes at a rate dictated by how fast they can sell them based on the price they had to pay for the land. The need for more land to be released is apparent.



Source: Home Builders Federation

Planning issues will always be a valid go-to complaint for developers but recent evidence suggests that the availability (and cost) of materials and labour has been a bigger constraint over the last couple of years.

Survey responses from the HBF survey suggest these issues are declining in importance but remain high relative to recent years. The uncertainty around future build cost inflation will inevitably limit land prices to some degree.

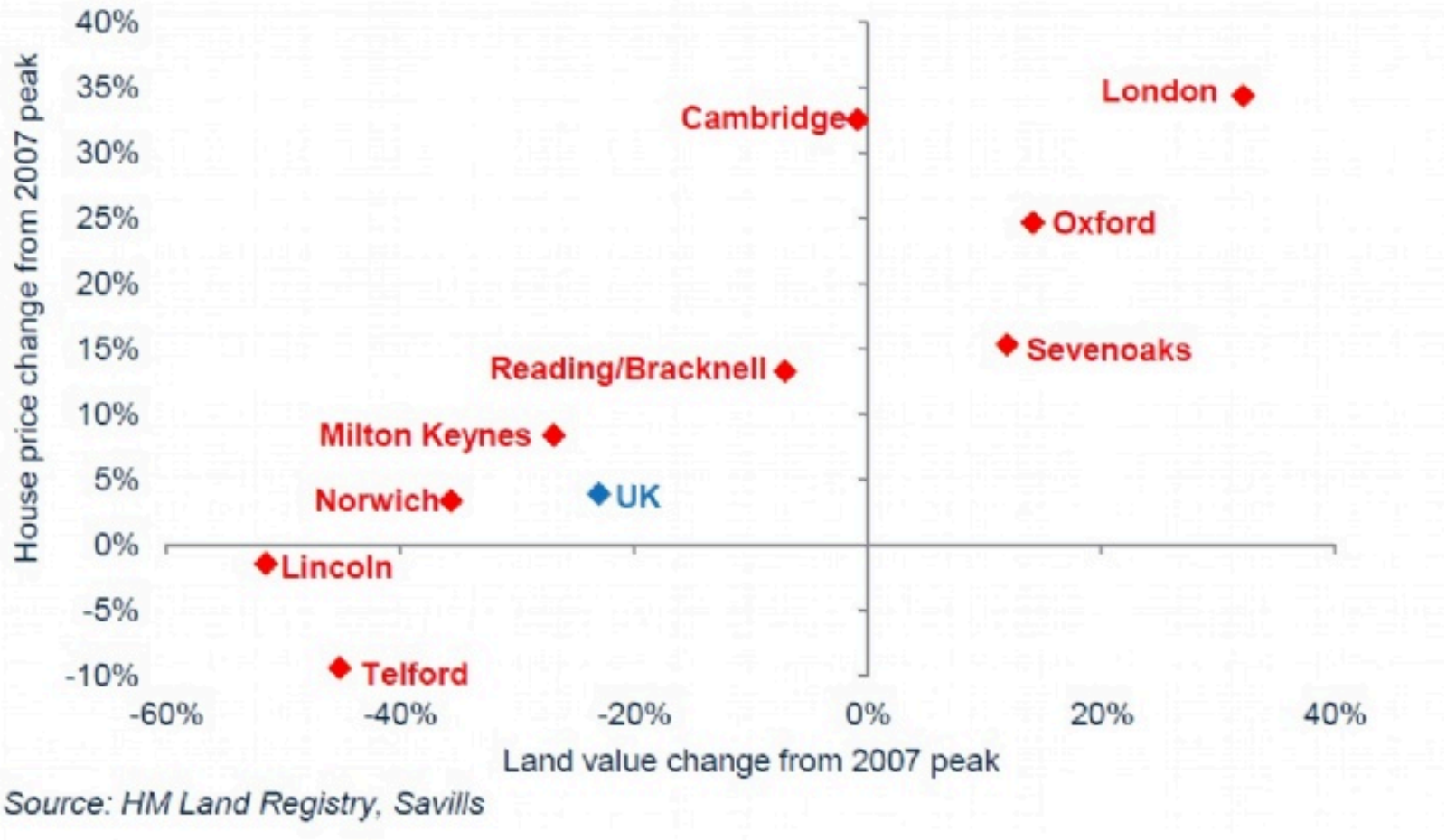


Source: Nationwide, Holmans, BIS, ONS, BCIS

Prior to 2001, indicators for build costs suggest that they generally matched the trend in house prices.

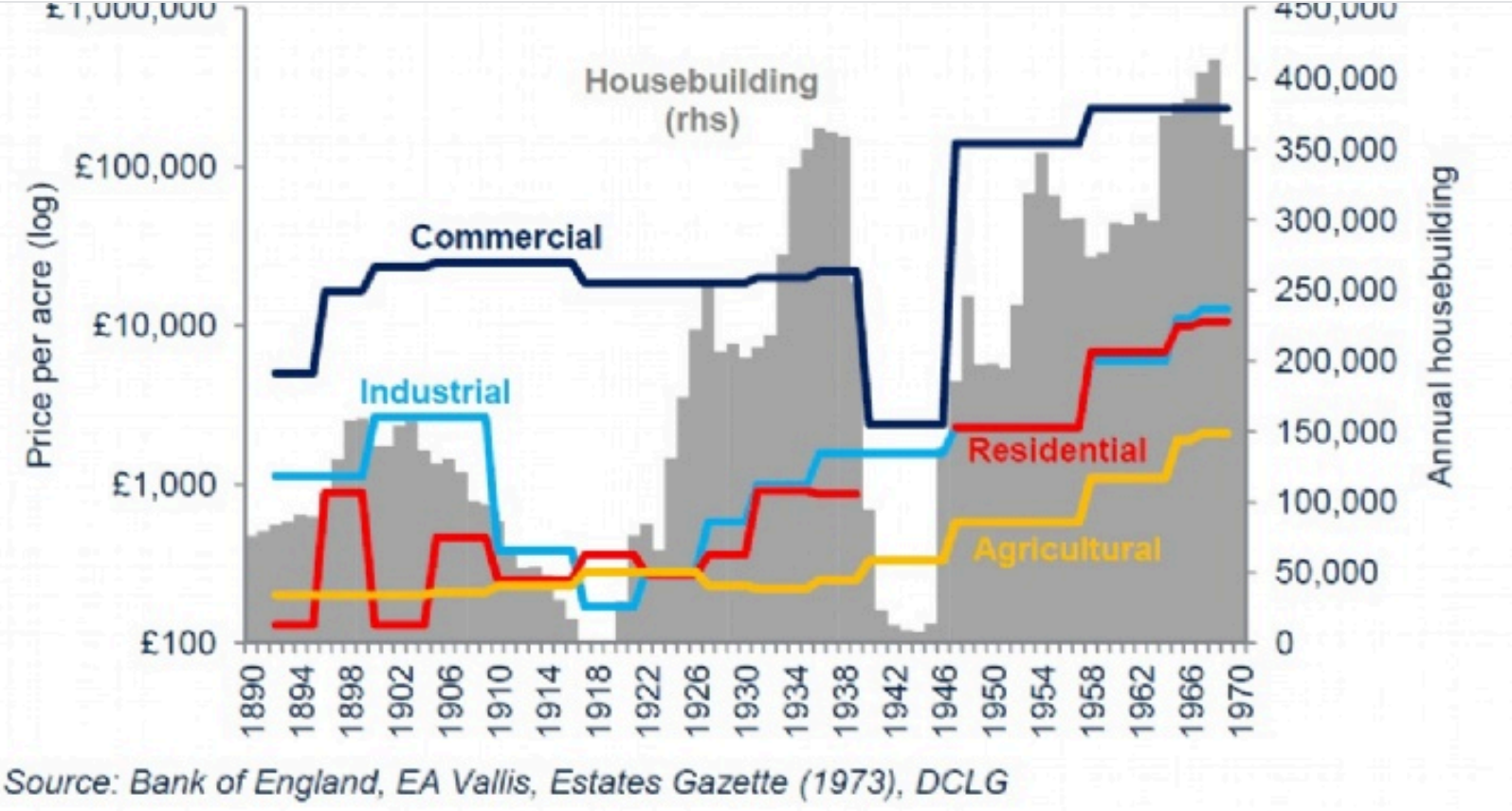
That relationship broke down between 2001 and 2007 when house price inflation substantially outpaced build costs.

The relationship has resumed post recession and the recent house price rises have been matched by increases in build costs.



The performance of local land values since the market peak in 2007 broadly reflects the underlying performance of the local housing market.

There are exceptions that highlight local approaches to development and land release. Cambridge has seen similar or higher house price growth than other markets yet land values are lower relative to peak. This reflects the local approach where more land has been made available, including some from the Greenbelt, and there is clarity on the level of affordable housing required.



Although not directly relevant to the above analysis, the chart opposite shows the trend in land values between 1892 and 1969.

The substantial premium for commercial land across the period and the divergence in value between residential and agricultural land from the 1930s are both interesting features and reflect the importance of location in land values.

Care should be taken in reading too much into any single year given the data collection periods.

Taken from
Housing Market Notes:

Approaching peak loneliness?
Size matters

Rental Britains
First time buyer affordability
Local house price indices
Measuring housing need
Magnetic London

< Publication Homepage

RESIDENTIAL

Share this article

Download PDF

Subscribe to Research

Related Research

RESIDENTIAL | 19 MARCH 2024
Local Housing Allowance: what can claimants afford?

RESIDENTIAL | 13 MARCH 2024
Surrey's Private Estates 2024

RESIDENTIAL | 08 MARCH 2024
Residential research update: March 2024

Other articles within this publication

23 other article(s) in this publication

RESEARCH ARTICLE | RESEARCH ARTICLE | RESEARCH ARTICLE | RESEARCH ARTICLE | RESEARCH ARTICLE

11 MARCH 2016

19 FEBRUARY 2016

29 JANUARY 2016

14 DECEMBER 2015

16 NOVEMBER 2015

Valuing Urban Realm Toolkit

Property Benefits (Retail) - Step One

Scheme Name	Doncaster Towns Fund

Retail Properties

Total No. Retail Rents	1	No. of retail premises (fronting the whole scheme area)
Year of Data	2022	

Rateble Value	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
Rateable Value	£ 752,325									
Year of Data	2022	2022	2022	2022	2022	2022	2022	2022	2022	2022

R11	R12	R13	R14	R15	R16	R17	R18	R19	R20
2022	2022	2022	2022	2022	2022	2022	2022	2022	2022

R21	R22	R23	R24	R25	R26	R27	R28	R29	R30
2022	2022	2022	2022	2022	2022	2022	2022	2022	2022

R31	R32	R33	R34	R35	R36	R37	R38	R39	R40
2022	2022	2022	2022	2022	2022	2022	2022	2022	2022

R41	R42	R43	R44	R45	R46	R47	R48	R49	R50
2022	2022	2022	2022	2022	2022	2022	2022	2022	2022

PERS Changes - Retail

PERS Link Attributes	Baseline	Scenario	Change	Value Uplift
Effective width			0	0.00%
Dropped kerbs			0	0.00%
Obstructions			0	0.00%
Permeability			0	0.00%
Legibility			0	0.00%
Lighting	0	2	2	2.44%
Personal security	-1	2	3	3.66%
Surface quality			0	0.00%
User Conflict			0	0.00%
Quality of environment	-1	2	3	3.66%
Maintenance	-1	2	3	3.66%
Total % Uplift in Rateable Value				**13.42%**

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
£ Increase in Rateable Value	**£100,962**									

R11	R12	R13	R14	R15	R16	R17	R18	R19	R20

R21	R22	R23	R24	R25	R26	R27	R28	R29	R30

R31	R32	R33	R34	R35	R36	R37	R38	R39	R40

R41	R42	R43	R44	R45	R46	R47	R48	R49	R50

Total £ Increase in Rateable Values	**£100,962**

Single Year Benefit at 2022 prices

Total Retail Property Benefit	
£ Increase in Rateable Values	£100,962

PERS assessment for land value impacts

PERS	Assessment Form – Before Intervention						
Name: Doncaster Towns Fund							
Location: Railway Square, Doncaster, D1 1PE						Facility type: Neutral	
Auditor: M Lambert						Date:	Time:
Parameter	Checklist Factors	Checklist			Overall Score	Comments	
		+ve	+/-	-ve	-3 to +3		
Lighting	Intensity/Frequency		✓		0	+	Lighting mostly neutral, of standard quality, maintenance could be improved.
	Definition/colour		✓				
	Maintenance	✓					
	Context Suitability	✓				-	
	After-dark		✓				
	Obstructions		✓				
Personal Security	Perceived/sense of crime	✓			-1	+	Low levels of pedestrian activity in this area, limited lighting and low visual appeal. Likely to contribute to sense of insecurity.
	Activity on the street	✓					
	Lighting		✓				
	Police presence	✓				-	
	CCTV		✓				
	Visual appeal	✓					
Quality of Environment	Traffic/noise	✓			-1	+	In this area (as distinct from station front) environment is of relative low quality, poor sense of place.
	Aesthetics	✓					
	Soft landscaping	✓					
	Quality of materials		✓			-	
	Quality of private frontages	✓					
	Sense of place	✓					
Maintenance	Cleanliness	✓			-1	+	Cleanliness could be improved, no reason to suggest that drainage is an issue from visual inspection. Limited graffiti and landscaping.
	Drainage		✓				
	Evidence of neglect	✓					
	Seasonal foliage	✓				-	
	Graffiti		✓				
	Landscaping	✓					
Other notes: Current uses apparent, limited sense of place.							

PERS assessment for land value impacts

PERS	Assessment Form – After Intervention						
Name: Doncaster Towns Fund							
Location: Railway Square, Doncaster, D1 1PE						Facility type: Neutral	
Auditor: M Lambert						Date:	Time:
Parameter	Checklist Factors	Checklist			Overall Score	Comments	
		+ve	+/-	-ve	-3 to +3		
Lighting	Intensity/Frequency		✓		+2	+	Proposals for area are for enhanced public realm incorporating lighting and removal of obstructions
	Definition/colour		✓				
	Maintenance			✓			
	Context Suitability			✓		-	
	After-dark			✓			
	Obstructions			✓			
Personal Security	Perceived/sense of crime			✓	+2	+	Enhanced public realm designs focusses on increasing activity and therefore passive surveillance. Activities of the policy are outside of the remit of this scheme.
	Activity on the street			✓			
	Lighting			✓			
	Police presence		✓			-	
	CCTV			✓			
	Visual appeal			✓			
Quality of Environment	Traffic/noise		✓		+2	+	Public realm elements will enhance the quality of environment based on designs provided. Sense of place is at the core of this scheme element.
	Aesthetics			✓			
	Soft landscaping			✓			
	Quality of materials			✓		-	
	Quality of private frontages			✓			
	Sense of place			✓			
Maintenance	Cleanliness			✓	+2	+	Cleanliness of the site and overall maintenance will be significantly enhanced by this scheme
	Drainage		✓				
	Evidence of neglect			✓			
	Seasonal foliage			✓		-	
	Graffiti			✓			
	Landscaping			✓			
Other notes: New materials and design will deliver enhancement to quality of space by itself, the proposed design will add to this. Particular benefits for maintenance, quality of environment and sense of place.							

Department for Transport

Active Mode Appraisal Toolkit

Last updated: September 2021
Original Version: March 2015

Queries and comments on this toolkit should be referred to:
TASM@dft.gov.uk

Version Control

Date	*Description of changes*
Nov-21	Updated GDP per capita, GDP deflator forecasts in line with TAG Data Book v1.17.
September 2021	Sensitivity version with MECs updated to reflect new BEIS carbon values (September 2021), in line with corresponding sensitivity TAG Data Book v1.16.
July 2021	Updated GDP per capita, GDP deflator forecasts, MECs in line with TAG Data Book v1.15. Appraisal values now increase by 1.5% p.a. from appraisal year onwards in line with revisions to appraisal accounting detailed in TAG Unit A1.1.
July 2020	Sensitivity version produced with updated GDP per capita, GDP deflator forecasts and MECs, all consistent with latest OBR economic projections in July 2020 FSR (to 2024/25) and March 2020 EFO (post 2024/25) and corresponding sensitivity version of TAG Data Book (v1.14).
July 2020	Updated GDP per capita, GDP deflator forecasts, and MECs in line with TAG Data Book v1.13.
May 2020	Style and formatting updates; additional explanatory text added; Marginal External Costs updated (in line with Nov 2019 Forthcoming Change); obsolete cells removed; health-based calculations now adjust based on average trip length as specified by user; new Area Lookup worksheet added (to support MECs-based calculations); absenteeism formula fixed (4.3% to 4.3 average sick leave and accounted for GDP per capita); number of users formula changed to reflect return journey % as % of journeys that have both an out and back leg (appear twice in daily counts); updated GDP per capita and GDP deflator forecasts; car occupancy rate assumption revised from 1 to 1.6; health-related impacts now attract the Green Book health discount rate, starting at 1.5% p.a.; health benefits now calculated based on quality-adjusted life years (QALYs) rather than the value of a prevented fatality.
May 2019	Updated GDP per capita and GDP deflator forecasts.
November 2018	Updated GDP per capita and GDP deflator forecasts.
May 2015	Initial version published.

Active Mode Appraisal Toolkit User Interface Intervention

Intervention-specific information

User input required for all interventions

Intervention name	Doncastetr TIP
Intervention promoter	DMBC

Key

- **User input required for all interventions**
- **User input required for all cycling interventions**
- **User input required for all walking interventions**
- **Default assumptions (can be revised with supporting justification)**

Please fill in the 'Intervenion details' to obtain a benefit cost ratio for an intervention. If local evidence is avaliable, users may revise the default assumptions below but must also provide additional sources or supporting evidence to justify any changes (column H).
A worked example is provided in the accompanying AMAT User Guidance document to provide the user with a step-by-step guide to completing an assessment using AMAT

Intervention details

Appraisal year	2022		Current year
Intervention opening year	2024		
Last year of funding	2025		
Appraisal period	30	years	The appraisal period should correspond to the expected asset life. This should not exceed 60 years.
Local area type	Other Urban		For applying Marginal External Costs used in mode shift calculations. Choices: London, Inner and Outer Conurbations, Other Urban, Rural, National Average

Mode information

Please fill out the cycling and walking sections where relevant. If a intervention does not directly affect the number of users of a specific mode, the relevant section should be left blank.
Ideally, forecast trip numbers should be based on counts representing an average weekday in spring or autumn to avoid seasonal bias. Both automatic and manual counts can be used.
The number of trips currently (without the intervention in place) and expected (with the intervention in place).
These sections require projections of the number of users in a 'Do-something' scenario (with the intervention in place) can be based on data from evaluations of historical interventions, case studies, or surveys.
If the user does not have current or proposed numbers, please refer to the AMAT User Guide on potential sources of data to inform your assessment.
For behaviour change schemes: 'How much of an average...trip will use the intervention?' should be set to zero and there should be no change in the Current and Proposed infrastructure.

Cycling

User input required for all cycling interventions

			Evidence/Source
Number of trips without the proposed intervention	20	per day	Estimate based on TTW data from 2011 Census
Number of trips with the proposed intervention	50	per day	Target agreed with DMBC
How much of an average cycling trip will use the intervention?	75.00%	%	maximum 100%
Current cycling infrastructure for this route	No provision		Currently no provision site visit
Proposed new cycling infrastructure for this route	Wider lane		Baesd on scheme proposals
Are any additional shower facilities being added?	No		None
Are any additional secure storage facilities being added?	No		None

Walking

User input required for all walking interventions

Number of trips without the proposed intervention	3172	per day	Datscha footfall data for the area covered by this intervention
Number of trips with the proposed intervention	4125	per day	30% increase based on the Pedestrian Pound report - comparable interventions elsewhere
How much of an average walking trip will use the intervention?	75.00%	%	maximum 100%

Current walking infrastructure for this route

Street lighting	No	None currently in place
Kerb level	No	Kerb levels inconsistent
Crowding	No	Signifcant amount of crowding in certain areas
Pavement evenness	No	Inconsistent pavement evenness
Information panels	No	No information panels in area
Benches	No	No benches in area
Directional signage	No	No directional signage in area

Proposed walking infrastructure for this route

Street lighting	Yes	Proposals include enhanced lighting
Kerb level	Yes	Kerb levels to be addressed as part of enhancement to area
Crowding	Yes	Crowding anticipated to be improved
Pavement evenness	Yes	Evenness to be addressed as part of enhancement to area
Information panels	Yes	Information panels to be added
Benches	Yes	Benches to be added
Directional signage	Yes	Signage to be added

Assumptions

Default assumptions (can be revised with supporting justification)

Default TAG assumptions have already been entered. Users should only revise these if they can provide supporting evidence.
Any additional evidence should be described in column H.

Decay rate	0.00%	%	

TAG A5.1 explains that the impact of a cycling intervention is likely to diminish year by year following investment.
The decay rate has been set at 0% for an infrastructure investment.
For revenue-funded initiatives, such as cycle training or personalised travel planning, the decay rate may be positive.
The default assumption is that 0% of new users are already active. This means all new users experience intervention-related health impacts.

Cycling

Average length of trip	4.84	km	National Travel Survey Data 2012-14
Average speed	15	km/h	National Travel Survey Data 2016
Proportion of cyclists who are employed	56.40%	%	National Travel Survey Data 2018
Proportion otherwise using a car	11.00%	%	Literature Review carried out by RAND Europe/Systra for DfT
Proportion otherwise using a taxi	8.00%	%	Literature Review carried out by RAND Europe/Systra for DfT

Walking

Average length of trip	1.1	km	National Travel Survey Data 2012-2014
Average speed	5	km/h	National Travel Survey Data 2016
Proportion of pedestrians who are employed	56.40%	%	National Travel Survey Data 2018
Proportion otherwise using a car	11.00%	%	Assumed to be the same as cycling diversion factors
Proportion otherwise using a taxi	8.00%	%	Assumed to be the same as cycling diversion factors

Additional Information

Return journeys	90%	%	National Travel Survey Data 2018

A return journey involves going to and from your destination using the same route.Trips that make up return journeys will appear twice in the daily trip count (opposite directions).

Background growth rate in trips	0.75%	%	National Travel Survey Data 2006-2016
Period over which this growth rate applies	20	years	Assumption based on TAG

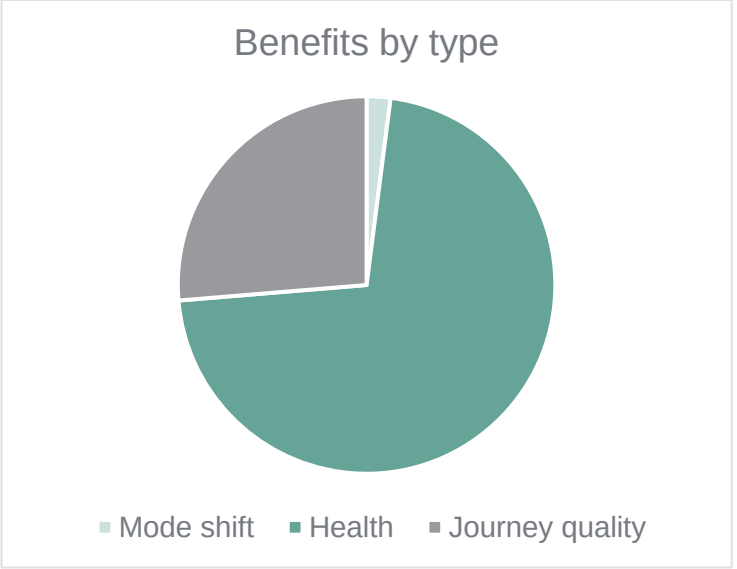
This is an annualised growth rate for increases in active travel trips. This could be due to a increase in population, changes in demographics or travel trends.

Number of days for which intervention data is applicable per year	253	per year	Number of working days per year (365 minus weekends minus public
Car occupancy rate	1.6		Source: National Travel Survey 2002-16
Taxi occupancy rate	2.4		Source: TAG Data Book 2010

Promoters may want to change this depending on the intervention. For example, if the intervention is designed to shift modes from car to walking or cycling the occupancy rates may be higher.

Analysis of Monetised Costs and Benefits (in £'000s)	
Congestion benefit	99.48
Infrastructure maintenance	0.54
Accident	16.54
Local air quality	2.22
Noise	1.10
Greenhouse gases	7.36
Reduced risk of premature death	3533.76
Absenteeism	662.73
Journey ambience	1541.14
Indirect taxation	-7.77
Government costs	0.00
Private contribution	0.00
PVB	5856.57
PVC	-0.54
BCR	**-10891.44**

Benefits by type:		
Mode shift	119.47	2.0%
Health	4196.49	71.6%
Journey quality	1541.14	26.3%



NB: AMAT was only used to assess the benefits of the active travel associated with the Scheme. The costs were not assessed within AMAT, but were assessed separately, as part of the full appraisal.

The values from AMAT are in 2010 prices, in line with DfT guidance. These prices were adjusted to 2022 using HM Treasury GDP deflators

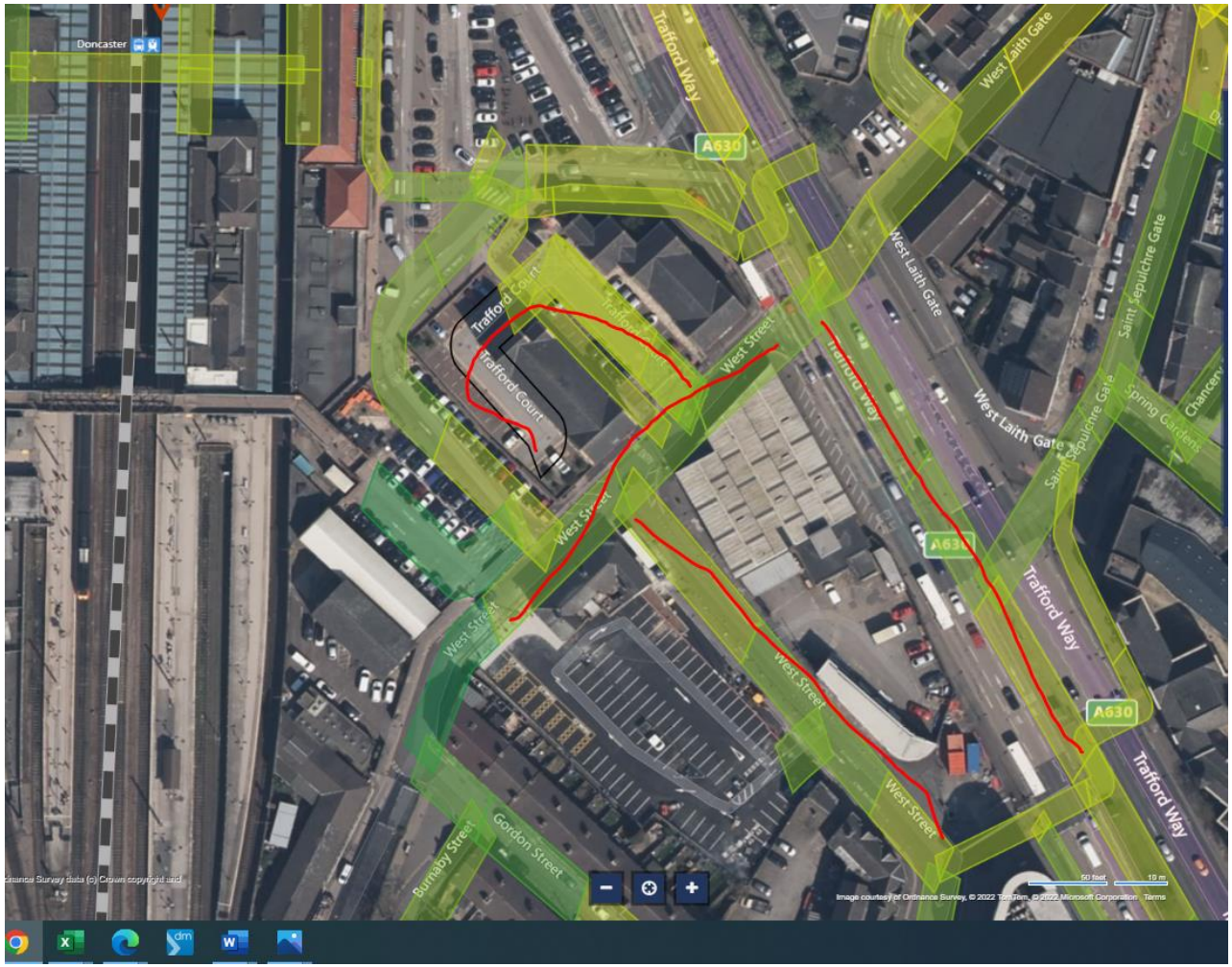
Data on footfall

West Street	Weekday	Weekend
	2,983	1,645
	2,646	1,686
	1,571	1,079
	2,049	1,369
	1,607	876
	4,499	2,892

Trafford Way	Weekday	Weekend
	5,026	3,489
	3,790	2,442
	2,983	1,645

Trafford Court	Weekday	Weekend
	5,001	3,405
	2,747	1,660

	Weekday	Weekend
Average for area	3,173	2,017



The pedestrian pound

The business case for better streets and places

Author:
Eilís Lawlor, Just Economics

Just Economics is a company that uses interdisciplinary research techniques to address economic injustice and achieve progressive and sustainable change
www.justeconomics.co.uk

This report has been commissioned by Living Streets, the national charity working to create safe, attractive and enjoyable streets around the UK. This report, and a summary report produced by Living Streets, can be downloaded from www.livingstreets.org.uk/pedestrianpound.

Living Streets (The Pedestrians' Association) is a Registered Charity No. 1108448 (England and Wales) and SC039808 (Scotland), Company Limited by Guarantee (England and Wales), Company Registration No. 5368409.
Registered office 4th Floor, Universal House, 88–94 Wentworth Street. E1 7SA.

www.livingstreets.org.uk
info@livingstreets.org.uk

Living Streets is the national charity that stands up for pedestrians. With our supporters we work to create safe, attractive and enjoyable streets, where people want to walk.

Foreword

Two years ago Living Streets commissioned the University of West England and Cavill Associates to 'Make the Case' for investment in walking. The authors brought together and evaluated the multiple economic, environmental, health and social benefits of investment in walking friendly public spaces. As we continue to grapple with the effects of the recession, the changing landscape of our economy and shrinking public funds, the case for investing in better streets and places that are great for walking has never been stronger. Our latest report, prepared by independent experts Just Economics, brings together the evidence to demonstrate how investment for walking can deliver a commercial return for business and a much needed boost for local economies too.

We all know that our high streets and town centres face challenges. Against a backdrop to boarded up shops and the well publicised failure of well known high street chains, widespread press coverage and knee-jerk government announcements have kept the issue in the public eye. The problem is that the way we shop has changed for good. The question is what are we going to do about it? High streets and town centres used to be about so much more than retail. It's time for them to be rediscovered as places where people like to get together, socialise and feel part of a community. The vibrancy and success of our high streets and town centres is most clearly demonstrated by the numbers of people walking around and spending time in the area.

The renewal of our high streets and town centres should be built on well thought out, evidence based measures. Recent comments about parking miss the wider picture. This research is a timely addition to the ongoing public debate about the future of our high streets and town centres. It reminds us that the quality of the public realm really matters and can deliver quantifiable benefits to businesses and consumers.

For almost ninety years Living Streets has campaigned for better streets for pedestrians where we live work and shop. This research highlights why our work is so important to the everyday life in our communities.

Tony Armstrong

Chief Executive, Living Streets

Contents

List of Boxes

Key findings

This report should be of interest to anyone concerned with the future of British high streets and town centres. It presents evidence that investment in better streets and places can deliver commercial returns to businesses and investors, as well as improve consumer's perceptions of high streets.

Between 1998–2009 the UK's population grew by 5.8 per cent and retail spend grew by £10 billion. In spite of this, over the last decade 16 per cent of high street shops across Britain became vacant. This has been driven partly by the growth of out-of town shopping since the 1980s. On average, people made 19% fewer shopping trips in 2011 than in 1995–7, as they moved to longer, less frequent car trips. A quarter of all UK journeys are made on foot, but two thirds of shopping trips are made by car, even though many of these are short and potentially walkable.

While there is a substantial amount of evidence available to show high social returns (especially for health and the environment), this is a challenging area within which to make robust claims about commercial returns. A key issue is to establish whether a public realm investment creates *additional* benefits. Even though there have been hundreds of studies exploring this relationship, hard, quantitative assessments are very rare. However, there is case study evidence that shows public realm investments deliver significant benefits to consumers. The following pages present both the qualitative and quantitative evidence.

Four performance indicators for these investments were identified from the literature: impact on existing business performance (footfall and retail); urban regeneration (new business, rental income, employment, social exclusion etc.); improved consumer and business perceptions, and business diversity. Each of these is discussed in turn, with the exception of business diversity, as insufficient data were available to merit a useful discussion of this issue.

1 The impact of public realm improvements on existing business performance:

- Case study evidence suggests that well-planned improvements to these public spaces can boost footfall and trading by up to 40%.
- Investing in better streets and spaces for walking can provide a competitive return compared to other transport projects; walking and cycling projects can increase retails sales by 30%.

- Evaluations of pedestrian improvements in Coventry and Bristol show a 25% increase in footfall on Saturdays and predict £1.4million benefits respectively.
- Improved walking routes to and from Wanstead High Street, in east London, increased footfall by 98%.
- Many car journeys are short and as the volume of goods purchased is small, these trips could be made on foot.

2 The importance of public realm improvements for urban regeneration

Four aspects of urban regeneration were reviewed. These included the impact on investment, tourism and business start-up rates; property and retail rents; employment; and social exclusion.

Investment, tourism and business start-up rates

- There are case study examples of where public investment has been associated with subsequent increases in employment. In Dublin, the redevelopment of the Temple Bar District led to a 300% increase in employment before the economic boom. Cultural quarters in Sheffield and Manchester have also seen increases in employment, albeit less dramatic ones.
- Although few studies attempt to model the impact on tourism, one such example found that the new North Terrace of Trafalgar Square had a 300 per cent increase in visitors.
- There is less research available on these areas than others such as footfall. This is partly because of the difficulty of establishing clear attributable relationships. However, investment by the private sector is itself suggestive of commercial gain.

Effect on property prices and rental yields

- There is substantial evidence that improvements to the public realm increase property prices. For example one study in Hong Kong, which controlled for confounding variables, found a 17% increase in retail rents from pedestrianisation.
- As well as reflecting direct economic value, rents reveal preferences to locate and shop in particular locations.
- Good urban design and quality green spaces have also been found to make a difference. In one study from 2007 the latter raised rents by up to 20 per cent. Another found that a 1 per cent increase in green spaces led to a 0.3 per cent to 0.5 per cent rise in average house prices.

- Walking projects have also been found to increase land values. A review of earlier literature suggests retail and commercial rates increase in the range of 10–30 per cent.

- US research on the relationship between 'walkability' and house prices has also shown a positive relationship. Easy proximity to local shops and services is linked to higher property values.

Employment benefits

- A US study compared the number of jobs created through the construction of walking, cycling and road infrastructure and found a higher employment density from pedestrian and cycling projects.

- Outside the construction sector it is more difficult to show a direct causal link to additional jobs created. However, higher employment can sometimes be inferred from higher turnover and investment.

Social exclusion

- Better streets and places may create a virtuous circle by raising self esteem for residents and promoting investor confidence in an area.

- However, the impact of public realm improvements on local people is sometimes absent from evaluations.

- A US study has shown how car dependent households on low incomes spend 50 per cent of their budget on transportation; the poor quality of the public realm in poorer neighbourhoods often acts as a disincentive to walking.

- A quarter of British households have no access to a car. Public realm improvements can ensure that those who need to are able to walk, cycle or get the bus to a range of local services, such as their local bank, doctor's surgery, library or post office.

3 Public realm improvements and consumer and business satisfaction

- There is significant evidence that perceptions of an area – to businesses and consumers – matter.

- It is often assumed that more parking is the answer to struggling high streets. However across Europe, studies have linked the quality of public spaces to people's perceptions of attractiveness of an area, contributing towards their quality of life and influencing where they shop.

- Pedestrianisation has also been blamed for falling sales, ignoring the many contributing factors. Contrary to this claim, there is consistent evidence that customers like pedestrian environments and dislike traffic.

- Retailers have been shown to over-estimate the importance of the car for customer travel. In these studies, more people actually walked, cycled or came by bus.

- Case study evidence suggests that restricting traffic does not necessarily reduce the number of customers. In fact, charging road users and ring-fencing the revenue for public realm investment could also enhance business performance in the long run.

- Other studies have found willingness to pay and positive perceptions amongst landowners, retailers and entrepreneurs.

- Householders and customers are willing to pay for better streets too: for example, revealing preferences for more attractive and sophisticated street designs.

- The way we shop has changed and so have our expectations of the high street. Shoppers now seek to 'experience' something different and we need to know more about how better streets can add to that experience.

In recent years, successive governments have placed more emphasis on walking and cycling on health, environmental and safety grounds. Active travel also complements efforts to revive high streets and create liveable communities. As well as being relatively cheap forms of transport, walking and cycling infrastructure requires less comparative government investment. In spite of this, walking has generally been treated as the 'poor relation' of infrastructure spending and is often an afterthought in urban planning.

Economic benefits from infrastructure spending are often difficult to demonstrate (for example, the current controversy regarding High Speed 2). A factor that influences the high cost benefit returns for walking investments is that the sums required are usually comparatively small and the consumer surplus – the savings generated from switching from cars or public transport – are substantial. Although this report has focused largely on private returns to businesses and investors, these should be assessed alongside the wider public or social returns. Together they make a compelling case for investing in the public ream. At a time when public resources are scarce, well-planned improvements to streets and places should be attractive to governments seeking high returns from public spending.

1 Introduction

The period 1998–2009 saw the UK's population grow by 5.8 per cent, which gave a boost to annual comparison goods spending of approximately £10 billion over the period. However, town centres have not reaped the benefits of this huge increase in retail expenditure (Encams, 2005). This report makes the case that, in the face of steep competition for diminishing public funds, the importance of better streets and public spaces needs to be better understood. Indeed, there is a general acceptance that such investments allow town centres to improve their offer (Department for Business, Innovation and Skills, 2011) helping to stimulate the local economy, improve perceptions of the area (especially for visitors) and help attract and retain workers (Ecotec, 2007).

Between 1998-2009 the UK's population grew by 5.8% and retail spend grew by £10 billion. However, town centres have not reaped the benefits of this huge increase in retail expenditure.

Our high streets have been under pressure for some time now. Across Britain, there were up to 15,000 high street store closures between 2000 and 2010. Over the same period 16 per cent of high street shops became vacant, footfall fell by 10 per cent and only a small number of independent retailers opened new premises (Department for Business, Innovation and Skills and Genecon and Partners, 2011). There has also been a sharp decline in private sector investment – the number of high street shops in investment portfolios has halved since the mid-1990s (Jones, 2010). As far back as the 1980s, Dawson (1988) described how 'radical' out-of-town centre developments were shifting the balance of retail management and operation away from the traditional high street. Out-of-town developments are now mainstream, and they have been accompanied by a dramatic increase in the use of the car to go shopping. Shopping trips now make up 20 per cent of all trips, and 64 per cent of those are made by car (Department for Transport, 2011). Yet many of these trips are short and potentially walkable, as shopping makes up a much shorter proportion of the overall distance travelled *(ibid.)*.

In the last decade 16% of high street shops across Britain became vacant. Since the 1980s there has been a shift to more out-of town shopping. Two thirds of shopping trips are made by car, even though many of these are short and potentially walkable.

The amount being spent on the high street is in decline; it now accounts for half of all retail spending and is predicted to fall further (Portas, 2011). This latest tumble has been attributed to the recent recession and fall in consumer confidence. However, a more serious long-term rival exists in the form of online retail. In the UK, online retail's share of all retail is high by European standards (12 per cent in 2011 up from 8 per cent in 2008) (Centre for Retail Research, 2012). Its growth has been credited with precipitating the closure of big high street chains such as Comet, Blockbusters and Jessops (Felsted and Rigby, 2013). E-commerce's share of retail is also predicted to continue to rise (Centre for Retail Research, 2012) driven by new trends such as 'showrooming' where shoppers view products in shops and then buy them online. Research suggests that 24 per cent of people showroomed while Christmas shopping in 2012 and 40 per cent of them took their business elsewhere[1] What is problematic here is that online retailers are not required to make any

Online retail as a share of spending is increasing, reliant on, but not benefiting, the high street. During the Christmas period of 2012, 24% of shoppers 'showroomed' and 40% took their business elsewhere. Large retailers are calling for an online retail tax to level the playing field.

1 www.foolproof.co.uk/the-true-impact-of-showrooming/

financial contributions to the maintenance of the public realm from which they benefit. This is exacerbated further by the fact that many online retail companies are not domiciled in the UK and pay a very small share of their profits in tax. The case of Amazon[2] was a recent high profile example but it is a wider problem, and has led to recent calls from supermarket bosses at Sainsbury's[3] and Morrisons[4] to support an online retail tax to level the playing field.

Shopping, as a share of all trips, has also been falling. On average, people made 19 per cent fewer shopping trips per year in 2011 than they did in 1995/97 (equivalent to 45 fewer trips per person per year). The trend of falling numbers of shopping trips over time is associated with a switch from more frequent, short shopping trips on foot, to longer, less frequent car trips (Department for Transport, 2011). The Retail Traffic Index (RTI), which measures the levels of shopper footfall across the country, showed that shopping visits fell in February 2013 by 3.6 per cent compared to February 2012 and by 7 per cent against January 2013. Northern England and London and the South East were worst affected where year-on-year footfall fell by 4.5 per cent and 4.4 per cent respectively (Retail Times, 2013).

People made 19% fewer shopping trips on average in 2011 than in 1995–7, as they moved to longer, less frequent car trips.

Nevertheless, walking still accounts for 25 per cent of journeys by all transport modes in the UK and the number of journeys made on foot could be increased. Brog and Mense (2000) compared data for eight cities internationally and found that Bristol had a lower level of walking for shopping (20 per cent) than any other city. Bristol City Council's ten-year walking strategy demonstrates a willingness to reverse that trend by aiming to make walking in Bristol "easier, safer and more pleasant for everyone"[5]. Significant gains could be made, for example, in the North German town of Wismar walking has achieved a 40 per cent modal share (Monheim, 2003).

Despite this, a quarter of all UK journeys are made on foot. Political support for walking and improving the walking environment could make a significant difference to the number of people walking.

In the face of competition from other markets, public realm improvements have been a staple of measures to tackle high street decline and enjoy considerable support within academic and policy circles. Begg (2002) has argued that a high quality pedestrian environment and public realm is an essential component of the right business environment. In a review of traffic calming schemes in the UK using a cost benefit framework, Banister (2009) concluded that many traffic calming schemes can be justified, particularly where there are large numbers of pedestrians sharing space with vehicles as in crowded shopping areas. Similarly, Transport for London have come to the conclusion that town centre pedestrianisation and public realm investment generate value for retail schemes, and, after an adjustment period of 12 months, see an upturn in turnover and centre viability (Transport for London, 2002). After a brief discussion about the methodology and report structure, the following sections present the evidence base for a commercial return on public realm investments.

Previous research has shown that the creation of better streets and public spaces is good for our health, and our environment. This report will also argue that it can deliver a commercial return for our high streets.

2 www.guardian.co.uk/technology/2012/apr/04/amazon-british-operation-corporation-tax

3 www.retail-week.com/city-and-finance/analysis-online-tax-debate-who-should-pay-more/5050959.article

4 www.dailymail.co.uk/news/article-2364810/Morrisons-boss-says-companies-pay-online-tax-internet-sales-damaging-high-street.html

5 www.bristol.gov.uk/page/transport-and-streets/walking

2 Methodology and report structure

A comprehensive review of the literature was carried out to locate all relevant studies. Economics[6] and 'grey literature' databases were searched using relevant search terms tailored to each research question including variants on the search terms:

Economics databases and 'grey literature' were searched with relevant search terms.

- "economic/commercial value/return" AND
- "walking investment/pedestrianisation/public realm" AND
- "business/retail/economic development/regeneration/high street".

The health of our high streets and city centres is, of course, as much about people and the management of spaces as it is about the quality of the public realm. However, these issues are largely absent from the literature. In general the data and research available focuses on the capital investment (i.e. 'bricks and mortar') elements of public realm investment. This narrows the scope of this report perhaps more than is appropriate given the holistic nature of the subject.

Most of the studies available focus on the 'bricks and mortar' benefits of public realm investment.

Four key measures of commercial value were identified from the literature. These were drawn largely from a report prepared by Ecotec for the East Midlands Development Agency (EMDA), which presented a case study for high street performance measurement and included the following key performance indicators (KPIs):

Four key measures were identified from the literature: footfall, consumer and business satisfaction, business diversity and economic activity.

- Footfall (length of stay, number of places visited, frequency of visits)
- Consumer and business satisfaction
- Diversity of business establishments
- Economic activity (consumer spend, new investment and development activity, non-retail business turnover, business sectors represented).

Of these, only footfall, economic activity and consumer and business perceptions have been included in this report. There is little evidence on the relationship between diversity and public realm improvements. Whilst high street diversity has been in decline[7], this is likely to be attributable to a range of exogenous factors (Portas, 2011). There is also a risk that rising rents in regenerated areas could actually damage diversity through a process of gentrification (Rousseau, 2009). This issue is discussed briefly in section 5, but is for the most part outside of the scope of this paper.

Of these, the diversity of the business offer is beyond the scope of this report.

6 ASSIA Applied Social Sciences Index and Abstracts (CSA) (ProQuest XML), Business Source Premier(EBSCO), ESDS (Economic and Social Data Service), IBSS: International Bibliography of the Social Sciences (CSA) (ProQuest XML), NBER Working Papers, JSTOR, OECD iLibrary, Oxford Scholarship Online Economics and Finance E-books Collection, Palgrave Connect ebook collections in Business and Management, ScienceDirect, SCOPUS - V.4 (Elsevier), UN Comtrade, UNCTAD TRAINS, Web of Knowledge

The evidence in this report is divided into three sections, relating to the three KPIs outlined above:

- Impact on existing business performance (footfall and retail)
- Urban regeneration (new business, investment, employment etc.)
- Improved consumer and business perceptions.

In light of the limitations discussed in the next section, this report draws on national and international literature, and case studies have been threaded through the report to help illustrate certain points. Wherever possible, examples have been chosen that have been evaluated and are considered to have a reasonable evidence base.

Case studies are used throughout for illustrative purposes.

7 The Competition Commission found that of the 565 large grocery stores that opened between 2001 and 2006, the vast majority – 99.5% – were opened by large multiple retailers. Only one in that whole time was independent and just three were co-operatives (Portas, 2011).

3 Issues with measuring the economic impact of public realm investments

There is no doubt that identifying a fully attributable, causal, link between investment in the public realm and commercial returns is a challenge. A key issue in any quantitative analysis is to establish whether the investments in question create *additional* benefit. For example, is an increase in sales attributable to the intervention in question, or is it the result of other factors, such as an improved offering by shops, reduced competition from other sources, or wider economic forces? In the social sciences, these 'deadweight' factors are accounted for by incorporating a reference group of some kind. However, for area-based interventions it can be difficult to identify good control groups. Other components of additionality include: "leakage effects", displacement, substitution and economic multiplier effects (English Partnerships, 2004). It is not necessary to explain each of these here, simply to make the point that there are many confounding variables (see Glossary for a brief description of each).

This is a challenging area within which to measure impact. A key issue is to establish whether public realm investment creates additional benefits over and above what would have happened anyway.

A report for the former East Midlands Development Agency (Ecotec, 2007) enlarged on some of the difficulties associated with measuring outcomes from public realm investment:

Key challenges in measuring impact include the difficulty in isolating variables, a poorly defined public realm and the long-term nature of the change being measured.

- The quality of the public realm is often influenced by interrelated processes, making it difficult to isolate the impact of different variables.
- The public realm is not clearly defined, particularly given its rising privatisation.
- The economic impacts of investment in the public realm are often long term (and beyond the timescale of the evaluation).
- In addition to the direct economic impacts, it is important to recognise the contribution made by the social and environmental impacts of the public realm.

For a variety of reasons, this means that studies tend to suffer from insufficient data regarding the direct impact that better streets and places can have on sales. In a synthesis of the literature, Whitehead *et al.* (2006) reported a lack of studies of business performance. He also noted that information needed for the analysis of cost versus benefits – about prices, rents and attributes of business properties – was difficult to obtain because of its confidential nature. His literature review indicated that several hundreds of studies have been undertaken on the link between urban quality and economic activity since the late 1970s, but that "hard quantitative assessments" are extremely rare and not easily transferable to formal economic forecasting and appraisal methods (*ibid.*).

Even though there have been hundreds of studies exploring this relationship, hard, quantitative assessments are very rare.

There is some evidence that small businesses choosing a new business location rank open space, parks and recreation as high priority. However, the measurement of indirect benefits to businesses, such as improved perceptions of an area, impacts on productivity from attracting better employees and enhancing the wellbeing of existing staff is not without its limitations either. These less tangible benefits are usually valued using revealed preference data from surrogate markets (e.g. travel cost, hedonic pricing) or through stated preference data from hypothetical markets constructed with the use of survey instruments (e.g. contingent valuation) (CABE Space, 2005). The former suffer from a lack of data, whereas the latter are expensive and suffer from other methodological problems. See Fujiwara *et al.* (2011) for a summary of issues with valuation techniques.

Indirect benefits are often inferred using revealed preference data or stated preference data but these methodologies also have their limitations.

As well as the direct benefits to businesses, better streets provide indirect benefits for customers, visitors and the wider economy. Litman argues that walking and walkability are undervalued in transport economics, relative to other modes (Litman, 2003). Conventional transportation planning practices treat walking as a minor transport mode and recognise only modest benefits from improved walkability and increased walking activity. This is the result of evaluation practices that tend to undercount non-motorised travel and undervalue walking benefits. He argues that this is because walking is more difficult to measure, it is low cost (and, therefore, lower status) and because it is assumed that it will take care of itself.

Transport economics often undervalues the indirect benefits of walking to pedestrians. Sometimes it is an after thought or it is assumed that it will take care of itself. As walking is low cost, this may also give it low status.

The absence of rigorous analysis is an issue that affects all forms of business support measures (Department for Business, Innovation and Skills, 2011), and according to DBIS this makes the merits of different types of urban investment difficult to compare. Projects also tend to come as a package, making it hard to distinguish between them empirically. However, the same DBIS report found case study evidence of significant benefits to consumers, such as more enjoyable visits, feelings of safety, more frequent visits, longer visits and a higher propensity to spend. They also found that public realm improvements exerted some level of influence over decisions about whether to live or work in the centre of towns and cities. The limitations outlined here underline the importance of including both qualitative and quantitative measurement in making the case for investment in the public realm.

Most of the evidence in support of public realm investment exists in case study form; this is a response to the challenges of conducting quantitative research in this area.

4 The impact of public realm improvements on existing business performance

Footfall on the UK's high streets has fallen by 10% since 2008. Research suggests that well planned improvements to public spaces can boost footfall and trading by up to 40%.

As discussed in the introduction, the number of shopping trips to the UK's high streets has fallen in recent years. Since the recession in 2008, footfall – a common measure of business performance - has decreased by 10 per cent – with the exception of London (Department for Business, Innovation and Skills, 2011). Nevertheless, well-planned improvements to public spaces within town and city centres have been shown to boost commercial trading by up to 40 per cent (Department of Environment, 1997). For example, in the 1990s comparative analyses in Germany and the UK carried out by Hass-Klau (1993) reported commercial benefits ranging from 20 to 40 per cent. A review of studies by Newby (1992), Hass-Klau (1993) and the European Federation for Transport and Environment (EFTE, undated) suggests a range of 10 per cent to 25 per cent for retail turnover (Whitehead *et al.*, 2006). The authors calculated that retail footfall increased by about a third (32.3 per cent) and retail turnover by an average of 17 per cent as a result of improvements, such as pedestrianisation.

Investing in better streets and spaces for walking can provide a competitive return compared to other transport projects.

Investing in the public realm and walking can provide a competitive return compared to other transport related measures. Modeling by Whitehead *et al.* (2006) of urban quality improvements in Manchester City Centre found small, but significant, positive effects for businesses and workers (*ibid.*). The results also suggested that the positive impacts from environmental improvements might be of the same order of magnitude as those expected from public transport improvements. Litman estimates that walking and other non-motorised transport projects typically increase retails sales by 30 per cent (Litman, 2002; Burden and Litman, 2011).

Most of the remaining evidence presented in this section is in case study form.

With the exception of these studies, most of the evidence available is anecdotal or based on individual cases. This approach is perhaps most appropriate given the methodological limitations outlined in section 3. The rest of this section highlights some of the strongest case study evidence from the international literature as well as from the UK. Boxes 1 and 2 illustrate more in-depth studies. Box 3 provides an example of the type anecdotal evidence available, from a very recent public realm scheme. Box 4 illustrates the benefits that can be achieved by improvements to the public realm and engaging with communities to manage public spaces. A summary of their published benefits is listed in table 1 at the end of this section.

A study in Bangkok found that pedestrianisation encouraged people to buy their goods and services locally.

A study in Bangkok by Kumar and Ross (2006) found that pedestrianisation had a positive impact on businesses in the area of implementation. They reported on previous research, which found that it encouraged local people to buy goods and services in their own neighbourhoods and attracted more customers from a wider area, improving community relations. They argue that improving the public realm,

often at low cost, creates a positive cycle, increasing property values and attracting wealthier customers. On the other hand, poor pedestrian, cycling and transit options can harm businesses by losing potential workers.

Improvements to the pedestrian environment are also associated with increased footfall. Turner *et al.* (2011) conducted a before and after study of new or improved facilities in eight New Zealand cities known to create difficulties for pedestrians. These included the provision of kerb extensions and refuge islands and controlled crossings. Pedestrian use increased in seven of the eight sites, ranging from 7 per cent to 90 per cent.

In 7 out of 8 cities in New Zealand, simple street improvements increased footfall by 7–90%.

Photograph courtesy of Sheffield City Council

Sheffield, Heart of the City

Box 1

Background

In the early 1990s, Sheffield faced a number of challenges, not least the decline in steel and engineering industries, and the opening of Meadowhall, a huge shopping centre on the outskirts of the city. The city had to rethink its offer in order to bring investment, employment and visitors back into the centre.

Intervention

The Heart of the City project was the first in a succession of regeneration projects (that now make up the Gold Route) designed to welcome visitors to the city. Phase One of the project was completed in 1999 with the delivery of three key public realm improvement projects: the re-construction of the Peace Gardens; the re-alignment and narrowing of Pinstone Street to create a new event and gathering space outside the Town Hall (the new Town Hall Square), and the narrowing of the carriageway in Surrey Street to give pedestrians more space.

Outcome

An evaluation of the public realm improvements to Peace Gardens reported a 35 per cent increase in footfall in the City Centre (Genecon, 2010). The authors estimated an attribution rate of 20 per cent – 44 per cent, or a net increase of visitors of 350,000–770,000, and a net increase in spending of £4.2m (based on 7 per cent attribution of additional spend of £12.20 per visitor). Reported regeneration outcomes included an increase of £1.60–£2.40 / sq. ft. rental value and the creation of 341–527 additional net jobs (*ibid.*).

Case studies from a number of English cities illustrate or predict the same benefits. For instance, a range of improvements to Coventry City Centre, such as new pedestrian areas, a new civic square, clearer signage and better placement of street furniture were credited with a 25 per cent rise in footfall in the town centre on Saturdays (NWDA/RENEW Northwest, 2007). In Bristol, the Broadmead Business Improvement District (BID[8]) was set up in 2005 to create a better shopping environment and a more seamless transition between the new and existing retail areas. An analysis of Bristol's Shopping Quarter (as it is now known) by Drivers Jonas LLP and Colin Buchanon (2008) assessed the benefits of the proposed scheme over the next ten years. This analysis predicted that the improvements would generate £1.4 million in terms of quality benefits to shoppers and passers-by.

Evaluations of pedestrian improvements in Coventry and Bristol show a 25% increase in footfall on Saturdays and predict £1.4 million benefits respectively.

Business Improvement District, Ealing, west London

Box 2

Background

The Ealing Broadway Business Improvement District (BID) is a not-for-profit company led by local businesses. It was established in 2006 in response to rival out-of-town development and its vision is to create a safe, clean, attractive and user friendly town centre. The BID invests in cultural and social events, street cleansing and measures to reduce business crime, as well as public realm improvements.

Intervention

Public realm improvements included: new street lighting, hanging baskets, de-cluttering and improved directions for visitors, which aim to enhance the overall environment. Additional investment in cycling and walking has improved accessibility for visitors and employees, and empty properties have been disguised with information on local shops and services. According to its business plan (2011–15) a further £1.9 million will be invested over five years to help increase footfall and sales (Ealing Broadway Business Improvement District, 2010).

Outcome

The 2008–9 review highlighted the positive outcomes (Ealing Broadway BID, 2009). For instance, footfall monitoring cameras installed in 2007/08 demonstrated that the town centre had performed better than the national benchmark over the year. There had been a 60 per cent reduction in late night town centre violence compared to the previous year and a 25 per cent reduction in pick-pocketing. Surveys identified that visitors described Ealing as a 'safe', 'friendly' and 'affordable' town centre. The project also claims to have achieved a significantly higher profile for Ealing Broadway as a place to shop, do business and unwind. This has resulted in more people coming to the town centre, more often and staying longer.

8 A BID is an organising and financing mechanism used by property owners and occupiers to determine the future of their retail, commercial and industrial areas. Costs are spread across all owners and occupiers, thus reducing the impact on individual retail businesses.

In London, Wanstead High Street achieved an average increase of 98 per cent in pedestrian numbers after enhancing the walking routes between its two stations, the bus terminus, school, library and high street (Tolley, 2011). Investment in better walking environments has been found to benefit businesses in other ways too. For example, the transformation of a canal towpath in London into a high quality route for walking and cycling is estimated to have produced £5,487,130 of benefit through reduced absenteeism stemming from health benefits (Davis, 2010).

Improved routes to and from Wanstead High Street increased footfall by 98%, and the transformation of a canal towpath is estimated to have saved businesses £5m in absenteeism costs.

There is evidence to show that pedestrians and cyclists spend more than people arriving by motorised transport. A number of international studies have compared the differences. In a 2009 study of the Bloor Street area in Toronto, people who biked and walked there reported they spent more money there per month than those who arrived by car (Tolley, 2011). Wooller (2010) looked the effect of pedestrianisation in the Takapuna shopping district in Auckland, New Zealand and put a figure to the increase in spending. She found that although shoppers spent similar amounts per trip, the pedestrian shopper spent approximately $80 more per month after the improvements. This was six times the amount spent by those in cars. In 2011, a similar study in London found that whereas car drivers spent more on a single trip, walkers and bus users spent more over a week or a month (The Means, a review for London Councils, 2012). They found that walkers spent £147 more per month than those travelling by car. Compared with 2004, spending by public transport users and walkers had risen; spending by car users and cyclists has decreased (*ibid.*).

There is evidence to show that pedestrians spend more than people arriving by car. Comparisons of spending in Canada and New Zealand revealed pedestrians spend up to 6 times more. In 2011, walkers in London spent £147 more per month than people arriving by car.

Hitchin Street, Biggleswade, Bedfordshire

Box 3

Background

Biggleswade is a typical market town in Central Bedfordshire, with a population of 16,550 and growing residential population. The town centre, with its market square, mix of historical buildings and large independent sector has weathered the current financial climate well – with a vacancy rate of 7%, it is well below the 12% national average (Roger Tym and Partners, 2012). However, the Town Centre Master Plan (Central Bedfordshire Council, 2011) has identified the need to enhance and raise the quality of the public realm, to ensure that the town centre remains healthy and improves further.

Intervention

Preliminary works (costing in the region of £400,000) have taken place to improve the physical appearance and vitality of Hitchin Street, a key shopping quarter adjacent to the market square. This provided an opportunity to pilot 'shared space' principles, introducing equal priority for pedestrians, cyclists and vehicles. The new single surface has been laid with block paving and the limits of the carriageway are delineated by colour contrast tactile paving to help blind and visually impaired pedestrians. Street furniture has been kept to a minimum and is removable to allow for future use for markets, festivals and other events.

Outcome

For a short "bedding-in" period residents and traders voiced some concerns over shared space (for example, it could confuse people using the street). However, since then the scheme has been positively received and has had a welcome effect on the town's economy. Hitchin Street previously had 50 per cent of the town's vacant shops; now businesses are returning and vacancy rates have fallen, and footfall has increased. These results and the impact on retail turnover will be confirmed in 12 months' time. However, the council is very pleased with the outcome so far*.

*Personal communication, Cllr Tony Brown, Central Bedfordshire Council.

Finally, motorists are not necessarily better customers than pedestrians, cyclists or public transport users. A report by the European Commission (1999) reports the findings of a study in Munster, Germany in which approximately 75 per cent of motorists surveyed purchased two or fewer bags of goods. They could easily have carried their shopping on foot, by bicycle or on the bus (Tolley, 2011). Indeed, a number of reports make the point that most shopping trips involve distances that could be walked or cycled (Commission, 1999; Sinnett *et al.*, 2011; Tolley, 2011; Sustrans, 2006).

As well as buying less than pedestrians or cyclists, motorists often carry few bags and could therefore travel by foot or bike.

Railton Road, Herne Hill, south London

Box 4

Background

Herne Hill junction was very hazardous for pedestrians, caused long traffic tail-backs and bus delays. Lambeth Council undertook a programme of public realm improvements to address these problems. This included the part-pedestrianisation of Railton Road, closing it off to through traffic and creating a new public space. As part of its Step Out in London project, Living Streets worked with the Herne Hill Forum and others to encourage and publicise the use of the area via activities and promotions.

Intervention

Activities, including a Sunday market and a "shop local" card giving a discount for use in local shops, together with a walking pledge, were introduced over the six month period from February – October 2012. A unique feature was the designation of the Railton Road as a community run space managed by a community forum comprising businesses and local organisations.

Outcome

A follow-up survey was carried out with the public, local businesses, market stall holders, shop local card holders and people who had signed a pledge to walk more to evaluate the project. 66 per cent of the pedestrians questioned agreed or strongly agreed that they shopped or used the services more. 90 per cent of the local businesses agreed (31 per cent) or strongly agreed (59 per cent) that the changes to the street had resulted in an overall improvement. Despite the recession, 38 per cent agreed or strongly agreed that people were spending more money. With regard to the market 78 per cent of businesses agreed that it brought more people to the area. 41 per cent of the traders had employed someone to work on the stall and 78 per cent of those employed were from the local area (Social Research Associates Ltd., 2012)

Public realm investments: ex-post changes in footfall and turnover

Table 1

Country	Location	Activity	Outcome	Source
UK	Bristol	Various public realm improvements	Projected £1.4 million over ten years	Drivers Jonas LLP and Colin Buchanon, 2008
	Coventry	Pedestrianisation, a new civic square, clearer signage and better placement of street furniture	25 per rise in footfall on Saturdays	NWDA/RENEW Northwest, 2007
	Ealing	Improved lighting, street cleansing, de-cluttering, better signage	Improved visitor perception and reduction in crime	Ealing BID, 2009
	London (Wanstead High Street)	Intervention to increase walking for short trips	98 per cent increase in pedestrian numbers	Tolley, 2011
	London	Canal towpath	£5.4 million in reduced absenteeism	Davis, 2010
	Sheffield	Peace Gardens	35% uplift in the number of visits for shopping and a net increase in spending of £4.2m	Genecon, 2010
New Zealand	Eight locations	Kerb extensions, refuge islands and control crossings	7–90 per cent increase in footfall	Turner et al, 2011
Thailand	Bangkok	Pedestrianisation	44 per cent of retailers reported an increase in sales volume, although 33 per cent reported no change	Kumar and Ross 2006

5 The importance public realm improvements for urban regeneration

Most urban renewal projects aim at improving public space in some form, as its importance is commonly acknowledged (Bohl, 2002; Litman, 2003). However, in practice, public space is often seen as performing a secondary role within urban regeneration projects, rather than the driving force (Van Melik and Lawton, 2011).

The quality of the public realm is generally acknowledged as being important to regeneration and renewal.

There are four aspects of urban regeneration that we will review in this section:

- Investment, tourism and business start-up rates
- Retail rents
- Employment; and
- Social exclusion.

Investment, business start-up rates and tourism

Increasing business activity in deprived areas has, for many years, been an important part of UK governments' efforts to address disadvantage (Seex, 2007). Evidence in relation to public realm improvements and business start-ups is however limited. One of the reasons for this may be that studies quote total turnover figures, which include business start-up rates. There are also significant displacement issues with new business formation; it is necessary to be able to demonstrate that those businesses would not have been established elsewhere, which is challenging. If increases in turnover or footfall already reflect the creation of new businesses, then counting the number of new businesses and the increase in turnover or footfall would run the risk of double counting the same benefit.

Evidence linking public realm improvements to business s tart-ups is more limited.

Nonetheless, public investment is often used to improve the appearance of business areas and town centres as part of regeneration strategies on the understanding that this stimulates and supports new markets and enterprise opportunities[9] (see box 5). Whilst it is not conclusive, there is case study evidence of redevelopments, such as the creation of 'cultural quarters', or 'waterfront developments' that coincide with large increases in new business. For example, Lerner and Poole (1999) report that in Tennessee, private investment in the redevelopment of the waterfront in the town of Chattanooga resulted in a doubling of the number of businesses in the district over an eight year period.

Investment in the public realm is often part of regeneration strategies on the understanding that this stimulates and supports new markets and enterprise opportunities.

9 See, for example, the East Midlands Competitiveness Programme (Department for Communities and Local Government, undated) or Chelmsford Borough Council's town centre public realm strategy (2011)

In Ireland, prior to its redevelopment by a state owned company, the Temple Bar area of Dublin was home to 60 businesses. A decade later this had risen to 450 businesses and a 300 per cent increase in employment. Most of this growth took place within four years of the area's transformation, before the economic boom of the late 1990s took hold (Montgomery, 2004). In the UK, similar (albeit less dramatic) improvements have been found for Manchester's Northern Quarter and the Cultural Industries Quarter in Sheffield (*ibid.*). The public realm also includes green spaces and again case study evidence suggests that the presence of good quality parks and green spaces can lead to an increase in new businesses (CABE Space, 2005).

In Dublin, the redevelopment of the Temple Bar District led to a 300% increase in employment. More modest gains have occurred in in Sheffield and Manchester.

The Grassmarket, Edinburgh* Box 5

Background

The Grassmarket is located south of Edinburgh Castle in the historic centre of the city. By the mid 2000s negative perceptions of the area associated with night time drinking and antisocial behaviour, dominance of vehicles and the gradual decline in the public realm all needed to be addressed. Engagement between Edinburgh City Council, businesses, residents and traders identified opportunities to provide a quality setting for the Grassmarket's historic architecture, enhance its retail vitality and introduce daytime activities attractive to a wide range of users.

Intervention

Over £5 million was set aside to redesign the streetscape, improve linkages to other areas of the city and establish a pilot events programme for the year. Space was redistributed from vehicles to pedestrians to allow flexible use for events, such as, such as markets, film shows, dance events and concerts. Work was completed in 2009. Public realm improvements of £3.87 million included the relaying of 40,000m² sets, together with 5,000m² new Caithness Flagstones, new street lighting (and CCTV) and underground recycling units. This was complemented by, for example, the planting of semi-mature trees and the refurbishment of listed buildings and monuments.

Outcome

One of the key lessons learned from the project was the importance of engaging with the community. Since completion, the Grassmarket has seen a wider range of business uses. It has also seen an improvement in its road safety record. However, the public realm is underused. In its business plan (2013–2018), the new Greater Grassmarket Business Improvement District (BID) suggests adopting this space to deliver a programme of regular events and markets. This underlines the importance of active management to bring additional footfall to the area.

*A short summary of the public realm improvements can be found here: www.scotland.gov.uk/Resource/Doc/212607/0114309.pdf

The scheme cost is given here: www.rjmcleod.co.uk/archived_projects/streetscaping/grassmarket__edinburgh/

The Greater Grassmarket BID business plan is here: www.grassmarket.net/files/Greater%20Grassmarket%20Business%20Plan%20final%20copy%20Sep%202012%282%29.pdf

The relationship between investment in walking and the public realm, and the positive impact on tourism, is often cited. It certainly underpins efforts made by local authorities to improve streetscapes and public spaces[10]. While some of the effects on tourism will have been captured in section 4 (the impacts on existing business of increased turnover and footfall), few studies attempt to model the impact empirically. One such example looked at the effect of rebuilding the North Terrace of Trafalgar Square. The transformation of the quality of the pedestrian environment led to an increase in visitors of over 300 per cent – to the point where this is now the third most popular attraction in London (Tolley 2011).

Although few studies attempt to model the impact on tourism, one such example found that the new North Terrace of Trafalgar Square had increased visitors by over 300%.

Oxford Circus diagonal crossing

Box 6

Background

Oxford Circus is the intersection between two of the busiest retail streets in Europe and a major hub in London's transport network. 60 million passengers use Oxford Circus underground each year (Atkins, 2010) and there are 200,000 pedestrian movements at Oxford Circus each day (Transport for London, 2010). Prior to its transformation the footways were severely overcrowded and there were delays to bus services along this busy public transport corridor. In addition to improving the pedestrian experience, and bus journey times, the aim of this scheme was to help revitalise retail and ensure that the West End retained its position as a world class shopping destination ahead of the 2012 Olympic Games (*ibid.*).

Intervention[1]

An audit by Atkins found that Oxford Circus had over 150 items of street furniture each creating 1.2m2 'dead space'. The scheme, undertaken in October 2009, removed street clutter and reduced this by half. Pavement area was increased by 63% and existing crossings were re-aligned, reducing the detour made by pedestrians to continue along Oxford Street and Regent Street. New diagonal crossings were inserted (loosely based on the Shibuya crossing in Tokyo, Japan) and crossing times were re-phased (removing staggered crossing periods) allowing all pedestrians to cross at the same time.

Outcome

The introduction of the diagonal crossing has seen an increase in walking speeds, a decrease in the time it takes to get from one side of Oxford Circus to the other and a 10 per cent reduction in personal injury accidents in the first year since completion. 30 per cent of pedestrians use the crossing at all times. Bus delays have been reduced too (Atkins, *ibid.*). The project cost £3.9 million[2]. Using the business case developed during the scheme, anticipated pedestrian benefits were in excess of £5.1 million; when actual post scheme journey times were applied, the benefits increased 4.5 per cent to £5.4 million (Atkins, ibid.). It is reported that the turnover of a retailer occupying one of the four corners of the Circus increased by 25%, from £20m to £25m, in the year after completion of the scheme[3].

[1] Intervention description from 'Re-imagining Oxford Circus' by Kate Alexander in Architects Journal, 9 April 2009 http://www.architectsjournal.co.uk/re-imagining-oxford-circus/5200512.article

[2] Personal communication, the Crown Estate.

[3] Pers. Com. (*ibid.*).

10 See, for example, the Economic Value of Urban Design (NWDA/RENEW Northwest, 2007)

In an undated study, Synder lists economic benefits to local businesses and municipalities identified in eight different studies of walking and cycling investments in the United States. Municipalities, for instance, gained from increased sales tax revenue from visitors' spend on food, lodging, clothing, equipment, and accessories. For example, a $4.5 million investment in streetscape and pedestrian improvements in Lodi, California, combined with economic development incentives, were credited with attracting 60 new businesses, halving the vacancy rate and increasing sales tax revenue by 30 per cent. Research by the Department for Transport has highlighted the need for a better understanding of visitors' experience of the pedestrian environment and their valuation of townscapes and heritage sites (Atkins Consultants, 2011). However, as box 6 demonstrates, the calculation of pedestrian benefits is already an established methodology.

A US study found that visitors' spend on items, such as food, lodging, clothing, equipment and accessories, increased sales and tax revenue. Visitors' experience of the pedestrian environment needs understanding better.

Private sector investment in public realm improvements, where there is every expectation of receiving a return on that investment, is itself suggestive of commercial gains. The argument is that good-quality public space can enhance values for developers, the rental potential of real estate for investors and generate higher revenues for retailers and other occupiers (Van Melik and Lawton 2011). All of the case studies relating to business start-ups above received substantial private sector development following public sector improvements in the area (Montgomery, 2004). For example, the total public funding for Temple Bar was approximately IR£40.6 million but over the period 1991–2001, the private sector is estimated to have invested over IR£100 million in the area (or a return of 1:4).

Private sector investment is itself suggestive of commercial gain. Many public realm schemes are financed by private investors or a mix of public and private funding.

Effect on property and rent

There is substantial historical evidence that public realm improvements positively affect retail property prices (Buchanan and Gay, 2009). For example, in Wellington, New Zealand, an initiative involving new street paving and landscaping saw gains in rents, capital values, pedestrian counts and the presence of cafes. An economic assessment of property values there suggests that by the late 1990s they were approximately double what they would otherwise have been (Reid, 1999). In the UK, Genecon's evaluation of regeneration in Sheffield (see section 4, box 1) reported a net increase in rental value of £1.60–£2.40 / sq. ft. and a 1–1.5 per cent yield improvement (based on 40 – 60 per cent attribution rate). Box 7 illustrates the impact on rental values and private sector investment in a small coastal town in Lancashire.

There is substantial evidence that improvements to the public realm increase property prices.

As well as generating income, rental values are a measure of the attractiveness of an area. By extension, shoppers' preferences for better streets and spaces (e.g. for pedestrianisation schemes) can be indirectly quantified by the change of retail rent (Yiu 2011). Yiu's study evaluates the impact of pedestrianisation using panel market data in Hong Kong to estimate the effect in a two-street-two-period controlled model. This addressed the need for a reference group identified in section 3. The results showed a net increase of 17 per cent in rental value of retail shops in the pedestrianised area, other things being equal.

Rents reveal preferences to locate and shop in particular locations. A controlled study in Hong Kong revealed a 17% increase in rents from pedestrianisation.

St. Anne's on the Sea, Lancashire

Box 7

Background*

St. Anne's on the Sea is located on the Lancashire Fylde Coast, four miles south of Blackpool. Once a prosperous coastal resort, decline set in the 1970s as a result of changing patterns of tourism, out of town shopping and demographic change. By the 1990s, in some streets over half the shops and buildings were vacant. The town centre was in need of significant regeneration in order to be attractive and appealing within a high quality tourism niche.

Intervention

A major consultation exercise carried out in 1999 identified a number of areas for improvement, such as better paving, street furniture and lighting, better landscaping, restoration of historic buildings and more street activity and events. In 2000 The Square was refurbished. The scheme included pavilions for seating and retail uses, landscaping, public art, open seating spaces and a performing arts arena. This work was funded from a number of sources including a significant grant of £1.75m from The Northwest Regional Development Agency.

Outcome

A report by the North West Development Agency concluded that the regeneration of St. Anne's had increased the vibrancy of the local area as a whole as a result of the greater levels of activity drawn to the town centre. This in turn stimulated further regeneration (Amion Consulting and Taylor Young, 2007). They estimated that the design of the scheme may have contributed to increasing rental values by up to 10 per cent, and vacancy rates reduced from 25 per cent in 1998 to 4 per cent in 2006. The confidence of the private sector was greatly improved and overall £4 million of regeneration works attracted over £20 million of private sector investment to the town (*ibid.*).

*Background information and the description of the regeneration works are drawn from the St. Anne's on the Sea Town Plan: Fresh Horizons, 2011, see: www.stannesonthesea-tc.gov.uk/wp-content/uploads/2012/05/St-Annes-on-the-Sea-Town-Plan.pdf

Litman estimates that walking and cycling projects typically increase land value from 70 to 300 per cent (Litman, 2002; Burden and Litman, 2011). In a synthesis of the literature on the relationship between walking interventions and property value, Whitehead *et al.* (2006) found an increase in value of 21.7 per cent for retail rents and 24.2 per cent for commercial rents and that a reasonable range was in the order of 10 per cent to 30 per cent (based on work by Hass-Klau (1993) and Colliers Erdman Lewis (1995)). He also found a mean increase in office rents of 24 per cent from waterfront regeneration/water features installation. He notes that this is almost identical to the mid-point of the range reported in Frederick *et al.* (1996) for the seven case studies they investigated (i.e. about 3 per cent to 53 per cent) (Whitehead, *ibid.*).

Walking projects typically increase land values anywhere between 7–300%. A review of earlier literature suggests retail and commercial rates increase in the range of 10–30%.

Walkscore is a US company founded in 2007 with the aim of promoting 'walkable neighbourboods'[11]. Its Walkscore software has been used by academics to assess the relationship between house prices and walkability. Walkability is determined by the presence of desirable destinations, such as shops and restaurants within walking distance. Pivo and Fisher (2011) found that greater walkability promoted higher values and higher net operating incomes for office, retail and apartment properties, though it had no effect on industrial property. Their study concluded that walkable properties have the potential to generate returns as good as or better than other property investments.

American Walkscore software assesses the relationship between house prices and walkability. Easy proximity to local shops and services is linked to higher property values.

Cortright (2009) investigated the impact of walkability on housing values across 95,000 real estate transactions in fifteen cities in the United States using the Walkscore programme. He found a strong correlation between walkability and variations in home values. A one point increase in Walkscore (scored out of 100 points) was typically associated with an increase in the value of a residential property of between $700 and $3000. Although there may be other confounding variables, this is consistent with other research on the impact on commercial and residential property prices.

A one point increase in Walkscore typically increases US house prices by $700–$3000.

Good urban design and access to green spaces have also been found to positively affect rental values. A UK study by the Northwest Regional Development Agency/ Renew Northwest found that good urban design can lead to an increase of up to 20 per cent in capital value and accelerate lettings and sales rates (Amion Consulting and Taylor Young, 2007). In a follow-up study 74 per cent of estate agents said good design had a positive effect on rental and capital values, while 75 per cent thought the impact of design on occupancy and take-up rates was either important or very important (NWDA/RENEW, Northwest 2009).

A report for the North West Regional Development Agency in 2007 found that good urban design raised commercial rents by up to 20%.

In their review of the literature on the value of green space, CABE (2005) cite a report by Ernst and Young which found that rental values (residential and commercial) for properties near a well-improved park generally exceeded those in surrounding areas. In the six case studies examined the rental premium ranged from 10 per cent to 40 per cent (*ibid.*). For example, property on Bryant Park in New York was shown to have a 220 per cent increase in commercial rental values (after improvements), compared to a maximum 75 per cent increase in the surrounding area over the period studied. In London, a study by the Greater London Authority established a relationship between property value and the amount of green space in the area (a 1 per cent increase in green space in a typical ward was associated with a 0.3 to 0.5 per cent increase in average house price).

Quality green spaces increase commercial rents and property prices too. A report for the GLA in 2003 suggested that a 1% increase in green space in a typical London ward led to 0.3 – 0.5% rise in average house price.

High property prices can also have a downside, potentially restricting local access to home ownership and reducing retail diversity, as smaller businesses are priced out of the market. This should be borne in mind in designing public realm improvement projects to ensure that that high street and residential diversity is promoted. For example, in Temple Bar in Dublin the state-owned development company bought up properties prior to regeneration and the monies generated from increased rental income were reinvested in the property renewal programme and used to cross-subsidise cultural projects (Montgomery, 2004).

Nevertheless, higher property prices do have a downside: restricting access to home ownership and pricing local businesses out of the market.

11 www.walkscore.com

Employment benefits

A US study compared the number of jobs created through the construction of walking, cycling and road infrastructure. Road projects created the least jobs.

A study in the United States looked at the employment benefits that could accrue from investing in walking and cycling infrastructure. It took into account jobs that were created in all the phases of design and construction of facilities including the manufacturing of materials and equipment. Pedestrian-only projects created about 10 jobs per $1 million spent, which is greater than multi-use or road construction with pedestrian and cycling access. Of all of the options, road only projects created the least number of jobs (Garrett-Peltier, 2011, 7.8).

About 3 additional jobs were created per $1 million spend on pedestrian-only projects, benefiting local employment.

About three additional jobs per $1 million spend on pedestrian-only projects were created when spillover benefits in the supply chain were included (*ibid.*). Although employment on specific projects is short-term in nature, this finding has more relevance in terms of boosting the construction sector from a local, regional or national perspective. The report's author concluded that there should more investment in pedestrian and cycling access, not just because of the environmental, safety and health benefits, but for local employment too.

Outside the construction sector it is more difficult to show a direct causal link to additional jobs created. However, higher employment can be inferred from higher turnover and investment.

Outside of construction, the evidence relating to employment is slimmer. However, there are some positive examples. In Washington DC, improvements to Barrack's Row (new patterned sidewalks, more efficient public parking, and new traffic signals) attracted 44 new businesses and 200 new jobs. Economic activity there has more than tripled since the inception of the project (Tolley, 2011). In the UK, Genecon (2010) reported the creation of 341–527 net jobs in their evaluation of the public realm improvements in Sheffield. These were based on attribution rates of 20 – 90 per cent, which varied depending on proximity to the original investment (see Box 1). It is not clear whether the lack of data here reflects the absence of a relationship or whether it is influenced by the methodological problems outlined earlier.

Social exclusion

The impact of public realm improvements on local people is sometimes absent from evaluations. The process of gentrification associated with rising property prices can be detrimental to existing residents.

An important objective of economic development projects is to improve the economic performance of the local area, and reduce unemployment especially in more deprived areas – see box 8 below. However, the impact of public realm investments on local people is sometimes absent from evaluations. Areas that benefit from these investments often have high concentrations of unemployed people and low business start-up rates. A risk with urban renewal policies is that they are detrimental, rather than beneficial to existing residents. This is particularly the case with increases in property values; a central component of the gentrification process. Whilst local councils or business groups may favour gentrification policies because of the increased rental income associated with the rising property values, from a social value perspective it can be a damaging dynamic that results in reduced social cohesion as local residents are displaced (Lees 2008; Stevens 2009).

Church Street regeneration, Ebbw Vale, Wales* Box 8

Background

Following on from the closure of Corus in 2002, Church Street in the town of Ebbw Vale suffered from a decline in business activity and the withdrawal by public sector organisations from a number of key properties. As a result the area lacked investment and experienced a drop in business confidence. The local press highlighted its poor condition – desolate, run down, characterised by vacant and boarded up properties – and its desperate need for regeneration. Amongst the issues identified in the masterplan for this area as detrimental to the area were: high unemployment, high property vacancy rates, low property prices and the poor quality of the public realm (e.g. litter and graffiti).

Intervention

Residents and businesses were contacted personally 'on the street' to take part in public seminars and events. A comprehensive scheme for the regeneration of Church Street was developed, encompassing three main strands: the delivery of public realm improvements, reuse of vacant properties, and assisting businesses with improvements to their properties and marketing. The public realm works included 1500m2 of pennant sandstone paving, 200m of new fencing, 360m of new of refurbished stone walls, new seating, litter bins, CCTV cameras, street lighting, art projects and pedestrians links from the steelworks to the town centre. Empty properties have been acquired and refurbished by the United Welsh Housing Association and given new uses as office, residential and retail space.

Outcome

The cost of the project was £2.5 million and a further £5 million was attracted through partnership funding. Close partnership working with residents, businesses and third sector organisations was essential to the project's success. Regeneration of Church Street will ensure that businesses are now able to capitalise on the re-development of the former steel works. The implementation of high quality public realm improvements has encouraged both private investors and Housing Associations to have the confidence and commitment to invest. This 'quick win' was important to encourage buy-in and to continue to involve stakeholders. The profile of the area has now been raised and there is demand for private sector investment.

*The information in this case study is drawn from the Action for Market Towns case study database. The regeneration of Church Street in Ebbw Vale was Commended in the 2012 Welsh Zone Action for Market Towns Awards (Business and Economy category). See http://towns.org.uk/.

Those living in deprived areas generally need better places to walk the most. In 2011, 25 per cent of households in the UK did not have access to a car, and households in the highest income quintile travelled just over three times further by car than the lowest income quintile (Department for Transport, 2011). In a study of walking in deprived areas, Mason *et al.* (2011) found that amenity use, especially of parks, play areas and general shops (mainly in the neighbourhood), was associated with more walking. Promoting more frequent walking is a realistic goal for improving physical

A quarter of British households have no access to a car. Urban design often assumes car ownership, excluding those without.

activity in deprived areas and the health of the nation. However, as an objective or public policy[12] it clashes with the often car-dependent nature of urban planning and transport design. Creating public spaces that are reliant on access by car or other forms of transport can, therefore, reduce access to those amenities by the lowest income groups.

Youth Street Audit, Rye Lane, Peckham, south London

Box 9

Background

In February 2012, Living Streets undertook a youth street audit in Rye Lane, Peckham, in the London Borough of Southwark. The aim of the audit was to assess the walking environment from young people's perspective, in order to identify the barriers young people face and to encourage a healthy and active approach to travel. This location was chosen for two reasons: first because it is an obesity hotspot and secondly public realm improvements are planned in near future. In this way, participants in the audit were included in a meaningful process contributing to real change.

Intervention

Rye Lane is a busy street in Peckham town centre. As well as a walking audit, the street was filmed early in the morning when people were going to work and vans were making their deliveries. The virtual audit, in particular, showed how pedestrians compete for space with delivery vans, trolleys, shop goods, bins, road works and bus stops. Overcrowding is a particular issue around the train station where the buses stop and pedestrians have to wait on a very narrow pavement. The young people's comments were brought together in the word cloud above. The three most common words were Peckham, playground and people – revealing a desire and need for people-friendly places and underlining the fact that places are about people.

Outcome

The youth street audit worked with young people who would normally never get asked about their surroundings or to take part in changes being made to their area. It helped to identify underused spaces, understand why they are not used and considered what physical changes or activities could take place there. Recommendations were made for short, medium and long term public realm improvements, based on suggestions from the young people, discussions with project partners and Living Streets' experience. The audit and the recommendations have since been fed into the Pocket Places initiative in Peckham prior to the project's launch in March 2012. Over the next two years, the project will create temporary and semi-permanent interventions in unused spaces along Rye Lane.

12 See, for example, the Department for Transport's 2004 Walking and Cycling: An Action Plan.

The ability to walk around the area where we live also affects consumer transport costs, which makes up a large proportion of household budgets for low income families (McCann, 2000). For example, one US study found that households in car-dependent communities devoted 50 per cent more spending on transportation (more than $8,500 annually) than households in communities with more accessible shops and services, and more multi-modal transportation systems (less than $5,500 annually; Litman, 2003). Nevertheless, when walking is a compulsory form of transport, it can be a 'source of both physical fatigue and psycho-social stress' (Bostock, 2001). Where walking environments are associated with boarded-up shops, litter and graffiti they are daily reminders of social exclusion (Green, 2009).

Conversely, a US study has shown how car dependent households on low incomes spend 50% of their budget on transportation. Urban design in poor neighbourhoods is often a disincentive to walking.

There is little evidence to link property or infrastructure-led development to economic improvements for the most deprived communities. However, CABE Space (2005) have described how important the perceptions of an area are to prevent urban decline, raise the self-esteem of residents and promote confidence in others for inward investment. Box 9 above shows how people connect with their places. Public realm improvements can contribute to urban renewal but they need to be carefully implemented and accompanied by economic development strategies to create business and employment opportunities – or they run the risk of leaving people behind (Litman, 2003).

Better streets and places are good for everyone: raising self esteem for residents and promoting confidence for inward investment.

6 Public realm improvements and consumer and business satisfaction

This section discusses attitudes towards public spaces and public realm improvements from the point of view of consumers and businesses. Although the direct economic value of public realm improvements can be difficult to quantify, there is a significant amount of evidence that suggests that the benefits are derived from people's perceptions of an area (NWDA/RENEW Northwest, 2007). Box 10 illustrates the importance of people's perceptions of the public realm in York. There is also some evidence that, over time, urban quality improvements alone may enhance the attractiveness of an area, and put a premium on locations within it (Whitehead *et al.*, 2006).

There is significant evidence that perceptions of an area – to businesses and consumers – matter.

Across Europe, a broadly positive relationship has been observed between the quality of public spaces and people's perceptions of the attractiveness of the local area (Holcomb, 1994; Barke and Harrop, 1994; Whitehead, *et al.*, 2006) and their quality of life (Gehl, 2011). As discussed in section 4, this also affects people's propensity to shop and spend. Nevertheless, it is often assumed that our struggling high streets need more parking and should be easier to get to by car. For example, the Federation of Small Businesses has argued that businesses in towns with insufficient car parking lose customers to other destinations. They claim that access to parking has a 'significant impact' on store performance[13]. Yet in a survey of shoppers and retailers in Edinburgh, the shoppers' main concern was for a good range of shops in an attractive environment (Tolley, 2011). Parking was not identified as important by shoppers, even though it was the only issue mentioned by more than 10 per cent of retailers (*ibid.*).

Across Europe, studies have linked the quality of public spaces to perceptions of attractiveness, quality of life – and where we shop. Even so, it is often assumed that more parking is the answer to struggling high streets.

Similarly, earlier this year the Royal Institute of Chartered Surveyors blamed pedestrianisation for high street decline, citing Holyhead in Wales (Deardon, 2013). This simplistic correlation ignores many other factors contributing to their decline – most notably the way we shop. People value pedestrian environments, for example, in shopping centres, suburban office campuses or pedestrian oriented resort communities. Other studies have shown that retailers like pedestrianisation once they have a good experience of its benefits (Kumar and Ross, 2006). They even suggest that pedestrianised commercial areas increase the livability of the environment. In fact, repeated studies show that shoppers are more likely to have negative opinions about traffic and transport than retailers (Hass-Klau, 1993; Kumar and Ross, 2006; Tolley, 2011).

Pedestrianisation has also been blamed for falling sales, ignoring the many contributing factors. In fact there is consistent evidence that customers like pedestrian environments and dislike traffic.

In another study, Sustrans interviewed 840 shoppers and 126 retailers on two neighbourhood shopping streets in Bristol to find out how customers travelled, and were perceived to travel, to the shops. This replicated a 1990s survey in the city of Graz, in Austria, which found that retailers overestimated the importance of the car

Retailers have been shown to over-estimate the importance of the car for customer travel. In those studies, more people actually walked, cycled or came by bus.

13 www.fsb.org.uk/101/assets/Car%20park%20survey.pdf

for customer travel (retailers assumed 58 per cent of their customers arrived by car, when in fact 44 per cent walked, 8 per cent cycled and 16 per cent arrived by bus). The results for Bristol told the same story; retailers overestimated the importance of the car by almost 100 per cent. They assumed that 41 per cent of their customers arrived by car; only 22 per cent had done so (Sustrans, 2006).

Reinvigorate York*

Box 10

Background

The York Visitor Survey 2011–12 found that, overwhelmingly, the top activity of the 7 million visitors to the city each year is to "stroll around and enjoy the ambience of York", together with "eating and drinking out". Less than 2 million of the 7 million visitors reported actually going into the major attractions. This illustrates the vital importance of the quality of public spaces. The City of York Council has made the case that improving the public realm in the city centre is vital to attract "entrepreneurs, investors, students and people looking for jobs".

Intervention

In September 2012, the Cabinet approved a £3.3 million investment across six city centre locations in order to 'Reinvigorate York'. The key objectives of this programme are to reinvigorate the city centre economy, increase footfall, improve quality of life for residents, increase the sense of York as a special place and to maintain its position as a top tourist attraction. An initial £200,000 has been allocated to a package of measures including improvements to paving, lighting, seating, bins and de-cluttering public spaces. Improving the environment for pedestrians, cyclists and public transport is a theme throughout.

Outcome

The economic outcomes of each project will be assessed using the Transport for London (TfL) Urban Design Toolkit, to monitor the economic benefits. However, this case study demonstrates both the importance of people's perceptions of quality of the public realm and the City of York Council's confidence of the economic benefits of more attractive streets through their willingness to pay for public realm improvements. The decision to invest in the city's public spaces anticipates the value of the enhancing the city's image as an international destination and widening its offer: as a place to live and work, as a means of attracting higher value employment and providing a catalyst for private sector investment.

*The information here is drawn from the 4 September 2012 Cabinet report
http://www.york.gov.uk/info/200174/planning_and_building_control/686/reinvigorate_york

Despite the view that town centres should be easier to get to by car, there is also evidence that shows that traffic calming measures do not adversely affect small businesses (Drennen, 2003). Contrary to expectations at the time, a combined traffic restraint and pedestrianisation scheme in Oxford in 1999 did not lead to a reduction in visitor numbers in spite of a 17 per cent reduction in car trips to the centre (Parkhurst, 2003).

Restricting traffic does not necessarily reduce the number of customers.

It is not only the business sector that can be skeptical about measures that restrict vehicular traffic. For example, a survey of local authority and academic attitudes towards road user charging reported that about 83 per cent of respondents were either 'very concerned' or 'fairly concerned' with the economic impact on the urban area (Ison, 2000). However, research by Whitehead, which has modeled the impact of road user charging on urban areas, has found that where revenue is ring-fenced for public realm investment it may enhance business performance in city centres in the long run (Whitehead, 2002).

Charging road users and ring-fencing the revenue for public realm investment could also enhance business performance in the long run.

Streets and Spaces, Leicester

Box 11

Background

Leicester has previously been described as having a traditional city centre, lacking public open spaces and suffering from dereliction and underinvestment in many areas[1]. However, in the past decade significant efforts have been made to improve and enhance the public realm. In 2005, a public realm strategy was initiated in response to the redevelopment and expansion the Shires Shopping Centre (re-launched as the Highcross) in the centre of Leicester[2]. This three year programme of investment – the Streets and Spaces initiative – led to £19 million of improvements across the centre, almost completing the 'retail circuit' including Gallowtree Gate, High Street, Hotel Street and Market Street.

Intervention

The purpose of the Streets and Spaces initiative was to regenerate and transform the appearance of the city centre to help it to benefit from the development of Highcross and the new visitors it would bring to the city. Measures included changing bus routes, pedestrianisation, de-cluttering, new street paving and street furniture, tree planting and changes to street lighting. The project opened streets up for pedestrians and was completed in time for the opening of Highcross in 2008.

Outcome

A survey of business carried out during the project's implementation found that "91 per cent felt that the space surrounding their business location had recently improved, and 64 per cent agreed that these improvements have been good for business"[3]. 73 per cent stated that the improvements had helped to attract visitors. It was also noted that the flagship John Lewis store, the retail anchor of the new Highcross development, would not have been secured without the Streets and Spaces initiative. In 2011, Sir Peter Soulsby was elected as Leicester's first City Mayor and he has embarked on a new programme – Connecting Leicester – a series of projects designed to reverse the impact of the car and encourage visitors to get to know the rest of the city4. Its emphasis is spreading the success from the retail heart of the city by reconnecting it, for example, to the medieval quarter and the Golden Mile). It is also taking advantage of the opportunities arising from the discovery of Richard III's body.

[1] Ecotec (2007) Economic Impact of the Public Realm: A Final Report to the East Midlands Development Agency

[2] Leicester Public Realm Strategy (2005) www.leicester.gov.uk/your-council-services/ep/economic-regeneration/regenerationnews/strategiesforchange/prs/

[3] Ecotec (*ibid.*)

[4] Leicester City Council Scrutiny Review, review of 'Connecting Leicester', November 2012

However, it is a measure of the importance placed on public realm that some retailers have expressed a willingness to pay (WTP) for it (Sinnett *et al.*, 2011). In 2003, the Central London Partnership (CLP) and Transport for London (TfL) commissioned a study to examine the economic benefits of walking and public realm improvements. The study included a series of interviews with people from a range of business sectors (landowners, developers, businesses). 85 per cent of respondents identified the quality of the streetscape as important to the ability to

Good quality public realm is considered by entrepreneurs to be an effective part of managing high streets. Landowners and retailers are even willing to pay to improve the streetscape in order to attract tenants and customers.

attract customers or tenants. All the landowners interviewed had made significant investments in improving the quality of their street environment. It was further argued that a failure to improve the quality of the public realm may lead to businesses reconsidering their investment (Llewelyn Davies, 2003). Box 11 above shows how street improvements in Leicester were integral to attracting John Lewis to the new Highcross development. A study by Whitehead of entrepreneurs' attitudes found that they considered good quality public realm to be an effective part of town and city management (Whitehead *et al.*, 2006).

Various techniques have been developed in order to measure pedestrians' preferences for more appealing public spaces and better walking environments. Kelly *et al.* (2011) used three approaches to measure the relative value of different street improvements (e.g. high quality materials or safety attributes) and compared the findings. Their methods were:

Various techniques have been employed to measure the relative value of street improvements. In each case the main attributes of a good pedestrian environment include: cleanliness, safe crossings, connectivity and a sense of security.

- A computer based tool developed using stated preference surveys
- An on-street survey designed to investigate values and attitudes towards different attributes of the pedestrian environment along a route; and
- An 'on the move survey' where pedestrian volunteers were interviewed while walking along the route in order to get an actual account of their experiences as they walk.

While each approach provided a different perspective on walkability, the general attributes of a good pedestrian environment were found to include: pavement cleanliness, safe crossing places, good connectivity and a sense of security (*ibid.*).

It is not only retailers who express a willingness to pay for better streets and places. For example, Willis *et al.* (2005) found in their survey that the mean WTP for improved street lighting was £16 per household per year, although in some instances this was less than the cost of implementing the scheme. An earlier study by Garrod *et al.* (2002) revealed that people had a positive WTP for a reduction in the negative impacts of road traffic and for more attractive, sophisticated traffic calming measures – rather than basic designs such as road humps, speed cushions and chicanes. This approach enables urban designers and planners to assess people's preferences through the relative values they give to public realm improvements. For example, as part of the design of the Castlegate Square area in Aberdeen, Davis and Laing (2002) found that the public placed a negative value of £5.60 on replacing the current railings in the square with new railings and a positive value of £6.00 on replacing the railings with bollards (i.e. a difference of £11.60).

Householders and customers are willing to pay for better streets too, revealing preferences for more attractive and sophisticated street designs.

The state of our streets really matters to people and this can be used to estimate the value of urban realm improvements. For example, Transport for London (TfL) have developed a 'Valuing the Urban Realm' toolkit based on the Pedestrian Environment Review System (PERS) – see box 12. Research using the PERS

Londoners were willing to pay an extra £14.78 to £17.35 per year on their council tax for improvements in the walking environment.

evaluation tool has found that Londoners are, on average, willing to pay an extra £14.78 to £17.35 per year on their council tax for improvements in the walking environment (Accent and Colin Buchanon, 2006). Similarly, Stated Preference experiments by Sheldon *et al.* (2007), also in London, produced WTP estimates for high street improvements amounting to £45 per person per annum across all the high streets visited. These findings prompted the Department for Transport to commission research into the use of Stated Preference techniques to value public realm improvements more generally (Atkins Consultants, 2011).

Applying Transport for London's (TfL) Urban Realm Toolkit to Croydon High Street

Box 12

Background

Croydon's town centre has persistently struggled since the early 1990s with higher vacancy rates (up to 32 per cent office vacancies) and lower footfall trends than national averages. In 2012, Croydon Council launched a strategy to address these long standing issues to "attract future private sector residential, retail and commercial investment" (GLA 2012). This would involve investment in the public realm and public transport, in order to help change people's perception of the area by creating more attractive, functional and safe public places.

Intervention

The public realm improvements include a wide range of measures, including: de-cluttered streets, extended and/or replaced footways, new planting, new street furniture, rationalised parking and servicing, pedestrian crossings and road junction improvements. This will be complemented by improvements to buildings and facades and direct measures to support retailers. The project has two quantifiable objectives. The first is to achieve a 5 per cent increase in footfall – based on comparative results for Harrow Town Centre public realm improvements. This would result in an additional yearly footfall count of approximately 400,000. The second objective is to increase the amount spent on the high street. Currently the average spend is £29 per person; if this remains constant, the increase in footfall would deliver £4.7m of additional retail expenditure per year within the intervention area (although this could be displaced from elsewhere).

Outcome

The outcomes of the project will be measured using existing data capture methods (e.g. vacancy rates) and through user and business surveys. However, the project has also been reviewed using TfL's toolkit 'Valuing the Urban Realm 2012'. The toolkit provides monetary values for proposed improvements to public space utilising the Pedestrian Environment Review System (PERS). This generated a value for an increase in public wellbeing arising from streetscape improvements of £11.4 million. This results in a benefit/cost ratio of 1.36:1. The private property value uplift from the proposed urban realm improvements or shop rental value increases are estimated at £89.2m (*ibid.*).

The authors concluded that there was evidence of significant, positive WTP for townscape improvement packages in towns and cities outside of London too. They gathered new survey data from four non-London sites and found a WTP of £20 to £45 per annum per person using the street, depending on the elements in the townscape package. The research provides values for different improvement packages (see Table 2).

Outside London data has identified a WTP of £20 to £45 p.a. per person for different townscape improvement packages.

Willingness-to-pay for attributes of different improvement packages

Table 2

Attribute	Willingness-to-pay, £ per annum		
	Central estimate	Judgemental 95% confidence interval on WTP	
		Lower Bound	Upper Bound
Priority: Shared Space	20 to 25	2	50
Priority: Full Pedestrianisation		10	30
Priority: Limited Vehicle Access		15	35
Surface (material high quality)	10	2	17
Activity (high, where complementary to uses on street)	10	3	6

Source: Atkins Consultants 2011

As discussed in the introduction our high streets have been under pressure for some time now. The way we shop has changed and so too have our expectations of the high street. A report by the Department for Business, Innovation and Skills (BIS, 2011) describes how consumers now seek more 'experience' and a greater choice. It highlights the need for high streets to respond to these changing markets; the most successful examples are those with something different to offer, that are places to visit for leisure, culture and specialist shopping rather than for routine purchases (*ibid.*). BIS rightly identify a gap in understanding in terms of how consumers balance notions of value and price. More evidence is needed on the contribution that key elements, such as the quality of the public realm, retail diversity and service, can make to increase what the high street has to offer.

The way we shop has changed and so have our expectations of the high street. Shoppers now seek to 'experience' something different. More needs to be known about how better streets can add to that experience.

7 Conclusions

This report has made the case that investment in better streets and places can deliver a range of commercial returns. Establishing direct causal links between investment in the public realm and outcomes for business is challenging, because research in this area is underdeveloped. However, the evidence that does exist suggests a positive impact on retail footfall, turnover, property values and rental yields, particularly for well-designed projects. There is also evidence that well-planned and implemented public realm investments can support regeneration efforts. However, it has been more difficult to link these to an increase in business start-up or survival rates, net employment and tourism. It is also important to acknowledge that data does not exist on potential negative effects of gentrification on communities in deprived areas.

Although this is a challenging area to measure, overall the evidence suggests that investment in better streets and places supports the delivery of a range of commercial returns.

Members of the public appear willing to pay for pedestrianisation and better townscapes. In contrast, business organisations and some businesses may be out of step with the views of their customers – valuing accessibility by car more than the quality of the public realm. Of course, this is not universally true. Many businesses do appreciate, invest in and benefit from pedestrian friendly environments.

People are even willing to pay for better streets, but some business bodies believe that parking matters more.

Most of the evidence presented in this report is in case study form, reflecting the type of research that is generally carried out in this field. It is difficult to generalise from specific examples. For instance, there is a risk that there is a positive bias towards schemes that work well, whereas less successful schemes are not unpublicised. The few systematic reviews that have been carried out support the assertion that improvements to the public realm contribute to commercial success. And the weight of qualitative and quantitative evidence suggests that businesses and their customers benefit from better streets. However as might be expected, this is an area that needs more research – particularly on the relationship between regeneration and local communities.

More baseline data needs to be gathered when undertaking public realm investments to aid calculations of additionality and to enable the generalisability of the results.

This report, and a summary report produced by Living Streets, can be downloaded from www.livingstreets.org.uk/pedestrianpound.

Concluding thoughts

1 High street decline appears to be a continuing trend and the share of retail going to online and out-of-town stores is set to rise. More radical policies are required to reverse these trends, as the high street will not be simply able to compete on price. Investments in walking in public realm make economic sense and are likely to pay for themselves in the long-run. However, other measures such as an internet sales tax, congestion charging and planning restrictions on out-of-town stores[14] should also be considered. There is some evidence to suggest that these are likely to work best when the funds are hypothecated and reinvested in the high street.

2 Consumers have a willingness to pay for local environmental improvements, so ways should be explored to take advantage of that to help raise revenue for these investments.

3 Public realm interventions should be carefully designed to ensure that local people – as well as the high street - benefit from them (or are at least not negatively impacted upon).

4 Business owners often over-value the importance of parking and car access to their sales. Business organisations in particular need to become more familiar with the evidence in this area, so as to promote the economic benefits of public spaces to their members, and the importance that customers place on them.

5 High property prices can also have a downside, potentially restricting local access to home ownership and reducing retail diversity, as smaller businesses are priced out of the market. This should be borne in mind in designing public realm improvement projects to ensure that that high street and residential diversity is promoted.

6 Better evaluation should be built into all project design to address the information deficits outlined earlier.

14 Both England's National Planning Policy Framework and Scotland's Planning Policy (The Scottish Government, 2013) include a "Town Centre First" presumption for retail development, but it remains to be seen if this is being implemented effectively.

Further research

1 The field would benefit from better evaluations of the public realm interventions. This should include baseline assessments of economic indicators as well as methods for calculating additionality.

2 This should also include an assessment of potential negative impacts on communities from processes such as gentrification. Evaluation of regeneration spending is particularly in need of more rigour. As it is largely delivered through public funding streams and spent on behalf of the most deprived communities greater transparency and accountability is required.

3 More research is required into the components of public realm improvements that are likely to yield positive impacts to a wide range of stakeholders. Whilst we know that good design matters, and is likely to pay for itself in the long-run, we know less about how (for example) investments can be harnessed to create employment for local people.

4 There is some suggestion from case study evidence that more interventionist approaches to urban regeneration are more effective than market-led approaches. This hypothesis needs further testing, as the finding could be important for the design of future projects.

5 The value of the high street to communities is often mentioned but has never been fully explored. The social value of the high street is an under-developed area of research, which would help make the case for better funding and more radical policy measures to support its survival.

Glossary of terms

Additionality is the extent to which something happens as a result of an intervention that would not have occurred in the absence of the intervention.

Contingent valuation is a survey-based economic technique for the valuation of non-market resources, such as environmental preservation or the impact of contamination. It assesses people's willingness to pay for a good or service, or their willingness to accept compensation for its loss. It is sometimes known as the stated preference model in contrast to a price-based revealed preference model.

Counterfactual is a scenario that expresses what has not happened or is not the case but could, would, or might happen under differing conditions. For example, an analysis of what outcomes would have taken place in the absence of a policy or intervention.

Deadweight is the estimate of what level of target outputs/outcomes would be produced if the intervention did not go ahead. It is the 'do nothing' or do minimum option and the outputs/outcomes produced under this option are referred to as deadweight. In some cases, deadweight might be estimated by assuming that a proportion of the total gross additional local effects would go ahead anyway under the reference case.

Displacement refers to the number or proportion of intervention outputs (occurring under the reference case and the intervention options) accounted for by reduced outputs elsewhere in the target area should also be deducted.

Economic multiplier: This refers to further economic activity (jobs, expenditure or income) associated with additional local income, local supplier purchases and longer-term development effects then need to be added.

Hedonic pricing: The most common example of the hedonic pricing method is in the housing market: the price of a property is determined by the characteristics of the house (size, appearance, features, condition) as well as the characteristics of the surrounding neighbourhood (accessibility to schools and shopping, level of water and air pollution, value of other homes, etc.) The hedonic pricing model is used to estimate the extent to which each factor affects the price.

Leakage effects refer to the number or proportion of outputs (occurring under the reference case and the intervention options) that benefit those outside of the intervention's target area or group should be deducted from the gross direct effects.

Substitution: This effect arises where a firm substitutes one activity for a similar one (such as recruiting a jobless person while another employee loses a job) to take advantage of public sector assistance.

Appendix:
Comments on analysis and data quality

In response to the brief given by Living Streets, Just Economics identified four discrete research questions. These informed the search terms used in database searches:

1 Do investments in walking and the public realm contribute towards existing business performance, income, footfall and spending, survival rates etc.?

2 Do investments in walking and the public realm improve the attractiveness of an area as measured by customer perceptions, stated preference etc.?

3 Can investments in walking and the public realm improve the commercial viability of an area, as measured by inward investment, business start-up rate, increase in the value of retail property units etc.?

4 What UK examples might serve as useful case studies to explore the commercial benefits of walking?

Few of the papers that were accessed could be considered cost benefit analyses. The majority summarised case studies or provided descriptive material on the economic benefits of walking. Due to the limited amount of literature in the area, we included everything that was available. This comes with the caveat that there is variability in the quality of the data on which they are based. For example, it is not always clear whether counterfactuals have been taken into account (see section 3). An effort has been made to draw attention to this where relevant.

Urban centres are often the recipients of different kinds of public and private investment. Comparing the impacts of these can be challenging for the reasons outlined in section 2, but also because the scale of the investment can vary from small, localised high street improvements to large-scale regeneration projects which attract large employers (not just retail) and cultural investment. In this report we consider all types of investment, and attempt where possible to differentiate between them.

However, it is not always possible to identify where, on the spectrum of small to large projects, the investment is situated. Projects at different ends of the scale are not directly comparable and require different levels of rigour in their evaluation. Whilst we discuss high street improvements and urban regeneration projects alongside each other, we also recognise that they are very different in nature. Where possible, we have focused solely on the public realm components of regeneration projects.

The quality of evaluation applied to urban regeneration also tends to be mixed. This makes synthesizing findings from such projects particularly challenging. Although there has been a much greater emphasis in recent decades on evaluation (Ho, 1999), this is still an area that suffers from methodological weaknesses. A proper discussion of the issue is outside the scope of this paper.

One issue that is worth mentioning is the extent to which regeneration outcomes are over-claimed. Evidence suggests that successful regeneration is extremely difficult to do well. It is notoriously badly evaluated but what evidence exists, suggests that while programmes may be designed to slow the decline of deprived areas, few have been shown to close the gap with wealthier areas (North *et al.*, 2003; Griggs *et al.*, 2008; Potts, 2008; Robertson, McIntosh and Smyth, 2010).

The most successful examples are well-planned, holistic and focused on outcomes for the most deprived (Turok, 1992). Whilst property-based initiatives have been shown to have positive regeneration impacts an 'unrestrained, market-led' approach has also been found to be detrimental (*ibid.*). They are probably best described as a 'necessary but not sufficient' component of an urban regeneration strategy (Imrie and Thomas, 1993; Loftman and Nevin, 1995). For example, the evidence relating to one-off 'prestige projects' or public art installations and regeneration lacks a robust evidence-base (Loftman and Nevin, 1995; Hall and Robertson 2001; Evans, 2005).

References

Accent, and Colin Buchanon. 2006. "Valuing Urban Realm – Business Cases for Public Spaces". Transport for London.

Amion Consulting, and Taylor Young. 2007. "The Economic Value of Urban Design." www.placesmatter.co.uk.

Atkins. (2010). "Oxford Circus Validation of Business Case Forecasts For Transport for London, 27 May 2010".

Atkins Consultants. 2011. "DfT Pedestrianisation and Townscape Research." www.gov.uk/government/uploads/system/uploads/attachment_data/file/89395/pedestrianisation-townscape-research-report.pdf

Banister, D. 2009. "Traffic Calming in the United Kingdom: The Implications for the Local Economy." *Pubblicazioni Ce. SET* (22). http://fupress.net/index.php/ceset/article/viewFile/7251/6752

Barke, Michael, and Ken Harrop. 1994. "Selling the Industrial Town: Identity, Image and Illusion." *Place Promotion: The Use of Publicity and Marketing to Sell Towns and Regions*: 93–114.

Begg, Iain. 2002. "Urban Competitiveness: Policies for Dynamic Cities". The Policy Press. http://books.google.co.uk/books?hl=en&lr=&id=QLG0LKHk6CcC&oi=fnd&pg=PR5&dq=Urban+Competitiveness:+Policies+for+Dynamic+Cities,&ots=uuyr9h3dZx&sig=PVT08x-FUOEGo6A1g0IlZpPthK8.

Bidwell, Susan. 2012. "Review of Studies That Have Quantified the Economic Benefits of Interventions to Increase Walking and Cycling for Transport." http://cph.co.nz/Files/QuantEconBenefitPhysicalActive.pdf.

Bohl, C. C. 2002. "Place Making: Developing Town Centers, Main Streets and Urban Villages, Urban Land Institute, 2002. Www. Uli. Org. Accessed Jan. 12, 2003."

Bostock, Lisa. 2001. "Pathways of Disadvantage? Walking as a Mode of Transport Among Low-income Mothers." *Health & Social Care in the Community* 9 (1): 11–18. doi:10.1046/j.1365-2524.2001.00275.x.

Brog, W., and Nicola Mense. 2000. "Eight Cities Walking: Comparative Data on Walking as a Transport Mode from Cities in Europe, Australia and the US, Portland." http://www.walk21.com/papers/Brog.pdf.

Buchanan, P., and N. Gay. 2009. "Making a Case for Investment in the Public Realm." *Proceedings of the ICE - Urban Design and Planning* 162 (1) (January 3): 29–34. doi:10.1680/udap.2009.162.1.29.

Burden, Dan, and Todd Litman. 2011. "America Needs Complete Streets." *ITE Journal* 81 (4): 36–43.

CABE Space. 2005. "Does Money Grow on Trees?". Cabe Space.

Cavill, Nick, Sonja Kahlmeier, Harry Rutter, Francesca Racioppi, and Pekka Oja. 2008. "Economic Analyses of Transport Infrastructure and Policies Including Health Effects Related to Cycling and Walking: A Systematic Review." *Transport Policy* 15 (5) (September): 291–304. doi:10.1016/j.tranpol.2008.11.001.

Central Bedfordshire Council. 2011. "Biggleswade Town Centre Strategy and Masterplan". www.centralbedfordshire.gov.uk/local-business/business-information-and-advice/developments/biggleswade-town-centre-masterplan.aspx

Centre for Retail Research. 2012. "Online Retailing: Britain and Europe 2012." www.retailresearch.org/onlineretailing.php.

Chelmsford Borough Council. 2011. "Chelmsford Town Centre: Public Realm Stategy." www.chelmsford.gov.uk/sites/chelmsford.gov.uk/files/files/documents/files/TC%20PRS.pdf.

Colliers Erdman Lewis. 1995. "How to Get Pedestrian Rental Growth". London, CEL.

Commission, European. 1999. "Cycling: The Way Ahead for Towns and Cities." *Office for Official Publication of the European Communities, Luxembourg.*

Cortright, Joe. 2009. "Walking the Walk: How Walkability Raises Home Values in US Cities." www.citeulike.org/group/11305/article/5541951.

Davies, A., and R. Laing. 2002. "Streetscapes: Their Contribution to Wealth Creation and Quality of Life". Final research report to Scottish Enterprise.

Davis, Adrian. 2010. "Value for Money: An Economic Assessment of Investment in Walking and Cycling." *United Kingdom: Department of Health, Government Office for the South West*. http://healthandtransportgroup.co.uk/health_transport/ValueforMoneyAnEconomicAssessmentofInvestmentinW.pdf

Dawson, John A. 1988. "Futures for the High Street." *The Geographical Journal* 154 (1) (March 1): 1–12. doi:10.2307/633470.

Deardon. 2013. "Town Centres 'Should Be Accessible'." *BBC*, February 12, sec. North West Wales. www.bbc.co.uk/news/uk-wales-north-west-wales-21418768

Department for Business, Innovation and Skills, and Genecon and Partners. 2011. "Understanding High Street Performance." www.bis.gov.uk/assets/BISCore/business-sectors/docs/u/11-1402-understanding-high-street-performance.pdf

Department for Busness, Innovation and Skills. 2011. "Understanding High Street Performance". HM Government.

Department for Communities and Local Government. undated. "East Midlands Competitiveness Programme 2007–13." www.gov.uk/government/uploads/system/uploads/attachment_data/file/132071/North_Derbyshire_and_North_Nottinghamshire_information.pdf

Department for Transport. 2004. "Walking and Cycling: An Action Plan." London: DfT.
———. 2011. "Statistical Release - National Travel Survey 2011". London: HM Government.

Department of Environment. 1997. "Managing Urban Spaces in Town Centres: Good Practice Guide". Stationery Office Books.

Drennen, Emily. 2003. "Economic Effects of Traffic Calming on Urban Small Businesses." *Masters Project, Department of Public Administration, San Francisco State University*. www.emilydrennen.org/TrafficCalming_full.pdf

Drivers Jonas LLP and Colin Buchanan. 2008. "Bristol Broadmead public realm study: baseline study July 2008". www.bristolshoppingquarter.co.uk/dbimgs/Public%20Realm%20study%20August%202008%281%29.pdf

Ealing Broadway Business Improvement District. 2006. "Ealing Broadway BID business plan 2006–2011". http://ealingshoplocal.co.uk/files-area/Ealing_BID_Business_Plan.pdf
———2009. "The Ealing Broadway Business Improvement District Review 2008/9". http://ealingshoplocal.co.uk/files-area/BID%20Annual%20Review%2008-09.pdf
———. 2010. "Take Five: Your Ealing Broadway BID's Five Year Prospectus." http://ealingshoplocal.co.uk/docs/Ealing_BID_5yr_Prospectus.pdf

ecogen. 2009. "Evaluation of the Market Towns Initiative." http://webarchive.nationalarchives.gov.uk/+/http://www.advantagewm.co.uk/Images/MTI%20Evaluation%20Final%20Report%20Sept%2009_tcm9-25275.pdf.

Ecotec. 2007. "Economic Impact of the Public Realm: A Final Report to the East Midlands Development Agency". Birmingham.

Encams. 2005. "The Link Between Local Environmental Quality and Economic Improvement."

English Partnerships. 2004. "Additionality Guide: A Standard Approach to Assessing the Additional Impact of Projects." *English Partnerships*.

Evans, Graeme. 2005. "Measure for Measure: Evaluating the Evidence of Culture's Contribution to Regeneration." *Urban Studies* 42 (5–6): 959–983.

Felsted, Andrea, and Elizabeth Rigby. 2013. "High Street Reels from HMV Crash." *Financial Times*, January 15. http://www.ft.com/cms/s/0/fffa9c9c-5f3d-11e2-be51-00144feab49a.html#axzz2M15gigse.

Frederick, Rod, Robert Goo, Mary Beth Corrigan, Susan Bartow, and Michele Billingsley. 1996. "Economic Benefits of Urban Runoff Controls." *Urban Sources Section, Assessment and Watershed Protection Division, US Environmental Protection Agency, Washington, DC*.

Fujiwara, Daniel, Ross Campbell, Great Britain, and Great Britain. 2011. "Valuation Techniques for Social Cost-Benefit Analysis: Stated Preference, Revealed Preference and Subjective Well-being Approaches: a Discussion of the Current Issues". HM Treasury.

Garrett-Peltier, Heidi. 2011. "Pedestrian and Bicycle Infrastructure: A National Study of Employment Impacts." *Amherst, MA: Political Economy Research Institute*. http://your.kingcounty.gov/ftp/parks/REGIONALTRAILS/RESEARCH%20STUDIES/PERI_PedBikeEmployment%20Study_June2011.pdf.

Gehl, Jan. 2011. "Life Between Buildings: Using Public Space". Island Press. http://books.google.co.uk/books?hl=en&lr=&id=X707aiCq6T8C&oi=fnd&pg=PA3&dq=life+between+buildings&ots=xhYMr5PRxF&sig=31k-vgJ9zO91b4TMMvFboMq2NRw.

Genecon. 2010. "Research & Evaluation of Public Realm Schemes." www.integreatplus.com/sites/default/files/genecon_public_realm_evaluation_sheffield.pdf

GLA. 2012. "Croydon's Town Centre High Street Improvement Project." www.london.gov.uk/sites/default/files/08%28b%29%20High%20Streets%20-%20Stage%202%20form.pdf.

Green, Judith. 2009. "'Walk This Way': Public Health and the Social Organization of Walking." *Social Theory & Health* 7 (1) (February): 20–38. doi:10.1057/sth.2008.19.

Griggs, J., A. Whitworth, R. Walker, D. McLennan, and M. Noble. 2008. "Person or Place-based Policies to Tackle Disadvantage? Not Knowing What Works." *York: Joseph Rowntree Foundation*.

Hall, Tim, and Iain Robertson. 2001. "Public Art and Urban Regeneration: Advocacy, Claims and Critical Debates." www.tandfonline.com/doi/full/10.1080/01426390120024457

Hass-Klau, Carmen. 1993. "A Review of the Evidence from Germany and the UK." *Transport Policy* 1 (1): 21–31.

Ho, Suet Ying. 1999. "Evaluating Urban Regeneration Programmes in Britain Exploring the Potential of the Realist Approach." *Evaluation* 5 (4) (October 1): 422–438. doi:10.1177/135638999400830084.

Holcomb, Briavel. 1994. "City Make-overs: Marketing the Post-industrial City." *Place Promotion: The Use of Publicity and Marketing to Sell Towns and Regions*: 115–131.

Imrie, R, and H Thomas. 1993. "The Limits of Property-led Regeneration." *Environment and Planning C: Government and Policy* 11 (1): 87–102.

Ison, S. 2000. "Local Authority and Academic Attitudes to Urban Road Pricing: a UK Perspective." *Transport Policy* 7 (4): 269–277.

Jones, Colin. 2010. "The Rise and Fall of the High Street Shop as an Investment Class." *Journal of Property Investment & Finance* 28 (4) (July 13): 275–284. doi:10.1108/14635781011058884.

Kelly, C.E., M.R. Tight, F.C. Hodgson, and M.W. Page. 2011. "A Comparison of Three Methods for Assessing the Walkability of the Pedestrian Environment." *Journal of Transport Geography* 19 (6) (November): 1500–1508. doi:10.1016/j.jtrangeo.2010.08.001.

Kumar, Santosh, and William Ross. 2006. "Effects of Pedestrianisation on the Commercial and Retail Areas: Study in Khao San Road, Bangkok." *Splintered Urbanism*. http://ecoplan.org/library/wt13-1.pdf#page=37.

Labadi, S. 2008. "Evaluating the Socio-economicimpacts of Selected Regenerated Heritage Sites in Europe". European Cultural Foundation.

Lees, Loretta. 2008. "Gentrification and Social Mixing: Towards an Inclusive Urban Renaissance?" *Urban Studies* 45 (12) (November 1): 2449–2470. doi:10.1177/0042098008097099.

Lerner, Steve, and William Poole. 1999. "The Economic Benefits of Parks and Open Space: How Land Conservation Helps Communities Grow Smart and Protect the Bottom Line." http://trid.trb.org/view.aspx?id=679877.

Litman. 2002. "Transportation Cost and Benefit Analysis." *Techniques, Estimates and Implications, Victoria Transport Policy Institute (www. Vtpi. Org/tca)*. http://www.vtpi.org/tca/tca01.pdf.

Litman, Todd Alexander. 2003. "Economic Value of Walkability." *Transportation Research Record: Journal of the Transportation Research Board* 1828 (-1): 3–11.

Llewelyn Davies. 2003. "Economic Benefits of Good Walking Environments". TfL and Central London Partnership.

Loftman, Patrick, and Brendan Nevin. 1995. "Prestige Projects and Urban Regeneration in the 1980s and 1990s: a Review of Benefits and Limitations." *Planning Practice and Research* 10 (3–4): 299–316.

Mason, Phil, Ade Kearns, and Lyndal Bond. 2011. "Neighbourhood Walking and Regeneration in Deprived Communities." *Health & Place* 17 (3) (May): 727–737. doi:10.1016/j.healthplace.2011.01.010.

McCann, B. 2000. "Driven to Spend". Centre for Neighbourhood Technology.

The Means. 2012. "The relevance of parking in the success of urban centres", a review for London Councils prepared by Sophie Tyler, Giles Semper, Peter Guest and Ben Fieldhouse

Monheim, Heiner. 2003. *Better Mobility with Fewer Cars: a New Transport Policy for Europe*. Department of Geography, University of Reading. http://wwwcgi.rdg.ac.uk:8081/web/FILES/geog/GP165.pdf.

Montgomery, John. 2004. "Cultural Quarters as Mechanisms for Urban Regeneration. Part 2: a Review of Four Cultural Quarters in the UK, Ireland and Australia." *Planning Practice and Research* 19 (1): 3–31. doi:10.1080/0269745042000246559.

Newby, Les, Sean Spencer-Wort, and Peter Wiggins. 1992. "Paved with Gold?: A Study of the Economic Impact of Pedestrianisation and Its Relevance to Leicester". Environ.

North, D. J., D. Smallbone, F. Lyon, and G. Potts. 2003. "Business-led Regeneration of Deprived Areas: a Review of the Evidence base.[Research Report 5]."

NWDA/RENEW Northwest. 2007. "Economic Value of Urban Design Final Report." www.placesmatter.co.uk/webfm_send/23

———. 2009. "Places Matter: The Economic Value of Good Design."

Parkhurst, Graham. 2003. "Regulating Cars and Buses in Cities: The Case of Pedestrianisation in Oxford." *Economic Affairs* 23 (2): 16–21. doi:10.1111/1468-0270.00410.

Pivo, Gary, and Jeffrey D. Fisher. 2011. "The Walkability Premium in Commercial Real Estate Investments." *Real Estate Economics* 39 (2): 185–219.

Portas, M. 2011. "The Portas Review: An Independent Review into the Future of Our High Streets." *Department for Business, Innovation and Skills, London* www.bis.gov.uk/assets/biscore/business-sectors/docs/p/11-1434-portas-review-future-of-high-streets

Potts, D. 2008. "Assessing the Impact of Regeneration Spending: Lessons from the UK and the Wider World." In *Regeneration and Wellbeing Conference, April, Bradford Centre for International Development, University of Bradford: Bradford*.

Retail Times. 2013. "Non-food Footfall Records Further Decline in February, Retail Traffic Index Shows." http://retailtimes.co.uk/non-food-footfall-records-further-decline-in-february-retail-traffic-index-shows/

Robertson, Douglas, Ian McIntosh, and James Smyth. 2010. "Neighbourhood Identity: The Path Dependency of Class and Place." *Housing, Theory and Society* 27 (3): 258–273. doi:10.1080/14036090903326429.

Roger Tym and Partners (2012). "Central Bedfordshire Council Retail Study, draft final report". http://www.centralbedfordshire.gov.uk/Images/Central%20Beds%20Final%20Report%202012%20(2)_tcm6-39253.pdf

Rousseau, Max. 2009. "Re-imaging the City Centre for the Middle Classes: Regeneration, Gentrification and Symbolic Policies in 'Loser Cities'." *International Journal of Urban and Regional Research* 33 (3): 770–788. doi:10.1111/j.1468-2427.2009.00889.x.

The Scottish Government. 2013. "National Review of Town Centres Advisory Group Report: Community and Enterprise in Scotland's Town Centres". www.scotland.gov.uk/Topics/Built-Environment/regeneration/town-centres/review

Seex, Patricia. 2007. "Business Investment in Deprived Areas: Creating the Conditions." *Journal of Urban Regeneration and Renewal* 1 (2): 119–128.

Sheldon, R, C Heywood, P Buchanan, D Ubaka,, and C Harrell. 2007. "Valuing Urban Realm – Business Cases for Open Spaces". Paper Presented at the European Transport Conference.

Sinnett, Danielle, Katie Williams, Kiron Chatterjee, and Nick Cavill. 2011. "Making the Case for Investment in the Walking Environment: A Review of the Evidence." http://eprints.uwe.ac.uk/15502/1/Making_the_Case_Full_Report.pdf.

Stevens, Quentin. 2009. "'Broken' Public Spaces in Theory and in Practice." *Town Planning Review* 80 (4) (July 1): 371–392. doi:10.3828/tpr.2009.3.

Sustrans. 2006. "Shoppers and How They Travel." www.sustrans.org.uk/assets/files/liveable%20neighbourhoods/Shoppers%20info%20sheet%20-%20LN02.pdf.

Tolley, R. 2011. "Good for Busine$$: The Benefits of Making Streets More Walking and Cycling Friendly, Discussion Paper."

Transport for London. 2002. "The Benefits of Town Centre Pedestrian and Public Realm Schemes."

Transport for London. (2010). Draft: "Oxford Circus Diagonal Crossing Monitoring Report". Unpublished.

Turner, Shane, R. Singh, P. Quinn, and T. Allatt. 2011. *Benefits of New and Improved Pedestrian Facilities: Before and After Studies*. 436. http://trid.trb.org/view.aspx?id=1122909.

Turok, I. 1992. "Property-led Urban Regeneration: Panacea or Placebo?" *Environment and Planning A* 24 (3): 361–379.

Van Melik, Rianne, and Philip Lawton. 2011. "The Role of Public Space in Urban Renewal Strategies in Rotterdam and Dublin." *Planning Practice and Research* 26 (5): 513–530. doi:10.1080/02697459.2011.626681.

Whitehead, Tim. 2002. "Road User Charging and Business Performance: Identifying the Processes of Economic Change." *Transport Policy* 9 (3) (July): 221–240. doi:10.1016/S0967-070X(02)00021-5.

Whitehead, Tim, David Simmonds, and John Preston. 2006. "The Effect of Urban Quality Improvements on Economic Activity." *Journal of Environmental Management* 80 (1) (July): 1–12. doi:10.1016/j.jenvman.2005.01.029.

Willis, Kenneth G., Niel A. Powe, and Guy D. Garrod. 2005. "Estimating the Value of Improved Street Lighting: a Factor Analytical Discrete Choice Approach." *Urban Studies* 42 (12): 2289–2303.

Wooller, Leslie Ann. 2010. "What Are the Economic and Travel Implications of Pedestrianising a Roadway in Takapuna's Shopping Precinct". AUT University. http://aut.researchgateway.ac.nz/handle/10292/999.

Yiu, Chung Yim. 2011. "The Impact of a Pedestrianisation Scheme on Retail Rent-an Empirical Study in Hong Kong." *Journal of Place Management and Development* 4 (3): 1–1.

This report has been commissioned by Living Streets, the national charity working to create safe, attractive and enjoyable streets around the UK. This report, and a summary report produced by Living Streets, can be downloaded from www.livingstreets.org.uk/pedestrianpound.

Living Streets (The Pedestrians' Association) is a Registered Charity No. 1108448 (England and Wales) and SC039808 (Scotland), Company Limited by Guarantee (England and Wales), Company Registration No. 5368409.
Registered office 4th Floor, Universal House,
88–94 Wentworth Street, E1 7SA.

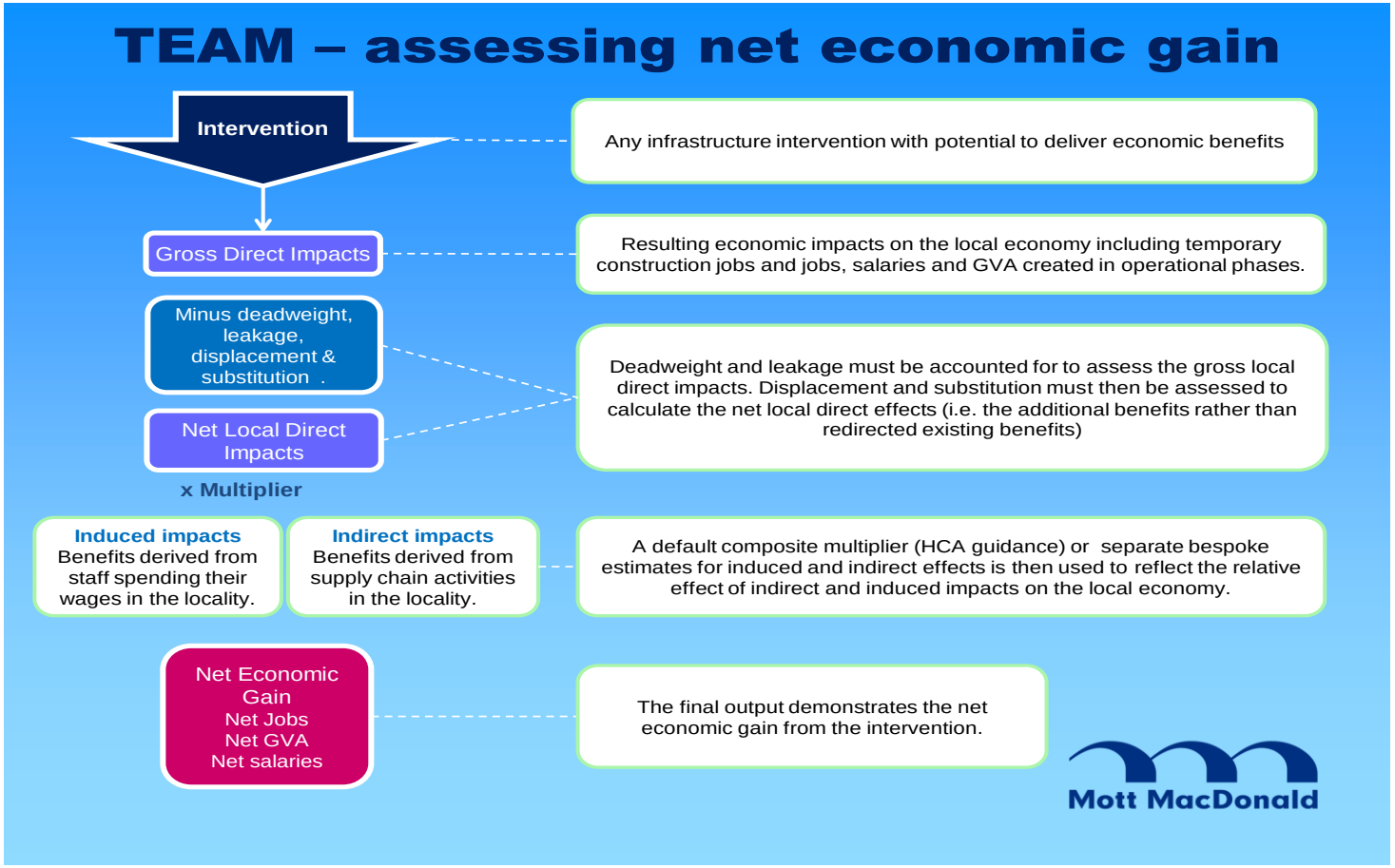
www.livingstreets.org.uk
info@livingstreets.org.uk

Living Streets is the national charity that stands up for pedestrians. With our supporters we work to create safe, attractive and enjoyable streets, where people want to walk.

About the Model

Back to menu

Mott MacDonald's Transparent Economic Assessment Model (TEAM) is a versatile economic impact modelling tool designed to calculate the economic benefits of proposed infrastructure intervention and policy measures. It has been designed by experts in economics, economic development and regeneration and is in-line with HM Treasury Green Book principles and Homes & Communities Agency's (HCA) additionality guidelines and uses the latest economic datasets from the Office of National Statistics (ONS). The tool measures the potential stimulus to economic activity from interventions by estimating the consequential employment, salary, gross value added (GVA) and investment benefits that would otherwise not have arisen. Net impact on jobs and GVA is then estimated.



Site(s) Proforma Details

1	2	3	4

KEY:	
X	Select from dropdown list
X	Enter value (if applicable)
	Instruction - please read

Back to menu

Site no. and name

1	2	3
City Gateway	0	0

Part A: Geography

1) Please select Local Authority area

Local Authority
NUTS 1 Region
NUTS 2 Region
NUTS 3 Region
Local Enterprise Partnership (England only)

Doncaster		
Yorkshire and the Humbe	0	0
South Yorkshire	0	0
Barnsley, Doncaster and	0	0
Sheffield City Region	0	0

Part B: Site (s) information

2) Please enter site specific details

	City Gateway		
Site name			
Total site size, ha			
Total site size, m²	0	0	0
Total construction value, £ million			

***Please enter by site one of the following:**
- the relevant development footprints if known by land use (3)
- the assumed land uses by % and no of storeys assumed if development footprint not known (4a & 4b)
- the gross number of jobs known for some sites enter this information in (5)
If mixture of the above please divide the site up.

3) If floorspaces are known please enter them below by land use for each site in m² (NIA, GIA or GEA).
(NB: This must follow the floorspace areas in Column C and should be converted if applicable)

Corporate	B1a	NIA	Office	B1aCorporate	4168
Professional Services	B1a	NIA	Office	B1aProfessional Services	
Public Sector	B1a	NIA	Office	B1aPublic Sector	
Tech	B1a	NIA	Office	B1aTech	
Finance & Insurance	B1a	NIA	Office	B1aFinance & Insurance	
Call Centres	B1a	NIA	Office	B1aCall Centres	
R&D Space	B1b	NIA	Office	B1bR&D Space	
Light Industrial	B1c	NIA	Office	B1cLight Industrial	
Industrial & Manufacturing	B2	GIA	Industrial	B2Industrial & Manufacturing	
National Distribution Centre	B8	GEA	Industrial	B8National Distribution Centre	
Regional Distribution Centre	B8	GEA	Industrial	B8Regional Distribution Centre	
Final Mile' Distribution Centre	B8	GEA	Industrial	B8Final Mile' Distribution Centre	
Incubator	Mixed B Class	NIA	Other	Mixed B ClassIncubator	
Maker Spaces	Mixed B Class	NIA	Other	Mixed B ClassMaker Spaces	
Studio	Mixed B Class	NIA	Other	Mixed B ClassStudio	
Co-Working	Mixed B Class	NIA	Other	Mixed B ClassCo-Working	
Managed Workspace	Mixed B Class	NIA	Other	Mixed B ClassManaged Workspace	

Wholesale	B8 / Sui Gene	GEA	Other	B8 / Sui Generis Data CentreWholesale			
Wholesale Dark Site	B8 / Sui Gene	GEA	Other	B8 / Sui Generis Data CentreWholesale Dark Site			
Co-location Facility	B8 / Sui Gene	GEA	Other	B8 / Sui Generis Data CentreCo-location Facility			
High Street	A1	NIA	Retail	A1High Street			
Foodstore	A1	NIA	Retail	A1Foodstore			
Retail Warehouse	A1	NIA	Retail	A1Retail Warehouse			
Finance & Professional Services	A2	NIA	Retail	A2Finance & Professional Services			
Restaurants & Cafes	A3	NIA	Retail	A3Restaurants & Cafes			
Limited Service/Budget	C1 Hotels	NIA	Other	C1 HotelsLimited Service/Budget			
Mid Scale	C1 Hotels	NIA	Other	C1 HotelsMid Scale			
Upscale	C1 Hotels	NIA	Other	C1 HotelsUpscale			
Luxury	C1 Hotels	NIA	Other	C1 HotelsLuxury			
Budget Fitness Centre	D2	GIA	Other	D2Budget Fitness Centre			
Mid Market Fitness Centre	D2	GIA	Other	D2Mid Market Fitness Centre			
Family Fitness Centre	D2	GIA	Other	D2Family Fitness Centre			
Cinema	D2	GIA	Other	D2Cinema			
Visitor & Cultural Attractions	D2	GIA	Other	D2Visitor & Cultural Attractions			
Amusement & Entertainment Centres	D2	GIA	Other	D2Amusement & Entertainment Centres			
Other	Not Categoris	NIA	Other	Not CategorisedOther			
TOTAL					4168	0	0

4a) If floorspaces are <u>unknown</u> please enter the proposed land uses on the site by %, to sum to 100%

Corporate	B1a	%	Office	B1aCorporate			
Professional Services	B1a	%	Office	B1aProfessional Services			
Public Sector	B1a	%	Office	B1aPublic Sector			
Tech	B1a	%	Office	B1aTech			
Finance & Insurance	B1a	%	Office	B1aFinance & Insurance			
Call Centres	B1a	%	Office	B1aCall Centres			
R&D Space	B1b	%	Office	B1bR&D Space			
Light Industrial	B1c	%	Office	B1cLight Industrial			
Industrial & Manufacturing	B2	%	Industrial	B2Industrial & Manufacturing			
National Distribution Centre	B8	%	Industrial	B8National Distribution Centre			
Regional Distribution Centre	B8	%	Industrial	B8Regional Distribution Centre			
Final Mile' Distribution Centre	B8	%	Industrial	B8Final Mile' Distribution Centre			
Incubator	Mixed B Class	%	Other	Mixed B ClassIncubator			
Maker Spaces	Mixed B Class	%	Other	Mixed B ClassMaker Spaces			
Studio	Mixed B Class	%	Other	Mixed B ClassStudio			
Co-Working	Mixed B Class	%	Other	Mixed B ClassCo-Working			
Managed Workspace	Mixed B Class	%	Other	Mixed B ClassManaged Workspace			
Wholesale	B8 / Sui Gene	%	Other	B8 / Sui Generis Data CentreWholesale			
Wholesale Dark Site	B8 / Sui Gene	%	Other	B8 / Sui Generis Data CentreWholesale Dark Site			
Co-location Facility	B8 / Sui Gene	%	Other	B8 / Sui Generis Data CentreCo-location Facility			
High Street	A1	%	Retail	A1High Street			
Foodstore	A1	%	Retail	A1Foodstore			
Retail Warehouse	A1	%	Retail	A1Retail Warehouse			
Finance & Professional Services	A2	%	Retail	A2Finance & Professional Services			
Restaurants & Cafes	A3	%	Retail	A3Restaurants & Cafes			
Limited Service/Budget	C1 Hotels	%	Other	C1 HotelsLimited Service/Budget			
Mid Scale	C1 Hotels	%	Other	C1 HotelsMid Scale			
Upscale	C1 Hotels	%	Other	C1 HotelsUpscale			
Luxury	C1 Hotels	%	Other	C1 HotelsLuxury			
Budget Fitness Centre	D2	%	Other	D2Budget Fitness Centre			
Mid Market Fitness Centre	D2	%	Other	D2Mid Market Fitness Centre			
Family Fitness Centre	D2	%	Other	D2Family Fitness Centre			
Cinema	D2	%	Other	D2Cinema			
Visitor & Cultural Attractions	D2	%	Other	D2Visitor & Cultural Attractions			
Amusement & Entertainment Centres	D2	%	Other	D2Amusement & Entertainment Centres			

Other	Not Categoris	%	Other	Not CategorisedOther			
TOTAL					0%	0%	0%
Check (should be zero if data entered)					1	1	1

4b) Proposed number of storeys if areas not known (insert a value =>1)

1	1	1

5) If a hotel development is proposed please enter the number of rooms (if known) here

Limited Service/Budget	C1						
Mid Scale	C1						
Upscale	C1						
Luxury	C1						

6) If gross level of jobs to be created on site is known please enter here by land use

Corporate	B1a	Office	B1aCorporate				
Professional Services	B1a	Office	B1aProfessional Services				
Public Sector	B1a	Office	B1aPublic Sector				
Tech	B1a	Office	B1aTech				
Finance & Insurance	B1a	Office	B1aFinance & Insurance				
Call Centres	B1a	Office	B1aCall Centres				
R&D Space	B1b	Office	B1bR&D Space				
Light Industrial	B1c	Office	B1cLight Industrial				
Industrial & Manufacturing	B2	Industrial	B2Industrial & Manufacturing				
National Distribution Centre	B8	Industrial	B8National Distribution Centre				
Regional Distribution Centre	B8	Industrial	B8Regional Distribution Centre				
Final Mile' Distribution Centre	B8	Industrial	B8Final Mile' Distribution Centre				
Incubator	Mixed B Class	Other	Mixed B ClassIncubator				
Maker Spaces	Mixed B Class	Other	Mixed B ClassMaker Spaces				
Studio	Mixed B Class	Other	Mixed B ClassStudio				
Co-Working	Mixed B Class	Other	Mixed B ClassCo-Working				
Managed Workspace	Mixed B Class	Other	Mixed B ClassManaged Workspace				
Wholesale	B8 / Sui Generis Da	Other	B8 / Sui Generis Data CentreWholesale				
Wholesale Dark Site	B8 / Sui Generis Da	Other	B8 / Sui Generis Data CentreWholesale Dark Site				
Co-location Facility	B8 / Sui Generis Da	Other	B8 / Sui Generis Data CentreCo-location Facility				
High Street	A1	Retail	A1High Street				
Foodstore	A1	Retail	A1Foodstore				
Retail Warehouse	A1	Retail	A1Retail Warehouse				
Finance & Professional Services	A2	Retail	A2Finance & Professional Services				
Restaurants & Cafes	A3	Retail	A3Restaurants & Cafes				
Limited Service/Budget	C1 Hotels	Other	C1 HotelsLimited Service/Budget				
Mid Scale	C1 Hotels	Other	C1 HotelsMid Scale				
Upscale	C1 Hotels	Other	C1 HotelsUpscale				
Luxury	C1 Hotels	Other	C1 HotelsLuxury				
Budget Fitness Centre	D2	Other	D2Budget Fitness Centre				
Mid Market Fitness Centre	D2	Other	D2Mid Market Fitness Centre				
Family Fitness Centre	D2	Other	D2Family Fitness Centre				
Cinema	D2	Other	D2Cinema				
Visitor & Cultural Attractions	D2	Other	D2Visitor & Cultural Attractions				
Amusement & Entertainment Centres	D2	Other	D2Amusement & Entertainment Centres				
Other	Not Categorised	Other	Not CategorisedOther				
TOTAL					0	0	0

Part C: Site Specific Information (Reference if needed)

The reference case is only required if the assumptions relating to leakage, displacement and substitution are different to the intervention case. If they are not do not fill in this section and use the deadweight assumption instead to account for existing jobs on site.

1) Please enter the gross level of jobs by individual site

Gross no. of jobs			

Summary tables

Back to menu

Economic impacts (Operation)

Jobs (B9), GVA (X11)

	Jobs	Site Number and name								
		1	2	3	4	5	6	7	8	9
	All	City Gateway	0	0	0	0	0	0	0	0
Gross direct jobs	379	379	0	0	0	0	0	0	0	0
Less deadweight, leakage, displacement and substitution	189	189	0	0	0	0	0	0	0	0
Net direct jobs	189	189	0	0	0	0	0	0	0	0
Multiplier jobs	19	19	0	0	0	0	0	0	0	0
Total net jobs	208	208	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

	Jobs				GVA, £m			
	Gross direct	Net direct	Multiplier	Total net	Gross	Net direct	Multiplier	Total net
City Gateway	379	189	19	208	£9.3	£9.3	£0.9	£10.2
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
0	0	0	0	0	£0.0	£0.0	£0.0	£0.0
TOTAL	**379**	**189**	**19**	**208**	**£9.3**	**£9.3**	**£0.9**	**£10.2**

HM Treasury

THE GREEN BOOK

CENTRAL GOVERNMENT GUIDANCE ON APPRAISAL AND EVALUATION

2020

213

This publication is available at www.gov.uk/official-documents

Any enquiries regarding this publication should be sent to us at public.enquiries@hmtreasury.gsi.gov.uk

ISBN 978-1-5286-2229-5
PU3051

HM Treasury

THE GREEN BOOK

CENTRAL GOVERNMENT GUIDANCE ON APPRAISAL AND EVALUATION

2020

Contents

List of Figures

List of Tables

List of Boxes

1 Introduction

1.1 The Green Book is guidance issued by HM Treasury on how to appraise policies, programmes and projects. It also provides guidance on the design and use of monitoring and evaluation before, during and after implementation. Appraisal of alternative policy options is an inseparable part of detailed policy development and design. This guidance concerns the provision of objective advice by public servants to decision makers, which in central government means advice to ministers. In arms-length public organisations the decision makers may be appointed board members, and where local authorities are using the method,[1] elected council members. The guidance is for all public servants concerned with proposals for the use of public resources, not just for analysts. The key specialisms involved in public policy creation and delivery, from policy at a strategic level to analysis, commercial strategy, procurement, finance, and implementation must work together from the outset to deliver best public value. The Treasury's five case model is the means of developing proposals in a holistic way that optimises the social / public value produced by the use of public resources. Similarly, there is a requirement for all organisations across government to work together, to ensure delivery of joined up public services.

1.2 The Green Book is not a mechanical or deterministic decision-making device. It provides approved thinking models and methods to support the provision of advice to clarify the social – or public – welfare costs, benefits, and trade-offs of alternative implementation options for the delivery of policy objectives.

1.3 Use of the Green Book should be informed by an understanding of other HM Treasury guidance:

- Managing Public Money – Which provides guidance on the responsible use of public resources
- Business Case Guidance for Strategic Portfolios – Which provides guidance on the development of strategic portfolios for the realisation and management of policies through programmes and projects
- The Business Case Guidance for Programmes – Which provides detailed guidance on the development and approval of capital spending programmes
- The Business Case Guidance for Projects – Which provides detailed guidance on the development and approval of capital spending projects
- the Aqua Book – Which sets out standards for analytical modelling and assurance
- the Magenta Book – Which provides detailed guidance on evaluation methods
- Supplementary subject guidance explains how the Green Book may be applied when dealing with particular topics, for example greenhouse gas emissions. This should be used where required. A list of topic specific supplementary guidance is given on page 127.

[1] Local authorities are asked to use the method when preparing proposals based on an allocation of central government funding, but many also find it useful when considering other capital allocation.

- Supplementary departmental guidance is produced by Departments and arms-length public organisations. It deals with the application of the Green Book in the particular context that is the organisation's area of responsibility. This supplementary guidance must be consistent with the Green Book, the Business Case guidance and supplementary guidance on specific topics. When the Green Book is updated supplementary guidance must be realigned as required to ensure consistency across government and the wider public sector.

1.4 Green Book guidance applies to all proposals that concern public spending, taxation, changes to regulations, and changes to the use of existing public assets and resources – see Box 1 below.

Box 1. Scope of Green Book Guidance

Green Book guidance covers:

- policy and programme development
- all proposals concerning public spending
- legislative or regulatory proposals
- sale or use of existing government assets – including financial assets
- appraisal of a portfolio of programmes and projects
- structural changes in government organisations
- taxation and benefit proposals
- significant public procurement proposals
- major projects
- changes to the use of existing public assets and resources

1.5 The role of appraisal and evaluation is to provide objective analysis to support decision making. Where the use of significant new and existing public resources is required the proportionate employment of the Green book and its supplementary business case guidance is mandatory. The decision support process includes the scrutiny of business cases by approving bodies in government departments and other public organisations, Treasury Approval Processes and the Regulatory Impact Assessment process. The Five Case Model and the methods and principles of the Green Book should also support options appraisal when formal business cases and regulatory decisions are not required. The relationship between Green Book guidance and government decision making processes is shown in Figure 1.

1.6 This guidance should be applied proportionately. The resources and effort employed should be related to costs, benefits and risks involved to society and to the public sector as a result of the proposals under consideration.

1.7 Monitoring and evaluation of all proposals should be proportionately included in the budget and the management plan of all significant proposals as an integral part of all proposed interventions.

Figure 1. The Green Book and Appraisal in Context

1.8 This guidance has been designed to be accessible to a variety of users – from policy officials to analysts. Accordingly, it follows a tiered structure where:

- a high-level overview is provided in chapters 1 – 3
- detailed information for practitioners is provided in chapters 4 – 8
- technical information and shared valuations for use in appraisal are provided in annexes 1 – 6
- hyperlinks have been inserted to allow users to cross-reference within the Green Book and associated supplementary guidance

1.9 The Green Book's chapters are as follows:

- chapter 2 provides a non-technical introduction to appraisal and evaluation
- chapter 3 provides an overview of how appraisal fits within government decision making processes
- chapter 4 explains how to generate options and undertake longlist appraisal
- chapter 5 explains how to undertake detailed appraisal of a shortlist of options using social cost benefit and social cost effectiveness approaches, and distributional and sensitivity analysis and accounting for unquantifiable factors it provides the Green Book definition of public/social value for money
- chapter 6 sets out the approach to valuation of costs and benefits
- chapter 7 sets out how to present appraisal results
- chapter 8 sets out the approach to monitoring and evaluation
- annexes 1 – 7 provide further technical appraisal information and values for use in appraisal across government

Scope and relationship with other appraisal guidance

1.10 The content and boundary of all Green Book guidance is determined by HM Treasury. The content is peer reviewed by the Government Chief Economists Appraisal Group. It applies to all government departments, arm's length public bodies with responsibility derived from central government for public funds and regulatory authorities.

1.11 Departments also produce internal guidance, setting out how Green Book appraisal should be carried out for their areas of responsibility. For consistency, departmental guidance should align with the Green Book. Where departmental guidance affects other government departments, or contains significant developments in methods and approach, relevant sections should be agreed with HM Treasury and the Government Chief Economists Appraisal Group.

1.12 Throughout the guidance there are links to external supplementary guidance. These provide further detail on subjects that are relevant across government e.g. the valuation of greenhouse gas emissions. To provide background and support understanding, non-governmental research and discussion papers are referenced in the Green Book. These documents do not form part of the guidance.

2 Introduction to Appraisal and Evaluation

2.1 This chapter provides a non-technical introduction to appraisal and evaluation.

Principles of appraisal

2.2 Appraisal is the process of assessing the costs, benefits and risks of alternative ways to meet government objectives. It helps decision makers to understand the potential effects, trade-offs and overall impact of options by providing an objective evidence base for decision making.

2.3 Appraisal The appraisal of social value, also known as public value, is based on the principles and ideas of welfare economics and concerns overall social welfare efficiency, not simply economic market efficiency. Social or public value therefore includes all significant costs and benefits that affect the welfare and wellbeing of the population, not just market effects. For example, environmental, cultural, health, social care, justice and security effects are included. This welfare and wellbeing consideration applies to the entire population that is served by the government, not simply taxpayers. A summary outline of the key steps in appraisal is shown below in Box 2.

2.4 The first step in appraisal is to provide the rationale for intervention, a process covered more fully in chapters 2 to 4 and in the business case guidance. Appraisal is a two-stage process, the first stage of which is the consideration of a longlist of option choices and the selection of a rational and viable set of options for shortlist analysis. The options framework and filter process used for longlist analysis and shortlist selection is explained in Chapter 4. The second stage in appraisal is shortlist analysis using social cost benefit analysis (CBA) or social cost effectiveness analysis is explained in Chapter 5.

2.5 In government as in many large private sector organisations, major changes involve a sequence of decisions at several levels. Typically, organisations will have their high level purpose expressed in some form of mission statement and may even talk about their intentions in terms of a vision. To make these rather high level statements into implementable programmes and projects, there needs to be another level of more specific strategic policy objectives. Realisation of these strategic objectives requires the organisation and planning of programmes and projects which are best managed in related strategic portfolios. Policies provide direction and high level objectives, these enduring parameters drive and direct the required changes the organisation is working to bring about. The definitions of key terms used in this guidance are given in Box 3.

2.6 At each level of decision making, objectives are set so that the proposal being considered meets the needs placed upon it by a preceding, higher level proposal. For example, a programme to deliver signalling for a new railway line will be part of a wider programme to construct the fixed infrastructure the line requires. The signalling system will need to meet the requirements of both the rail infrastructure plan, and the operational needs of the new line, so that it enables safe running of planned train speeds and frequency. Individual projects within the signalling programme will each deliver a component of the overall system, and need to be understood in that context.

Box 2. Summary Outline of Key Appraisal Steps

- **Preparing the Strategic case** which includes the Strategic Assessment and Making the Case for Change,[2] quantifies the present situation and Business as Usual (the BAU) and identifies the SMART objectives. This **Rationale** is the vital first step in defining what is to be appraised. Delivery of the SMART objectives must drive the rest of the process across all dimensions of the Five Case Model as explained throughout this guidance.
- **Longlist analysis using the options framework filter** considers how best to achieve the SMART objectives. Alternative options are viewed through the lens of public service provision to avoid bias towards preconceived solutions that have not been rigorously tested. A wide range of possibilities are considered, and a viable shortlist is selected including a preferred way forward. These are carried forward for further detailed appraisal. This process is where all complex issues are taken into account and is the key to development of optimum Value for Money proposals likely to deliver reasonably close to expectations.
- **Shortlist appraisal** follows and is at the heart of detailed appraisal, where expected costs and benefits are estimated, and trade-offs are considered. This analysis is intimately interconnected to the, Strategic, Commercial, Financial, and Management dimensions of the five case model, none of which can be developed or appraised in isolation. The use of Social Cost Benefit Analysis (CBA) or Social Cost Effectiveness Analysis (CEA) are the means by which cost, and benefit trade-offs, are considered.
- **Identification of the preferred option** is based on the detailed analysis at the shortlist appraisal stage. It involves determining which option provides the best balance of costs, benefits, risks and unmonetisable factors thus optimising value for money.
- **Monitoring** is the collection of data, both during and after implementation to improve current and future decision making.
- **Evaluation** is the systematic assessment of an intervention's design, implementation and outcomes. Both monitoring and evaluation should be considered before, during and after implementation.

Box 3. The meanings of widely used words as they are used in the Green Book

A Policy is a statement of intent that is implemented through a procedure or a protocol and a deliberate system of principles to guide decisions and achieve rational outcomes. Policy provides the enduring parameters to police change. As well as setting strategic policy objectives it consists of all the elements below.

Strategy is a plan of action designed to achieve an overall aim or objective. Derived originally from the art of planning and directing overall military operations and movements in a war or battle.

A Strategic Portfolio consists of the programmes and projects necessary to make the changes required to deliver a strategic objective or objectives that contribute to delivery of policy.

A Programme is an interrelated series of Sub-Programmes, Projects and related activities in pursuit of an organisation's longer-term objectives. Programmes deliver outcomes through changes in services

A Project is a temporary organisation designed to produce a specific predefined output at a specified time using predetermined resources.

[2] As explained in more detail in the Business Case guidance referenced in paragraph 1.3 above and referenced in Chapter 4.

2.7 In a similar way, the government's priorities are expressed in high level strategic objectives. To make them implementable these then drive the creation of strategic portfolios. These portfolios consist of the programmes and projects that are required to realise a strategic policy objective. Programmes identify and manage the interrelated projects and sub-programmes needed. In this example improved transportation services are a means to change economic and social outcomes. The required projects deliver changes in outputs, which when taken together support delivery of a change in rail service provision.

2.8 The changes in services in the above example are expected to result in changes in economic and social outcomes. At each level of decision making the application of appraisal takes account of the wider context of which the proposal is a part. Appraisal should be proportionate to the costs and risks involved to both the public sector and to the public i.e. to society. The levels at which decisions occur are explained in more detail in Chapter 3.

Rationale

2.9 It is necessary to set out clearly the purpose of the intervention. This is known as the rationale, and in central government overall policy objectives are determined by ministers or other decision makers. Officials should identify and design alternative options to achieve these stated objectives. Advice must be based on objective analysis and real options.

2.10 The rationale should explain how intended changes in outcomes will be produced by the recommended delivery options. The objective of the proposal may be to:

- ☐ maintain service continuity arising from the need to replace some factor in the existing delivery process or
- ☐ to improve the efficiency of service provision
- ☐ to increase the quantity or improve the quality of a service
- ☐ to provide a new service
- ☐ to comply with regulatory changes
- ☐ often a mix of all of all of these.

It is however vitally necessary to be clear that the rationale may also be to improve the welfare efficiency of existing private sector markets, for example by making polluting organisations maintain standards and meet the cost of remediation to retain standards. It may also concern achievement of ethical distributional objectives for example fair access to health or education. It might involve providing social/public goods that are not provided at a satisfactory level by the market alone, for example justice services or social services.

Generating Options and longlist appraisal

2.11 Proposals should initially be considered from the perspective of the service needed to deliver the required policy outcome and not from the perspective of a preconceived solution or asset creation. This guards against thinking too narrowly or being trapped by preconceptions into missing optimum solutions.

2.12 Longlist analysis and selection of the shortlist must use the options framework and filter[3] in a workshop that including key experts and stakeholders as explained in more detail in Chapter 4. This method brings together the results of research, advice of experts, and knowledge of stakeholders. Provided the preparatory research has been carried out, and the right experts and stakeholders involved in the workshop, a wide variety of service scope, solution methods, service delivery methods, service implementation designs, and service funding options can be relatively rapidly appraised. Unintended collateral effects should also be considered including distributional effects that may unfairly impact particular parts of the UK, or groups within UK society. The reasons for inclusion or exclusion of option choices in the shortlist must be transparently recorded and cross referenced as a key part of longlist appraisal.

2.13 Where relevant place based effects, and the duties placed on public officials by the Equality Act 2010 and effects on families' when applying the family test 2010 and significant income distribution effects must be included proportionately in appraisal as set out in this guidance. Where they are not relevant a short explanation of why must be provided.

Shortlist appraisal

2.14 Shortlist appraisal is where the expected costs and benefits of an intervention are estimated, including the cost of risks and risk management, it is where the trade-off between them is considered. Where there is a clear difference in the social costs and benefits between alternative shortlisted options Social Cost Benefit Analysis (CBA) is used. Where there is no measurable social difference between options then Social Cost-Effectiveness Analysis (CEA) is appropriate. Both of these are explained in more detail in Chapter 5.

2.15 Costs and benefits are viewed from the perspective of UK society, not just to the public sector or originating institution. That is not to say for example that a proposal to improve provision of acute care by extending an NHS building would search for UK wide effects, but simply to say that it would be considered from the perspective of the local health economy, and not confine itself to effects on the organisation making the proposal. This common sense approach to costs and benefits is not confined to thinking about branches of public services in isolation. Services provided to the public by central and local government are experienced by the public as a flow of services and there is an understandable and undeniable expectation that the various arms of government are joined up and will deliver optimum joined up public services. This understanding must inform the design of proposals in general and the choice of costs and benefits used in appraisal.

2.16 Assessing costs and benefits across all affected groups or places matters because even a proposal with a relatively low public sector cost such as a new regulation, may have significant effects on specific groups in society, places or businesses. Costs or benefits of options should be valued and monetised where possible in order to provide a common metric.

2.17 Where there is no reasonable market price a range of valuation techniques are recommended. These include societal costs and benefits such as environmental values, and they are explained further in Chapters 5 and 6 with more technical guidance in the Annexes. In some cases where there is more detailed supplementary guidance which is referred to in the text it is cross referenced with internet links. Where credible values cannot be readily calculated but it is clear they relate to a significant issue. They should then be factored in early on in preparation of a proposal, and accounted for during option design, at the longlisting stage during shortlist selection. Further guidance on dealing with unquantified and unmonetisable values is given in Chapters 4, 5 and 6 and Annex A1, and in a range of supplementary guidance referenced on page [127] and on the Green Book web pages for example the Enabling Natural Capital Approach (ENCA) guidance.

[3] The options framework and filter is outlined in Chapter 4 and explained in greater detail in the Green Book supplementary guidance on Business Cases for projects programmes and Strategic Portfolios available on the main Green Book web page.

2.18 Costs and benefits should be calculated over the lifetime of the proposal. Proposals involving infrastructure such as roads, railways and new buildings are appraised over a 60 year period. Refurbishment of existing buildings is considered over 30 years. For proposals involving administrative changes a ten year period is used as a standard measure. For interventions likely to have significant costs or benefits beyond 60 years, such as vaccination programmes, or nuclear waste storage, a suitable appraisal period should be discussed with and formally agreed by the Treasury at the start of work on the proposal. Where a commercial contract is involved, and it covers a short period such as five years for an IT system for example, it is necessary to understand and plan for service delivery over the longer period applicable for the kind of proposal being considered. It is the life of the public service described above that determines the length of the appraisal period. The costs of maintain the service and of transferring to another system will need to be included and it will need to be planned for. Appraisal of the proposal must include provision of the service when the contract needs to be replaced.

Distributional analysis

2.19 Distributional analysis is important where there may be significant redistributive effects between different groups within the UK, resulting from a proposal. The level of detail and complexity devoted to this analysis should be proportionate to the likely impact on those affected. Redistribution may concern any of the groups identified by the Equality Act 2010, and should be considered when applying the Families test introduced in 2014 or where different income groups or types of businesses or geographically defined places in the UK may be affected. See also in Annex 2 and paragraphs 4.15 to 4.19 in Chapter 4.

2.20 Where a form of distributional appraisal is necessary one of three possible levels of complexity may be regarded as proportionate:

- Where the level of impact on a defined group or area is very marginal it may be judged that it is sufficient to note the effect and bring it to the attention of the sponsoring Senior Responsible Owner (SRO) and the approving authority to allow judgment on possible action.
- Where the likely effect is more substantial, then a straight forward and as far as possible, quantified and monetised analysis is required to appraise the effects, and to support judgments by decision makers in considering whether adaptation of the proposal or mitigation of its effects is possible, and to provide relevant options for the decision makers to consider.
- If there is likely to be a very significant redistribution of income or related social welfare either as an objective or as a collateral consequence of a proposal, then it may be appropriate to employ an equivalised income approach as set out in Annex-3. Where such weighting is employed it must be understood that the results are sensitive to the choice of weights. The reasons for the choices made must be transparently explained. Additional sensitivity tests are required to reveal the difference made by the weighting process and in particular to reveal the impact of varying the weights to reflect the uncertainty they introduce by using the upper and lower limits of the values they can reasonably be expected to take.

Optimism bias, risk and sensitivity analysis

2.21 When conducting appraisal consideration should also be given to:

- **optimism bias** – this is the proven tendency for appraisers to be optimistically biased about key project parameters, including capital costs and operating costs, project duration, and resulting benefits delivery. Optimistic rather than realistic projections result

in undeliverable targets and if permitted across the board create institutional failure as all proposals fall consistently far short of promised results. For this reason, specific optimism bias adjustments must be applied at the start of the process as numbers are initially identified. As proposal specific risks are identified they must be entered into the risk register explained in Chapter 5. As ways of avoiding, sharing or mitigating risks are identified and included in a proposal optimism bias can be proportionately reduced. Initial optimism bias levels recommended by the Green Book must be employed unless the organisation concerned has their own robust alternative estimates based on sufficient reliable data from similar projects. Managing, avoiding, sharing and mitigating risk is the key to successful delivery of well designed proposals, points to note are:

- **risks** – that are specifically related to a proposal may arise in the design, creation/building, implementation or operation of a proposal. Risk costs are either the cost of avoiding, sharing or otherwise mitigating risks, or the cost of risk materialising. An estimate of a materialised risk cost should be made using an expected likelihood approach explained in paragraph 5.51 and as set out more generally in Chapter 5 paragraphs 5.47 to 5.52. The objective is to manage risk in a socially cost effective way, not simply to build numbers into a spreadsheet. Risks should be fully understood, and realistic measures built into proposals for their management, this includes low probability but high impact events.
- **sensitivity analysis** – is performed to explore the sensitivity of expected outcomes to potential variations in key input variables.
- **switching values** can be estimated as part of sensitivity analysis where appropriate. These are the values an input would need to change to in order to make an option no longer viable.

Discounting

2.22 All values in the economic dimension are expressed in real prices relating to the first year of the proposal. This means that the average inflation rate is removed. Discounting is based on the concept of time preference, which is that generally people prefer value now rather than later. This has nothing to do with inflation, because it is true even at constant prices. Discounting converts costs and benefits into ***present values*** by allowing for society's preference for now compared with the future. It is used to allow comparison of future values in terms of their value in the present which is always assumed to be the base year of the proposal. For example if Projects A and B have identical costs and benefits but Project B delivers a year earlier, time preference gives Project B, a higher present value because it is discounted by a year less than project A.

2.23 In government appraisal costs and benefits are discounted using the social time preference rate as explained in Chapter 5 and paragraphs 5.32 to 5.39 as well as Annex 5. The reason for social discounting is to allow proposals of different lengths and with different profiles of net costs and benefits over time to be compared on a common basis. For reasons explained in Chapter 5 it does not need to be concerned with the cost of capital which is dealt with elsewhere by other means.

Selecting the preferred option and public value for money

2.24 The primary reason for implementing all proposals is not a Benefit to Cost Ratio (BCR), but it is to meet the "business need" identified early in developing the rationale for the proposal, this takes place at the start of developing the strategic dimension of the business case. **All shortlisted options must be viable and meet the requirement of delivering the SMART objectives. They will differ in timing, risk, cost and benefit delivery at or above the "Do Minimum" option**.

2.25 Comparison of each shortlist option with Business As Usual, reveals the quantified differences of alternative options. The value of all benefits, less all costs, in each year when discounted can be added together because they are in present value (discounted) terms, and then represent net cost benefit (benefits minus costs). This sum is the Net Present Social/Public Value (NPSV) of a proposal. The NPSV and Benefit Cost Ratio (NPSV divided by relevant public sector implementation costs) produces an initial ranking of options.

2.26 Where there is a significant feature the benefits of which are not readily or credibly monetisable, then value for money can be revealed by preparing two alternative versions of the preferred option. One without the unmonetisable benefit and another including it and its additional costs. A comparison of each of the options with BAU enables decision makers to see the additional cost of the unmonetisable benefit and to consider if it is an acceptable price worth paying.

2.27 Significant unquantifiable risk and uncertainties are also to be considered at this stage. The choice of the preferred option on grounds of public or social value for money is wider than just the initial BCR.[4] Optimum value for money is a considered choice starting from the initial option ranking, that also considers important unquantifiable benefits and significant unquantifiable uncertainties and known risks.

2.28 Projects do not determine the need for a programme of which they are a part, nor do programmes do so for strategy, or strategic portfolios for policy. The justification of enabling proposals is the wider policy or programme or portfolio of which they are a part. Where social costs and benefits are not sensibly calculable or where they are clearly the same for all options it is sensible to optimise on a cost efficiency basis. For example, a signalling system for railway, must deliver according to a specification provided by the overall programme of which it is a part. There is no need to imagine the signals alone have some social value in isolation from the programme that justifies their existence. Nor is it credible or useful to apportion the overall programme benefits to the signalling component.

Monitoring and Evaluation

2.29 Monitoring is the collection of data, both during and after implementation. This data can be fed back during implementation as part of managing, and it can be used during operation of a service in the same way, as well as for informing evaluation. It is important to understand and quantify Business As Usual (BAU) so that the setting of SMART objectives is realistic, proposals are founded on sufficient understanding, and performance can be monitored and evaluated.

2.30 Evaluation is the systematic assessment of an intervention's design, implementation and outcomes. It tests:

- ☐ if or how far an intervention is working or has worked as expected
- ☐ if the costs and benefits were as anticipated
- ☐ whether there were significant unexpected consequences
- ☐ how it was implemented and if changes were made why

2.31 All proposals must as part of the proposal contain proportionate budgetary, and management provisions for their own monitoring and evaluation. This applies to monitoring and evaluation both during and after implementation. Monitoring and evaluation are an important way of identifying lessons that can be learnt to improve both the design and delivery of future interventions.

[4] Where cost effectiveness is employed, the unit costs of options, is used in the same way as a BCR in initial option ranking and uses the same approach as for a BCR when considering unquantifiable benefits risks and uncertainties at both the long and the shortlist appraisal stages.

3 The Overarching Policy Framework

3.1 This chapter provides an overview of how appraisal fits within government decision making processes including the Policy Cycle, the Five Case Model and Impact Assessments.

Policy and Strategic Planning an Overview

3.2 It is vital to understand both the context within which policy objectives are being delivered and the process of change that will result from the proposed intervention and cause the desired policy objectives. This process of causation is referred to in the Green Book as the logical process of change or simply process of change. The supplementary guidance on Business Cases covers in more detail the steps needed to develop, understand and explain, the objective basis of this expectation and provide reasonable evidence. It is the foundation of the rationale for intervention in the way that is proposed.

3.3 Key issues that influence the wider debate which gives rise to policy development have been summarised in the mnemonic known as PESTLE which stands for Political, Economic, Social, Technological, Environmental and Legal issues. The translation of these issues through policy into outcomes is represented in Figure 2 below.

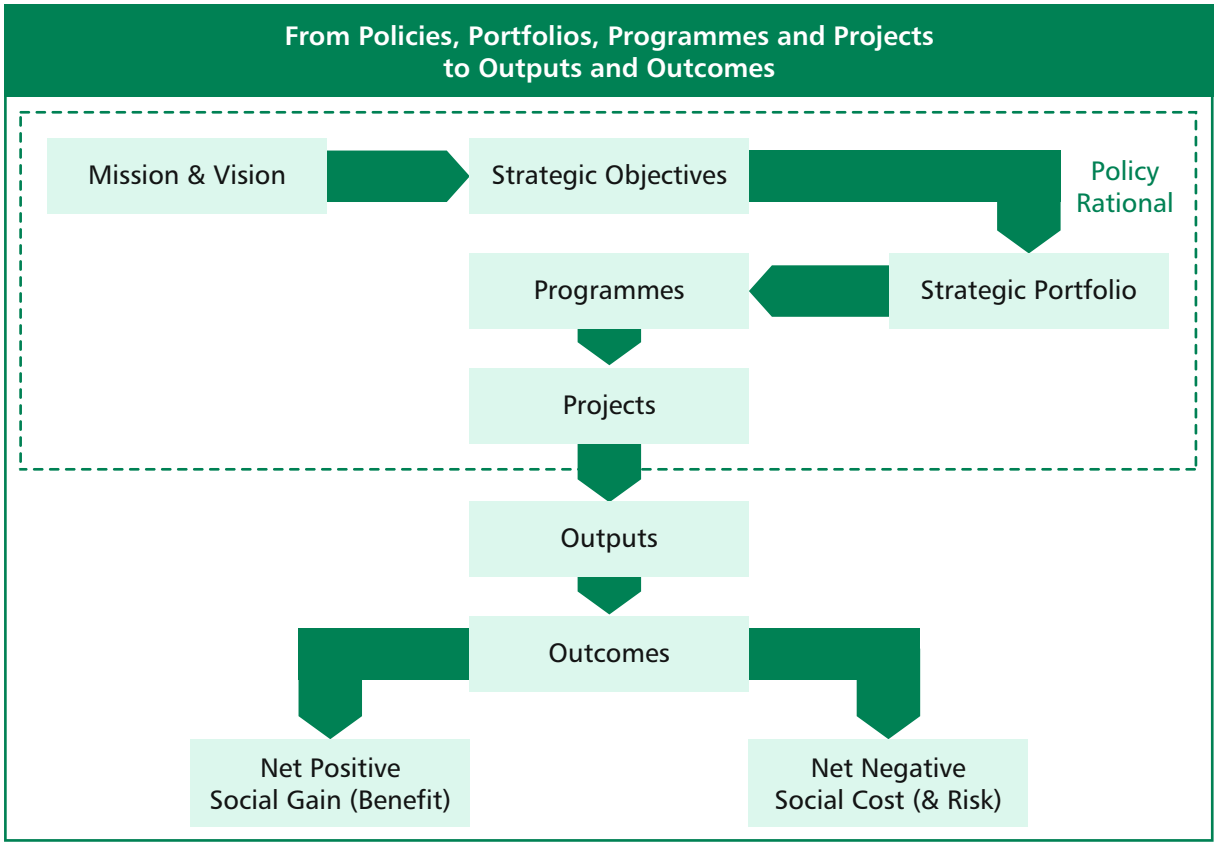
Figure 2. Policy and the wider context
Political, Economic, Social, Technological, Environmental, Legal (PESTLE)

3.4 Policy development must start with development of the rationale and be based on a sound understanding of the current position. This needs to be understood in objectively quantifiable terms so that the scope and key features of the issues are understood appropriately. Parts of government may from time to time adopt policy priorities and develop policy tests for use in

support of these very specific objectives. Where they exist they need to be taken into account when considering policy formation. Such tests are considered at the preliminary research stage and as part of policy design, when considering objectives, and at the longlist stage discussed in more detail in Chapter 4.

3.5 As indicated in Chapter 2, the development of policy into implementable solutions to deliver objectives, necessarily involves decisions at a number of levels of scale and delegation. Typically, progressing from high level statements of "mission" or purpose through more specific high level strategic policy objectives. Programmes are created to deliver these objectives, these Programmes contain Projects and related activities, that, taken together, are necessary to bring about the changes required to deliver the objectives. These programmes are best developed and managed through strategic portfolios which involve a common policy theme as illustrated in Figure 3. More detailed guidance on developing strategic portfolios, programmes and projects is available on the main Green Book webpage.

Figure 3. From Policy to Outcomes

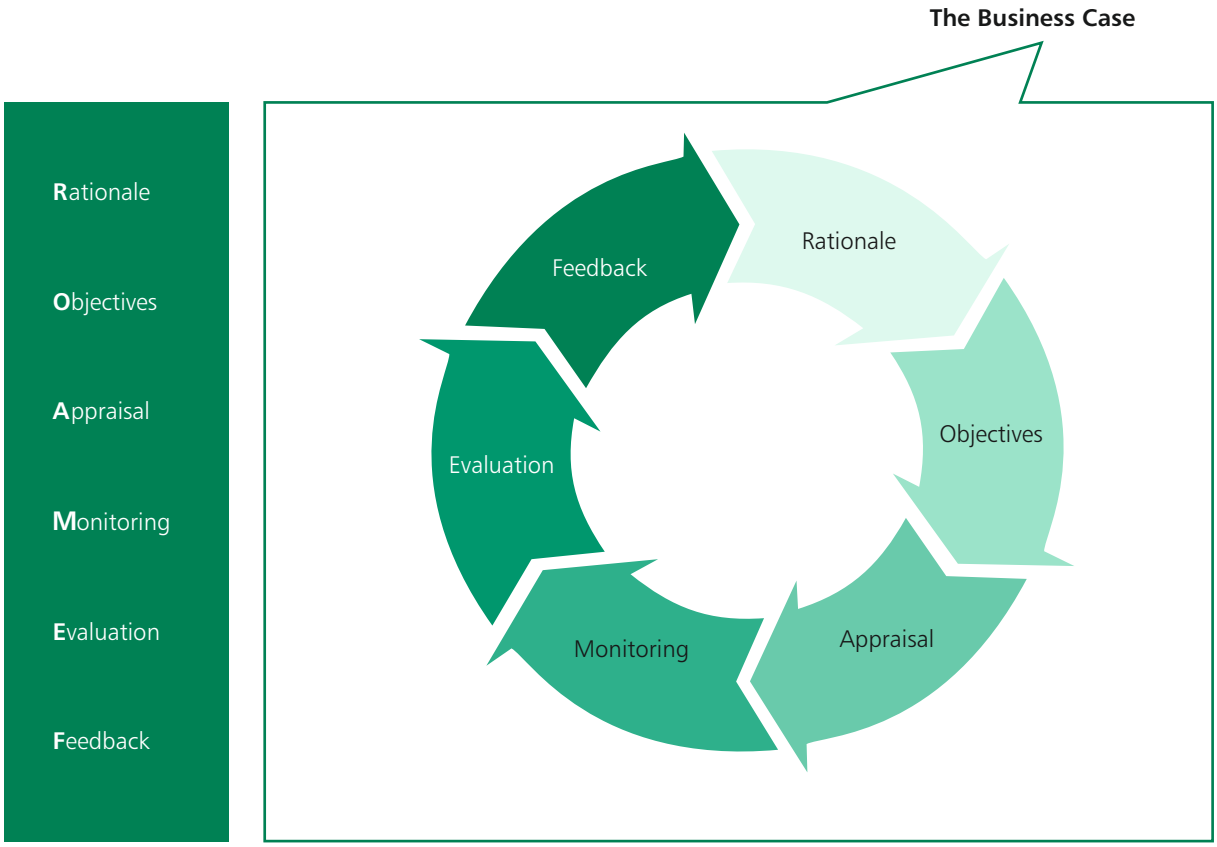


3.6 At each of the policy development levels indicted above, the context in terms of objectives is provided by the preceding higher level. The nature of the issues being considered also changes dependent on this context and the scale of the proposal. Thus, programmes are concerned with identifying and managing projects and keeping track of the programme critical path and expected spending envelope. On the other hand, projects are concerned with delivery of specific changes in business outputs. Projects provide the detailed design of output changes and make requests for specific spending.

3.7 At each level the thinking and development process follows the same high level policy development and review pattern known as the ROAMEF cycle as shown in Figure 4. The process proceeds from developing a rationale for the proposal, through identification of objectives, to

options appraisal, monitoring and evaluation. More detailed supplementary guidance supporting the processes outlined above is provided by the family of business case guidance documents available from the Green Book web page.

Figure 4. The ROAMEF Policy development cycle



3.8 Monitoring and evaluation play an important role before, during and after implementation. The aim is to improve the design of policies, identify strategic objectives, to understand the mechanism of change and to support the management of implementation.

3.9 Strategic portfolios identify, scope, plan, prioritise and manage the constituent programmes needed to deliver the objectives of the portfolio. Each strategic portfolio deals with a different aspect of policy delivery known as a theme and consists of related programmes. A generic example is provided at Figure 5 below and a hypothetical case study example at Figure 6 in Chapter 4. The Green Book supplementary guidance on business cases provides more detailed information.

Figure 5. A generic example of the relationship between Strategy, Programmes and Projects

Stage	Organisational Strategy	Programme	Project
Purpose and focus	To deliver the vision, mission and long-term objectives of the organisation, typically involving transformational service change. **Organisational Strategy for Transforming a Public Service**	To deliver medium term objectives for change, typically involving improved quality and efficiency of service. **Programme A:** **Service Improvement**	To deliver short-term objectives, typically involving improved economy of service and enabling infrastructure. **Project A:** **Re-procurement of ICT**
Scope and content	Strategic portfolio comprising the required programmes on the critical path for delivery of required **benefits**. **Programme A:** **Service Improvement** **Programme B:** **Human Resources** **Programme C:** **Estates Management**	Programme portfolio comprising the required projects and activities on the critical path for delivery of anticipated **outcomes**. **Project A1:** **Re-procurement of ICT** **Project A2:** **Business Process Re-engineering** **Project A3: Quality Management**	Project comprising the inputs and activities required for delivery of the agreed **output**. Work streams: **Replacement ICT** **Upgrading ICT** **Staff training ICT**
Product	**Organisational Strategy and business plans**	Programme Business Case (PBC)	**SOC, OBC and FBC for large projects** **BJCs for smaller schemes**
Monitoring, evaluation and feedback	5-year strategy. Monitor during implementation. Review at least annually and update as required.	3-year programme. Monitor during implementation. Evaluate on completion of each tranche and feedback into strategy development.	1-year project. Monitor during implementation. Evaluate on completion of project and feedback to programme.

3.10 Programmes initiate, align and monitor the constituent projects and related activities needed to deliver outputs that will produce the anticipated outcomes of the programme. These outputs may consist of new products, new or improved services, or changes to business operations. It is not until the projects deliver and implement the required output changes that the outcomes that cause the benefits of the programme can be realised.

3.11 Programmes require a continuing process of review and alignment with policy objectives, to ensure that a programme and its projects remain linked to strategic objectives. This is because while they are implementing changes and improvements to business operations, they may need to respond to changes in external factors or to accommodate changes in policy objectives or strategies. The relationship between strategic portfolios, programmes and projects is illustrated by the generic Figure 5 above and the hypothetical practical example in Figure 6 in Chapter 4.

3.12 The process of policy development should be based on objective evidence. Where assumptions are needed, they should be reasonable and justified by transparent reference to the research information they are based on. Information may come from a range of possible sources including, evaluation of previous interventions and what works, background academic research, specially commissioned research or surveys, and international comparisons. Research and due diligence activity should take place early on, before the process of more detailed policy development or business case development and appraisal begins.

Box 4. Guidance and definitions and for managing successful Programmes and Projects

A Programme is an interrelated series of Sub-Programmes, Projects and related events and activities in pursuit of an organisation's long-term goals/objectives.

- Managing Successful Programmes (MSP), is an international standard originated by the UK government for programme management, it defines a programme as 'a temporary, flexible organisation created to co-ordinate, direct and oversee the implementation of a set of related projects and activities in order to deliver outcomes and benefits related to the organisation's strategic objectives'.
- Large projects are often referred to as programmes. In practice, the key differences between programmes and projects are:
- Programmes focus on the delivery of outcomes and projects on the delivery of outputs
- Programmes are comprised of enabling projects and activities
- Programmes usually have a longer lifespan than projects and usually consist of a number of tranches that take several years to deliver, and
- Programmes are usually more complex and provide an umbrella under which their enabling projects can be coordinated and delivered.
- There are different types of programmes, and the content of the supporting business case will be influenced by the nature of the change being delivered and the degree of analysis required.

A Project is a temporary organisation that is needed to produce a specific predefined output or result at a pre-specified time using predetermined resources. Managing Successful Projects with PRINCE2 guidance defines a project as 'a management environment that is created for the purpose of delivering one or more business products according to a specified business case'.

Most projects have the following characteristics:

- a defined and finite life cycle
- clear and measurable inputs and outputs
- a corresponding set of activities and plans
- a defined amount of resource, and
- an organizational structure for governance and delivery.

3.13 The potential for the proposal to have wider systemic effects across society, the economy and the environment should be considered whether or not they are intentional. Such collateral effects if significant must be taken into account at the longlist stage of the appraisal process, as explained in Chapter 4.

3.14 Proposals with long term costs and benefits must consider whether longer term structural changes may occur in the economy or society. Such external structural shifts may arise from demographic, technological, environmental, cultural, or other similar external changes. These potential effects need to be considered and taken into account at the longlisting stage of proposals.

3.15 At every level of the decision-making process, whether it concerns strategic portfolios of programmes, a programme, or a project, there is a need to set out the logical chain of cause and effect by which the SMART objectives will be produced. The need for this is widely recognised and, in some places, which lack the five-case model, and its strategic dimension, it has been catered for by approaches labelled as logic models or the theory of change.

3.16 In the five-case model, this logical model of cause and effect is necessarily different at each level of the decision-making process. Strategic portfolios are concerned with significant strategic policy objectives, and managing the programmes that will deliver the outcomes required by the policy. Whereas programmes are concerned with organising their constituent projects and related activities. Projects will be concerned with the delivery of specific outputs that enable the programme of which they are a part to change outcomes in society and the economy.

3.17 SMART objectives should as far as possible be expressed in terms of outcomes not service outputs. Projects should reflect the programme of which they are a part and they must deliver the outputs that the programme requires. A few projects may be stand alone and some projects within programmes may occasionally need to express some objectives as outcomes. Even where a proposal concerns creating or acquiring an asset, it should be appraised from the perspective of its capacity to deliver the required service levels. This helps to avoid biasing proposals towards initial solutions that may not have been sufficiently thought through.

3.18 Transformation in Green Book terms refers to a fundamental change in the structure and operation of the subject that is to be transformed. This differs from a simple change in quantity. It refers to a radical qualitative change in state, so that the subject operates in a very different way or has different properties. An analogy is the change from cold water into ice which is fundamentally different from cold water in both its structure and mechanical properties. For example, internet shopping is transforming retail shopping and consequentially the nature of many high streets.

3.19 Where proposals claim to be aiming for "transformational change" the nature of the change needs to be transparently explained. A credible explanation of the change process is required with the objective evidence on which it is based and objective support for assumptions made. Where the effects may be in practical terms irreversible, and intergenerational wealth transfers are involved, it is particularly important to take account of long-term structural changes and systemic impacts. In such cases sensitivity analysis and in many cases scenario analysis is important as explained in Chapters 4, 5 and 6.

3.20 The purpose of longlist appraisal is to narrow down possible options to identify an optimum shortlist of viable options for detailed appraisal. Shortlist appraisal can only support choice between the options offered to it. The selection of a credible and viable list of the best options for detailed appraisal is therefore vital to avoid pointless analytical work to support a choice between suboptimal options at the shortlist stage.

3.21 The primary focus of the business case process and appraisal is to identify and define the options and to support advice on prioritisation and choice. The objectives of a project are derived from the programme of which it is a part. The objectives of the programme reflect policy and are shaped by the strategic portfolio of which it is a part and the overall policy objectives determined by government. The focus is therefore on identifying the best possible options and choosing between them by identifying the optimum. Strategic policy justification is part of the high-level strategic analysis that takes place when overarching policy is being researched and options for policy at a high level are being explored. A hypothetical example showing the relationship between strategy programmes and policies is given in Figure 5 above, it is quoted from the programme business case guidance on the Green Book web page which isaccessible at this link.

The Five Case Model

3.22 The Five Case Model is the required framework for considering the use of public resources to be used proportionately to the costs and risks involved, and taking account of the context in which a decision is to be taken. The five "cases" or dimensions are different ways of viewing the same proposal, outlined in Box 5 below. The policy, analytical, commercial, financial, and delivery

professions within the public service must avoid working in silos and work together on proposals from the outset. The five dimensions cannot be developed or viewed in isolation, they must be developed together in an iterative process because they are intimately interconnected.

3.23 The five case model provides a universal thinking framework that if understood and applied correctly accommodates the widely varied features of any investment or spending proposal. There is no need to invent an additional case to accommodate a special feature of a proposal, the model takes account of such features which are expressed as either objectives to be achieved or as constraints that a proposal has to work within such as a legal, regulatory, or ethical consideration.

Box 5. The Five Case Model

Strategic dimension	**What is the case for change, including the rationale for intervention?** What is the current situation? What is to be done? What outcomes are expected? How do these fit with wider government policies and objectives?
Economic dimension	**What is the net value to society (the social value) of the intervention compared to continuing with Business As Usual?** What are the risks and their costs, and how are they best managed? Which option reflects the optimal net value to society?
Commercial dimension	**Can a realistic and credible commercial deal be struck?** Who will manage which risks?
Financial dimension	**What is the impact of the proposal on the public sector budget in terms of the total cost of both capital and revenue?**
Management dimension	**Are there realistic and robust delivery plans**? How can the proposal be delivered?

Strategic dimension

3.24 The strategic dimension of the Five Case Model must identify "Business as Usual" (BAU) – that is the result of continuing without implementing the proposal under consideration. This must be a quantified understanding to provide a well understood benchmark, against which proposals for change can be compared. This is true even when to continue with BAU would be unthinkable.

3.25 The **strategic dimension** is where external constraints that a proposal must work within are considered, for example, legal, ethical, political, or technological factors. External dependencies must also be identified, such as necessary infrastructure over which the proposal has no control.

3.26 The outcome that the proposal is expected to produce is defined by a small number (up to 5 or at most 6) of SMART objectives that must be Specific Measurable Achievable Realistic and Time-limited. The SMART objectives selected in the strategic dimension must directly drive the rest of the process throughout the model. Crucially they provide the basis of option creation and the appraisal process in the economic dimension.

3.27 Programme objectives should be expressed in terms of outcomes that the expected change in service provision is expected to produce. This is a key element in understanding and refining the objective which should be expressed numerically. The objectives must directly reflect the rationale for the proposal and be able to be monitored and evaluated.

Box 6. Logical Change Process

The Strategic dimension of the Business Case requires a Strategic Assessment key steps in which are:

- ☐ A quantitative understanding of the current situation known as Business As Usual (BAU)
- ☐ Identification of SMART objectives that embody the objective of the proposal
- ☐ Identification of the changes that need to be made to the organisation's business to bridge the gap from BAU to attainment of the SMART objectives. These are known as the business needs.
- ☐ An explanation of the logical change process i.e. the chain of cause and effect whereby meeting the business needs will bring about the SMART objectives.

  This all needs to be supported by reference to appropriate objective evidence in support of the data and assumptions used including the change mechanisms involved. It should include:

  - ☐ the source of the evidence;
  - ☐ explanation of the robustness of the evidence; and
  - ☐ of the relevance of the evidence to the context in which it is being used.
- ☐ This provides a clear testable proposal that can be the subject of constructive challenge and review. Single point estimates at this stage would be misleading and inaccurate and objectively based confidence ranges should be used.

3.28 The key part of all proposals, whether strategic portfolio, programme or projects, is the strategic assessment which examines the current position (Business As Usual) and compares it with the desired outcome, as summarised by the SMART objectives. The gap which needs to be bridged between Business As Usual and the attainment of the SMART objectives represents the business needs. An objectively based understanding of how meeting the business needs will result in attainment of the SMART objectives, is a basic requirement – see Box 6 and the Green Book Supplementary Guidance on Business Cases concerning strategic assessment.

3.29 From this early stage how a proposal fits with wider public policy and any potential impacts on the operations, responsibilities or budgets of other public bodies must be considered. Consultation and cooperative working between public bodies supports effective and efficient delivery of public services and avoids unnecessary waste and inefficiencies.

3.30 Research, consultation and engagement with stakeholders, should be conducted from the earliest stage. This provides greater understanding of the current situation and potential opportunities for improvement including links to relevant policies.

Economic dimension

3.31 The **economic dimension** is the analytical heart of a business case where detailed option development and selection through use of appraisal takes place. The economic dimension of the business case is driven by the SMART objectives and delivery of the business needs that are identified in the strategic case as explained in Chapter 4. It estimates the social value of different options at both the UK level and, where necessary on different parts of the UK or on groups of people within the UK. Where overseas development assistance is concerned the value to the recipient country is relevant. The potential for the proposal to cause significant unintended consequences should also be considered and where they are likely they must be taken into account

3.32 Longlist appraisal and selection of the shortlist is a crucial function of the economic dimension explained more fully in Chapter 4, and in the family of Business Case Guidance documents available from the Green Book web pages. The selection of a preferred option from the shortlist requires

interaction between the strategic and economic dimension and the commercial, financial and management dimensions of the case. None of these can be considered in isolation, and the supplementary guidance on Business Cases should be followed to ensure that the proposal is developed in an integrated, way bringing together all of the dimensions together with the benefit of key stakeholder input.

3.33 The selection of the preferred option from the shortlist uses social cost benefit analysis or where appropriate social cost effectiveness analysis as explained in Chapter 5. The value for money recommendation is based upon a range of factors including the net social value of the option including the costs of risk and residual optimism bias, the net whole life cost of the public resources employed, and the additional costs of including key objectives, the benefits of which are unquantifiable. The overall risk of the option to the public and the public sector is also an important consideration.

Commercial dimension

3.34 The **commercial dimension** concerns the commercial strategy and arrangements relating to services and assets that are required by the proposal and to the design of the procurement tender where one is required. The procurement specification comes from the strategic and economic dimensions. The commercial dimension feeds information on costs, risk management and timing back into the economic and financial dimensions as a procurement process proceeds. This is part of the iterative process of developing a proposal into a mature business case. The Cabinet Office Functional programmes can provide support and advice during appraisal e.g. the Commercial Function can support assessment of procurement decisions.[5]

Financial dimension

3.35 The **financial dimension** is concerned with the net cost to the public sector of the adoption of a proposal, taking into account all financial costs and benefits that result. It covers affordability, whereas the economic dimension assesses whether the proposal delivers the best social value. The financial dimension is exclusively concerned with the financial impact on the public sector. It is calculated according to National Accounts rules.

Management dimension

3.36 The **management dimension** is concerned with planning the practical arrangements for implementation. It demonstrates that a preferred option can be delivered successfully. It includes the provision and management of the resources required for delivery of the proposal and arrangements for managing budgets. It identifies the organisation responsible for implementation, when agreed milestones will be achieved and when the proposal will be completed.

3.37 The management dimension should also include:

- ☐ the risk register and plans for risk management
- ☐ the benefit register
- ☐ the arrangements for monitoring and evaluation during and after implementation and any collection of data prior to implementation, including the provision of resources and who will be responsible

[5] https://www.gov.uk/government/organisations/government-commercial-function

3.38 The management dimension is completed more fully during the middle and latter stages of a proposal's development into a full business case. The implications of the management dimension feed into the appraisal and must be reflected in the full versions of the economic, commercial and financial dimensions.

Regulatory Impact Assessments

3.39 Regulatory Impact Assessments (RIAs) are used to support the appraisal of new primary or secondary legislation, or in some cases the impact of non-legislative policy change. The Green Book should be used for the appraisal required for RIAs, in the same way as for spending proposals. It sets out the methodology for appraisal of social value and distributional effects.

3.40 RIAs follow the same logic as spending and resource appraisals and make use of the five case model in their thinking. There needs to be the same rationale with clear policy objectives, and expected process of change and SMART policy objectives. Costs, benefits and risks to the public and those affected as well as to the public sector are relevant and where new policies are concerned, consideration of a range of options. The calculation of costs and benefits, as well as the detailed evidence base which supports RIAs, should be developed in accordance with Green Book methodology. For small regulatory changes standalone RIAs may not be required, though any analysis included to support these changes should be in line with Green Book methodology.

3.41 The rules for the scrutiny and clearance processes, in England, for regulations with an impact on business above a certain value and methodology for calculating specific metrics relating to the impact on business, are set out in the Better Regulation guidance. The Better Regulation guidance reflects ministerial decisions on statutory reporting duties and may be periodically updated to reflect policy change.

Option appraisal in government

3.42 The Green Book methodology set out in this guidance should be applied proportionately to support effective decision making across government. Some problems such as emergencies are not covered by the regular approval process. Some questions arise that do not involve the use of significant resources, the answers to which hinge on issues of social value alone. These may use only part of the process covered here, but in most cases key elements of the thinking model apply, and its use supports rapid, effective and efficient decision making, supported by objective advice.

4 Generating Options and Long-list Appraisal

4.1 This chapter sets out how to develop a rationale for intervention, generate a longlist of possible options to achieve objectives and filter them down to a shortlist suitable for detailed cost benefit or cost effectiveness analysis. These methods and principles apply when considering all significant proposals, for intervention for example regulatory options or options concerning the use of existing resources as well as new public spending and investment. As a guide to navigation a summary of the Appraisal Framework is shown throughout this guidance, below over the page in Box 7 the rationale stage is highlighted.

Rationale

4.2 In central government the objectives of policy at the highest level are determined by Ministers who are responsible to Parliament. Within the frameworks that are provided by Ministerial decisions and by the law, decision makers in other public bodies also have responsibility for setting policy objectives. The role of public officials and of this guidance is to provide objective unbiased advice to decision makers, to support choice between alternative means of realising the policy objectives that have been set.

4.3 Ideally policy objectives should be framed as social outcomes. This longlist stage of the process includes the estimation of indicative social costs and benefits including the cost of risks that result from different options. These indicative values should be expressed as ranges. As the appraisal process progresses and knowledge increases, accuracy will improve resulting in a narrowing of these ranges. While absolute certainty is not a realistic expectation, unbiased estimates within reasonable ranges accompanied by plans to manage uncertainty are a requirement.

4.4 A "rationale" explaining the desired change, and crucially the means by which it can be brought about, must be developed as outlined in Chapter 3. The rationale relates to the context of the proposal and its place in the chain of decision making,[6] the objectives of which run like a thread from Strategy, through programmes and in to projects. The content of the rationale will relate to both the context set both by its place in the chain of decision making and the nature of the proposal concerned. A clear explanation is required of the chain of cause and effect that is expected to support attainment of the objectives. It must also explain how the proposal fits with the objectives of the stages before it in the decision chain.

4.5 Different organisations and arms of public service should act in ways that are mutually supportive and cooperative. Therefore, from the start proposals must be designed to ensure they provide a supportive strategic fit with wider public policies as described in Chapter 3. Where proposals are likely to rely on or impinge upon the policies or responsibilities of another public body, there is a duty for public organisations to work together to ensure that a positive result for the public is produced.

[6] For examples of the decision chain from strategy to projects see Figure 5 in Chapter 3 and a hypothetical example in Figure 6 below. Guidance on each level of decision is provided by the family of Business Case publications available from the Green Book web pages.

Box 7. Navigating the Appraisal Framework: the Rationale

Rationale for intervention

- ☐ conduct the strategic assessment, research and understand the current position – Business As Usual
- ☐ establish rationale for intervention including the Evidence based Logical Change Process
- ☐ determine whether Place Based, Equalities, and/or Distributional Appraisal is required
- ☐ ensure Strategic Fit and identify SMART objectives (outcomes and outputs) for intervention

Longlist appraisal

- ☐ identify Constraints and Dependencies
- ☐ consider Place Based, Equalities, and/or Distributional objectives
- ☐ identify Critical Success Factors (CSFs)
- ☐ consider unquantifiable and unmonetisable factors
- ☐ consider a longlist of option choices with the Options Framework-Filter
- ☐ consider Place Based, Equalities, and Distributional effects
- ☐ using the Options Framework-Filter create a viable shortlist and preferred way forward

Shortlist appraisal

- ☐ select Social Cost Benefit Analysis or Social Cost Effectiveness Analysis
- ☐ identify and value costs and benefits of all shortlisted options
- ☐ estimate the financial cost to the public sector
- ☐ ensure all values in the economic dimension are in real base year prices with inflation removed
- ☐ qualitatively assess non-monetisable costs and benefits
- ☐ apply appropriate Optimism Bias
- ☐ maintain Risk and Benefits Registers
- ☐ assess Avoidable, Transferable and Retained Risk, build in additional Risk Costs and reduce Optimism Bias accordingly
- ☐ sum the values of costs and benefits in each year
- ☐ discount the yearly sums of costs and benefits in each year to produce Net Present Social Values (NPSVs)
- ☐ add the NPSVs over time to produce The Net Present Social Value (NPSV) of each option
- ☐ calculate Benefit Cost Ratios (BCRs) if using CBA or Social Unit Costs if using CEA as appropriate

Identification of the preferred option

- ☐ identify preferred option considering NPSV, BCR, unmonetisable features risks and uncertainties
- ☐ conduct sensitivity analysis and calculate switching values, for each option

Monitoring and evaluation

- ☐ during implementation – inform implementation and operational management
- ☐ in the operational phase – inform both operational management and evaluate the outcome and lessons learned to improve future decisions.

4.6 Policies generally consist of programmes to bring about change. Programmes are best organised and managed in strategic portfolios that support particular themes within the overall policy objective, for example see Figure 6 below. Programmes are comprised of projects, which individually deliver changes in service outputs. Together the projects, through the delivery of change in their outputs, support delivery of a change in outcomes which are the objectives of the programme. The family of supplementary guidance on different types of business cases are available at this link and they provide the detailed guidance necessary for use when preparing spending proposals. The models and method are also applicable to other kinds of decisions such as regulatory or asset disposal issues.

Figure 6. A hypothetical applied example the relationships between Strategy, Programmes and Projects

	Organisational Strategy	Programme	Project
Purpose and focus	To deliver the vision, mission and long-term objectives of the organisation, typically involving transformational service change. **National Strategy for Improving Pre-16 year old Educational Attainment**	To deliver medium term objectives for change, typically involving improved quality and efficiency of service. **Improving School Buildings Programme**	To deliver short-term objectives, typically involving improved economy of service and enabling infrastructure. **Regional School Improvement Project A**
Scope and content	Strategic portfolio comprising the required programmes on the critical path for delivery of required **benefits.** **Improving Schools Building Programme** **Review of Pre-16 Curriculum Programme** **School Teachers Training Programme**	Programme portfolio comprising the required projects and activities on the critical path for delivery of anticipated **outcomes**. **Regional School Improvement Project A** **Regional School Improvement Project B** **Regional School Improvement Project C**	Project comprising the products and activities required for delivery of the agreed **output**. Work streams: **School building refurbishment** **New equipment** **Upgrading & Replacement IT**
Product	**Organisational Strategy and business plans**	**Programme Business Case (PBC)**	**SOC, OBC and FBC for large projects** **BJC for smaller schemes**
Monitoring, evaluation and feedback	10 year strategy Review at least annually and update as required.	7 year programme Monitor and Evaluate during implementation and on completion of each tranche. Annual reviews as a minimum and feedback into strategy development.	2 year project Monitor and Evaluate during implementation and on completion of project and feedback to programme.

4.7 Proposals for change must start from a thorough objective and quantitative understanding of the current situation, this should be informed by research and consultation with experts and stakeholders. A clear quantitative understanding of "Business As Usual" (BAU) is essential to understanding the current situation, and to identifying and planning the changes that may be required. All those involved in appraisal, and in development of business cases, and in their review and approval must be trained and accredited. Details of the appropriate HM Treasury approved training and accreditation scheme are given at this link.

4.8 **Business As Usual (BAU)** in Green Book terms is defined as the continuation of current arrangements, as if the proposal under consideration were not to be implemented. This is true even if such a course of action is completely unacceptable. The purpose is to provide a quantitative benchmark, as the "counterfactual" against which all proposals for change will be compared. BAU does not mean doing nothing, because continuing with current arrangements will have consequences and require action resulting in costs, in practical terms there is therefore no do-nothing option.

SMART objectives

4.9 Clear objectives are vital for success. Identifying objectives begins at the outset or when making the case for change (part of the strategic dimension explained in more detail in Chapters 3 and 4 and in the Business Case Guidance). A lack of clear objectives negates effective appraisal, planning, monitoring and evaluation. Objectives must be SMART that is:

Specific

Measurable

Achievable

Realistic

Time-limited

SMART objectives must be objectively observable and measurable, so that they are suitable for monitoring and evaluation (see Chapter 8).

4.10 The identification of "SMART" objectives is a crucial part of the rationale, whether they are for a strategic portfolio, or programme, or project. They summarise quantitively the desired outcomes of the proposal. Taken together with the quantified BAU, the SMART objectives support a "GAP" analysis. This is used to identify the internal business changes that need to be made to move from the current BAU position to the desired outcome. The business changes required which this GAP analysis identifies are known as the core "**Business Needs,**" these needs must be met to achieve the core requirements of meeting the SMART objectives. At this early stage in appraisal it is expected that only indicative estimates of principle costs and benefits are available. As proposals are developed it is likely to be necessary to revise or refine early quantitative estimates and on occasion this may require resetting of quantitative objectives.

4.11 Up to 5 or 6 SMART objectives should be established. More than this and a proposed scheme is likely to lack focus and is more likely to fail or significantly exceed costs and under-deliver. The SMART objectives of portfolios and programmes are expressed as outcomes. Outcomes are the external consequences of changes in service outputs. Where projects are part of a programme, the project objectives are outputs required to enable delivery of the programme.

Important factors when considering the longlist

Constraints

4.12 Constraints are external considerations that set limits, within which a proposal must work, for example the law, ethics, social acceptability, timing, practicality and strategic fit with wider public policies and strategy. Constraints must be identified and understood at the earliest possible stage, and taken into account when considering the longlist.

Dependencies

4.13 Dependencies are external factors such as infrastructure that an option is reliant upon to be successful, but which are beyond its direct control. The successful delivery of the proposal's objectives depends on them being present and functioning, for example a digital development proposal would be dependent on users having access to adequate internet connectivity and capacity.

Unmonetizable and Unquantifiable benefits

4.14 Where it is thought that there is a benefit to society in implementing a proposal including a feature, the benefit of which is not readily or credibly quantifiable or monetisable, it should be considered as follows: At the longlist stage when creating a shortlist, a version of the preferred way forward[7] that includes provision of the feature with unmonetised benefits and an otherwise identical option without this provision should be produced. The costs and risks of each of these

[7] The preferred way forwards as explained in later in this chapter is the favoured option at this stage before shortlist analysis, see Chapter 5 for explanation of the choice of the preferred option and dealing with unmonetizable and unquantifiable option choices.

two options will naturally vary. Both should be taken forward to the shortlist stage so that in the final selection process the price of inclusion of the additional provision is revealed by comparison. The decision maker can then judge whether that additional cost is a price worth paying.

Collateral effects and unintended consequences

4.15 Collateral effects both positive and negative may result from an intervention and unintended consequences may occur as a result. These may affect particular groups in society or parts of the country. It is important to think about this when developing and appraising the longlist of options. This is especially true where proposed changes may create new opportunities, obligations or incentives. It is necessary to consider possible beneficial and adverse effects of changes in behaviour that may result from the intervention. The following paragraphs 4.15 to 4.18 are directly relevant to this consideration.

Appraising Targeted Place Based effects

4.16 Where objectives are targeted at geographically defined parts of UK, appraisal concerns the local effects produced by a flow of new and existing resources into the target areas. It is also concerned with the consequential effects on similar areas that may be adversely or favourably affected. This is, in contrast to UK policies where the effects on the UK as a whole are the subject of advice on alternative options. UK effects remain of relevance to place based policies, as a check against serious negative consequences at a UK level. It is however, the effects on the target areas and the consequential effects on related places that may be affected, such as travel to work areas that are the main focus of advice. The point of this advice to is support the choice between the alternative options for delivering the place based policy objectives.

Appraising Collateral effects on Places and Groups within the UK

4.17 National policy objectives that may have significant favourable or adverse effects on parts of the UK, should also be appraised from the relevant place based perspective, as well as from that of the UK as a whole. Where either UK or place based policies are likely to have significant effects on groups in UK society that are specified by the Equality Act 2010, or on families under provisions of the Family test 2014, these also need to be appraised. This consideration supports advice to decision makers based on a wider view of the effects of alternative options than just reporting on a nationwide bottom line. The results of this appraisal must be made visible to decision makers – see Chapter 7.

Equality and Family Effects

4.18 Equalities effects must be considered at the longlist stage and taken into account and where quantified also at the shortlist stage, as required by the Public Sector Equality Duty (PSED). This obligation was created under the Equality Act 2010, it requires public sector bodies to "have due regard to advancing equality." Consideration of equality issues must influence the decisions reached by public bodies. Decision makers should therefore be informed of the potential effects of intervention on groups or individuals with characteristics identified by the Act. The "Family test" introduced in October 2014 should also be considered where there may be significant effects on families and children. See Annex A.1 for more detailed information. This requirement for consideration also extends to long-list stage and throughout the appraisal process.

The Public Sector Equality Duty covers 9 protected characteristics as follows:

- age,
- disability,

- gender reassignment,
- pregnancy and maternity,
- race,
- religion or belief,
- sex and sexual orientation.

Income Distribution at the longlist stage

4.19 Significant income distribution effects, should be considered at the longlist stage, whether or not they are an objective of a policy, or are collateral consequence of implementing an unrelated policy. Distributional effects may apply to defined income groups, household types or types of business. At the longlist stage they may be a constraint on the feasibility of some options. Appraisal of distributional effects should be proportionate to the likely effects on those affected. Where the impact on those affected is marginal it may be sufficient to ensure that decision makers are made aware of the effect and its likely scale and possible options for avoidance or mitigation. Where it is a significant collateral effect of another policy a straightforward monetary analysis may be required. Where redistribution is a policy objective such as payments under the welfare system or if it is highly significant in terms of the impact on incomes and welfare of those affected then a weighted and equivalised income distribution analysis may be justified as set out in Annex A3.

Competition Effects and Market Imperfection

4.20 Market creation may be used to deliver some objectives. Appraisal of market creation or of changes to regulation, require an understanding of the current situation in terms of the current market or the barriers to market provision or functioning. Competition effects must also be considered, for example a proposed asset sale may require the existence of a healthy well-functioning market that is free from significant distortion. The effects of proposals on market functioning need to be thought through and the creation of unnecessary barriers to healthy markets should be avoided. Often it is necessary to introduce regulation to protect consumers and the economy from market imperfections and to support better market functioning. Where relevant these issues need to be explored at the preliminary research stage before embarking on developing the rationale as part of making the case for change. Supplementary guidance on competition issues can be found on the Competition and Markets Authority webpages. In more complex cases advice from specialist competition economists may be required.

4.21 Perfect markets, as many elementary economics textbooks note are a rarity. While some markets are closer to the perfect model than others the main value of the concept of market perfection lies in providing an abstract thinking tool used by economists to trial economic propositions under a range of market imperfections.

4.22 The Green Book is based upon the ideas of welfare economics and concerns the optimisation of social welfare. Much of its subject matter therefore concerns estimation of public, that is social, welfare values. These are values that economic markets are either unable to fully capture, or are unable to register at all. The various forms of shortfall in market welfare optimisation are characterised as "market failures." Since the objectives of policy are set by ministers, not by officials, the main points that the Green Book needs to address concern well-functioning healthy markets and competition issues. The need to understand competition and market efficiency, arises when considering either;

- whether a public policy objective can be met by improving the social welfare efficiency of an existing market, or establishing a new market, or

- whether a proposed intervention may also result in distorting an existing market and so significantly damage welfare efficiency.

4.23 There is not always a hard and fast dividing line to identify the degree of welfare inefficiency in markets. Some decisions are informed by considerations of ethics or social preference as for example in provision of health and social care. Competition considerations are explained in more detail in the guidance published at this link on the web pages of the "Competition and Markets Authority".

Examples of some of causes of market failure include:

- Public goods: Many aspects of the environment can for example be described as public goods, for instance the benefits of clean air. When provided it is unavoidably available to all. It is non-excludable in supply and once provided, it matters little how many people enjoy it. It is therefore non-rivalrous in demand. These features make clean air impossible to supply on a commercial basis.

- Imperfect information: Well functioning markets require buyers and sellers to both have perfect information about what is on offer and about the other bargains being struck in the market, that is about quality and price. An imbalance in the information available known as information asymmetry confers an unfair advantage on the side that possesses it.

- Externalities: These occur when an activity imposes costs or produces benefits for economic agents not directly involved in the deal. For example, pollution not covered by regulation may be profitable for a perpetrator but impose real costs on others who are not directly involved in the market.

- Market power: This results from insufficient actual or potential competition where either sellers or buyers have an unfair advantage. It can arise from too few buyers or sellers, as occurs with monopoly and oligopoly among sellers or through collusion by sellers in anti-competitive behaviour. Problems can also arise from monopsony, i.e. where there is effectively only one dominant buyer. Barriers to market entry and exit can also cause a concentration of market power.

Longlist appraisal with Options Framework-Filter

4.24 The main steps in longlist appraisal are highlighted in Box 8 below. Use of the options framework-filter is required best practice for consideration of a longlist of possible options. The method disaggregates the design of viable options into its basic components, breaking down the choices to be made into a sequence of logical steps. This helps to avoid falling into the trap of making unconscious implicit and unconsidered assumptions. It does so by requiring the information and assumptions required at each step to be cited and explained. By their nature implicit assumptions are unconsidered and untested because they are implicit and virtually invisible. They are invariably the seeds of cost escalation, time delays, under delivery and often outright failure, because they have not been considered and tested.

4.25 The options framework-filter provides a structured process that supports a constructive engagement with stakeholders and experts, and it focusses on the choices needed to construct viable options. A workshop facilitated by an experienced accredited person is required to undertake the longlisting. The workshop or workshops bring together the knowledge and expertise of all of the professions involved in reviewing the longlist developing the shortlist, together with key stakeholders or their representative organisations. Ideally the senior responsible owner known as the SRO should also be present. As with all of this guidance this needs to be

carried out in a way that is proportionate to the likely costs and risks involved to the public and the public sector. In some cases, it may be necessary to hold more than one such workshop and to take the review and shortlisting process in stages.

4.26 This process makes use of indicative cost and likely benefit estimates. While not accurate enough to define the final option, they should be good enough to support selection of a viable shortlist. An option that only meets the core "Business Needs" previously identified as the internal changes needed to meet the core requirement of achieving the SMART objectives, is known as the "**Do Minimum**" option. The do minimum does not take advantage of any opportunities for additional changes that may occur. It may or may not, be the option eventually chosen, but it is essential because it provides a second important benchmark that can reveal the real value of additional changes. Comparison with the "Do Minimum" option reveals whether options that take advantage of additional opportunities to make changes are worthwhile or not. If comparison with the "Do Minimum" reveals that they add more cost and risk than they add value, they are regarded as likely to be pointless "**gold plating**". However, this may not be the case where there is a widely recognised benefit that is not readily or credibly quantifiable or monetisable. Paragraph 4.14 above on choices with unquantifiable and unmonetizable benefits explains this.

Box 8. Navigating the Appraisal Framework and the Longlist

Rationale for intervention

- ☐ conduct the strategic assessment, research and understand the current position – Business As Usual
- ☐ establish rationale for intervention including the Evidence based Logical Change Process
- ☐ determine whether Place Based, Equalities, and/or Distributional Appraisal is required
- ☐ ensure Strategic Fit and identify SMART objectives (outcomes and outputs) for intervention

Longlist appraisal

- ☐ identify Constraints and Dependencies
- ☐ consider Place Based, Equalities, and/or Distributional objectives
- ☐ identify Critical Success Factors (CSFs)
- ☐ consider unquantifiable and unmonetisable factors
- ☐ consider a longlist of option choices with the Options Framework-Filter
- ☐ consider Place Based, Equalities, and Distributional effects
- ☐ using the Options Framework-Filter create a viable shortlist and preferred way forward

Shortlist appraisal

- ☐ select Social Cost Benefit Analysis or Social Cost Effectiveness Analysis
- ☐ identify and value costs and benefits of all shortlisted options
- ☐ estimate the financial cost to the public sector
- ☐ ensure all values in the economic dimension are in real base year prices with inflation removed
- ☐ qualitatively assess non-monetisable costs and benefits
- ☐ apply appropriate Optimism Bias
- ☐ maintain Risk and Benefits Registers
- ☐ assess Avoidable, Transferable and Retained Risk, build in additional Risk Costs and reduce Optimism Bias accordingly
- ☐ sum the values of costs and benefits in each year
- ☐ discount the yearly sums of costs and benefits in each year to produce Net Present Social Values (NPSVs)
- ☐ add the NPSVs over time to produce The Net Present Social Value (NPSV) of each option
- ☐ calculate BCRs if using CBA or Social Unit Costs if using CEA as appropriate

Identification of the preferred option

- ☐ identify preferred option considering NPSV, BCR, unmonetisable features risks and uncertainties
- ☐ conduct sensitivity analysis and calculate switching values, for each option

Monitoring and evaluation

- ☐ during implementation – inform implementation and operational management
- ☐ in the operational phase – inform both operational management and evaluate the outcome and lessons learned to improve future decisions.

4.27 "Critical Success Factors" (CSFs) are the attributes that any successful proposal must have, if it is to achieve successful delivery of its objectives. A table of five basic CSFs that apply to all proposals is given in Box 9. In some cases, one or at most two addition factors may be added, but if a proposal's objectives, constraints and dependencies are correctly understood this is rarely the case, at most the number should not exceed seven.

Box 9. Critical Success Factors

Key Critical Success Factors	Description
Strategic fit and meets business needs	How well the option: ☐ meets the agreed spending objectives, related business needs and service requirements ☐ provides holistic fit and synergy with other strategies, programmes and projects
Potential Value for Money	How well the option: ☐ optimises social value (social, economic and environmental), in terms of the potential costs, benefits and risks
Supplier capacity and capability	How well the option: ☐ matches the ability of potential suppliers to deliver the required services ☐ appeals to the supply side
Potential affordability	How well the option: ☐ can be financed from available funds ☐ aligns with sourcing constraints
Potential achievability	How well the option: ☐ is likely to be delivered given an organisation's ability to respond to the changes required ☐ matches the level of available skills required for successful delivery

Option choices and the options framework-filter

4.28 When used as set out here, and covered in more detail in the Treasury's family of supplementary guidance documents on development of Business Cases, the Five Case Model employs structured facilitated workshops, using the options framework-filter. It can support a rapid and clear consideration of a wide range of options. These must be based on evidence from research and the inclusion of input from experts and stakeholders. The workshops enable selection of an optimum viable shortlist, capturing a clear rationale for the inclusion and exclusion of alternative option choices. It has been used widely in the UK and internationally, to efficiently and effectively support the development of policies, strategic portfolios, programmes and projects.

4.29 When constructing the longlist a predetermined or complete final option should be avoided. Instead the method will support the building of a number of alternative viable options by considering the logical sequence of option choices set out in Box 10. The identification of options for delivery and the identification of a viable shortlist is driven by the SMART objectives. Choices between options are viewed through the lens of the public service that the scheme is intended to deliver.

Box 10. Choices in the Strategic Options Framework-Filter

Option choices – broad description		
1 **Scope**	☐	coverage of the service to be delivered
2 **Solution**	☐	how this may be done
3 **Delivery**	☐	who is best placed to do this
4 **Implementation**	☐	when and in what form can it be implemented
5 **Funding**	☐	what this will cost and how it shall be paid for

4.30 These option choices are about:

- ☐ "Service Scope" – what is the coverage of the service to be delivered, defined by one or several parameters including geographic, demographic, quality, time limits and any other relevant factors.
- ☐ "Service Solution" – how the scoped outcomes preferred above can be delivered, considering available technologies and best practice. In addition to direct service provision by a new or existing public sector organisation, alternatives may also include outsourcing, insourcing, the creation of new markets, new or revised regulations, grants and subsidies, public information initiatives, or the use of so called "nudge techniques" based on insights from behavioural psychology and economics.
- ☐ Service Delivery – who in organisational terms is best placed to deliver the scope, and choices preferred above, for example:
  - ○ Direct public sector provision
  - ○ Public Private Partnerships (PPP)
  - ○ Not-for-profit providers
  - ○ Private sector providers
- ☐ Service Implementation – how the proposal is to be delivered, for example will it be an initial pilot with provisions to learn "what works" and to adapt, a phased implementation or a 'big bang' approach? Or would a roll out dependent on geography, age, expiry of existing arrangements or other factors be more appropriate?
- ☐ Service Funding – an initial indicative cost estimate in light of the preferences for scope, solution, delivery and implementation, and how will it be funded.

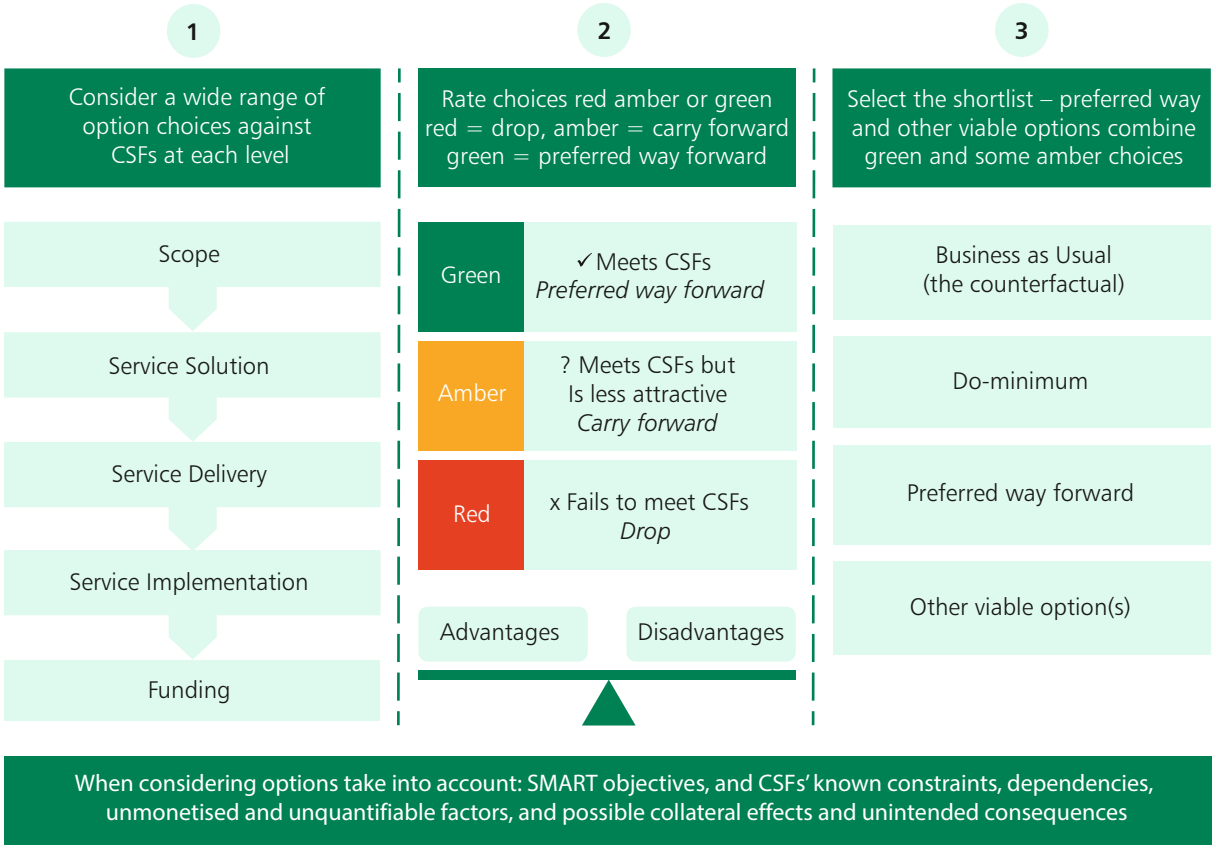
4.31 The method supports the building of a number of alternative viable options, by considering the logical sequence of option choices set out in Box 10, by going through an iterative process explained below.

How SWOT analysis identifies options with the Options Framework-Filter

4.32 Consideration of the longlist and selection of the shortlist is an iterative process that is explained in the following paragraphs. The identification of options for delivery and the identification of a viable shortlist is driven by the SMART objectives. Choices between options are viewed through the lens of the public service that the scheme is intended to deliver. This avoids

limiting option selection, that would be caused by considering only a predetermined solution that may run foul of the implicit assumptions problem outlined above. That approach is also likely to ignore potentially better alternatives by taking too narrow a view.

Figure 7. Overview of Longlisting with the Options Framework-Filter process



4.33 The way in which options are broken down into a series of choices is shown in Box 10. How these are appraised, and acceptable choices are built back up into full options is explained below. This is an iterative process and in the initial pass through the framework minima, maxima and a provisional preferred way forward are identified. Variations around the preferred way forward, which at this stage is not a preferred option, are considered in the light of the choices made at the preceding levels of choice. The individual choices are considered sequentially by analysing the strengths, weaknesses, opportunities, and threats associated with each of the possible choices, (this is known as a SWOT analysis). This analysis will be based on the need for all, shortlisted options to meet the SMART objectives, and on how well each option choice meets the critical success factors identified in Box 9. Option choices that do not at least meet the "Do Minimum" requirement of meeting the core objectives fail to meet the SMART objectives, they must therefore be rejected at this stage. The reasoning must be recorded as set out below.

4.34 Consideration of the options choices takes place in a workshop setting, that brings together all of the public service professions involved with key stakeholders and experts. It should be facilitated by a competent independent facilitator accredited in the Treasury methodology. Longlist consideration begins with the choice **of service scope**. The maximum and minimum potential scope should be identified. The minimum must, by definition be the scope required to just meet the business needs, so it therefore meets the SMART objectives. The maximum may or may not be viable. Between these two extremes, examination in a workshop setting will generate valuable insights into viable possibilities. Several alternative option choices for scope between the maximum and minimum should be examined to test the effect on viability through considering the CSFs. Each choice should either be rejected or carried forward as possible. During this initial pass through the framework a favourite option choice for scope should be identified as the preferred

way forward. This is not yet the preferred option because it may not be the final selection at shortlist stage, but at this early stage it is identified as "front runner". The reason for rejecting, selecting, or carrying forward each choice must be recorded in a brief paragraph describing the advantages and disadvantages and the conclusion reached. Evidence, and assumptions and their sources must be cited. For summary purposes a colour coded matrix using red for reject, amber for possible, and green for the initially preferred option choices should be used. A hypothetical example is shown in Figure 8 below and the method is set out in more detail in the **Business Case Guidance** under options framework in Chapter 5 of both Project and the Programme guidance.

4.35 The next choice concerns the **service solution** choice which is about how the required changes will be realised. On this first iteration of the framework filter this choice is made assuming that the preferred scope identified above is used. As above the SWOT analysis based on SMART objectives and the CSFs is applied to consideration of service solution. The minimum required to meet the "Do Minimum" and so meet the "Business Needs" is identified. A sensible maximum which may not necessarily be viable is also identified to understand the range of possibilities. Rational points in between these two extremes are considered and the same procedure that was used for scope is followed. This uses the CSFs in a SWOT analysis to reject some and carry forward other possible choices and to identify a choice of preferred way forward. The reasoning together with evidence and citation of sources of evidence and assumptions is concisely recorded.

4.36 The next stage concerns **service delivery** choice, in light of the preferred way forward identified for scope and solution it considers the appropriate delivery agent, in other words who will deliver the required changes. It is not necessary to consider maximum and minimum levels of ambition for this choice but to look at the range of reasonable alternatives available. The same SWOT analysis method and criteria for selection are used and a preferred option together with other alternative options are identified. The reasons for decisions including rejection of possibilities must be recorded as described above.

4.37 **Service implementation** choice are the next set of choices to consider in relation to the preferred way forwards for scope, solution and delivery. This concerns the way that the service change will be delivered as explained above. For example is a, "big bang approach" desirable or possible, or would a phased roll out be more appropriate? Does uncertainty on key effects require the use of a piloting and a "phased learning development roll out process," with adaptation and building on what works between each phase? Alternative option choices are considered through a SWOT analysis in the same way as earlier choices, and the decisions for each are clearly recorded.

4.38 **Funding option choices** are the final set of choices to be considered. In the same way as above the initial iteration of the framework filter process considers this option in the light of the preferred way forward chosen above. Note that because "funding" is considered at the end of the sequence, this does not mean that finance has been ignored up until now. On the contrary **the use of the same critical success factors in the SWOT analysis when appraising every set of choices means that the five case model is used to consider possibilities in the round for every decision**. Use of the CSF's in the SWOT analysis is the means by which this holistic consideration is carried out.

Assembling the shortlist

4.39 The initial pass through the options framework rejects option choices that do not meet the SMART objectives, or which are judged unacceptable by a failure to satisfy the CSFs to a satisfactory degree. The reasons for rejecting, preferring or for carrying forward as a possibility must be recorded as part of the SWOT analysis, along with the evidence and assumptions on which decisions are based. The inside knowledge of stakeholders and experts is captured during this

process. If well done, it should ensure that there are no untested implicit assumptions included in choices carried forward for further consideration. For each option choice there is a clear favourite which may, or may not, be the selected option after detailed analysis at the shortlist stage.

4.40 It is now possible, to assemble a rational viable set of shortlist options from among the possibilities identified at the first iteration, in addition to a quantified BAU for use as a benchmark counterfactual. This must include a:

- Do minimum option (that just meets the business needs required by the SMART objectives)
- Preferred Way Forward (that may or may not be the Do Minimum)
- A more ambitious preferred way forward (this may be more expensive, deliver more value, but at higher costs with increased risks
- A less ambitious preferred way forward – unless the preferred option is a do minimum (this option may take longer, deliver less value but cost less and / or carry less risk)

4.41 Figure 8 contains a hypothetical example of an options summary matrix[8] illustrating how the choices should be graphically summarised. Business as Usual is also shown on the left. The hypothetical example refers to a small imaginary developing country which is seeking assistance from international development bodies to support investment in a road improvement programme, as part of its wider economic and transport development strategy. There are four cities labelled A, B, C, and D the size and importance of which declines from A to D. Research at strategic level has indicated that improved road service improvements are vital for economic development. In this case the service level changes are represented by improved interconnections that the road developments provide.

4.42 The preferred option choices are shown by the green cells in the matrix. The red choices have been rejected because they do not deliver the SMART objectives, and other viable choices are carried forward and are represented by the amber choices. A do minimum option can be assembled using the minimum options carried forward or the green if no other option is available for that choice. This example illustrates how options that are more or less ambitious versions of the preferred way forward, are also possible, by substituting reasonable alternative option choices coded amber, for some of the preferred way forward choices coded green, to vary the costs benefits and risks involved.

[8] The example quoted is from the project business case guidance

Figure 8. The Options Framework-Filter summary matrix

Business As Usual (BAU)	Project	Do Minimum	Intermediate Option	Intermediate Option	Do Maximum
1.0 All Cities.	**1.Service scope** – as outlined in strategic case	1.1Linking Cities A and B.	1.2. Linking Cities A, B and C.	1.3 Linking Cities A, B, C and D.	1.4 Linking All Cities, A, B, C, D and E.
Carried forward		Carried forward	Preferred Way Forward	Carried forward	Discounted
2.0 Current services: for road maintenance etc.	**2. Service Solution** – in relation to the preferred scope	2.1 Core: Refurbish existing highways.	2.2 Core & Desirable: Combination of refurbish & new highways.	2.3 Core & Desirable: Completely new highways.	2.4 Core, Desirable and Optional: New highway & facilities.
Carried forward		Carried forward	Preferred Way Forward	Carried forward	Discount
3.0 Current arrangements.	**3. Service Delivery** – in relation to preferred scope and solution	3.1 Local Contractor.	3.2 National Contractor.	3.3 International Contractor.	
Carried forward		Discount	Carried forward	Preferred Way Forward	
	4.Implementation – in relation to preferred scope, solution and method of service delivery	4.1 Phased over 3 years.	4.2 Phased over 2 years.	4.3 Big bang over 1 year.	
		Carried forward	Preferred Way Forward	Discount	
	5.Funding – in relation to preferred scope, solution, method of service delivery and implementation	5.1.Public funding.	5.2 Mixed public and private funding.	5.3 Private finance – service charge.	5.4 Private finance – toll.
		Discount	Preferred Way Forward	Discount	Discount

4.43 This summary matrix provides an overview, it is not a substitute for recording the decisions and the reasons /evidence used in the SWOT analysis. These must be recorded along with the indicative estimates of costs and benefits as explained above. Longlist appraisal must be based on evidence and rational assumptions with objective support. Simple weighting and scoring lacks an objective basis and detracts from transparency, it must not be substituted for this transparent evidence based analysis as part of the decision process.

4.44 In some cases complex technical trade-offs at the longlist stage, concerning choices of service scope and service solution, may be assisted by the use of expertly facilitated Multi-Criteria Decision Analysis making use of swing weighting, referred to here as MCDA. Swing weighting techniques objectively weigh the balance of informed expert and stakeholder opinion, in a high-level expert workshop. The inferior form of multi criteria analysis or MCA is not suitable for Green Book appraisal. It involves simple subjective weighting and scoring is not a recognised method due to its lack of transparency and objectivity. More guidance on swing weighted MCDA is given in Annex 1 and the referenced supplementary Green book guidance.

4.45 In this way an evidence based set of viable options can be developed that capture input from experts and stakeholders, which includes option choices that facilitate comparison of options with unquantifiable benefits as explained above. This shortlist can then provide a reasonable basis for social cost benefit or social cost effectiveness analysis at the shortlist stage. The shortlist is based on indicative estimates, it should be compared with the Business As Usual benchmark, and include; the preferred way forward (which appears most likely to deliver the SMART objectives), a viable

do-minimum option (that meets minimum core business requirements to achieve the SMART objectives), and at least two alternative viable options that explore more and less ambitious and risky options than the preferred way forward.

5 Shortlist Options Appraisal

5.1 Chapter 5 sets out how to appraise shortlist options. It covers assessment of costs and benefits, the treatment of equalities, place based appraisal, distributional analysis and adjustments for discounting, inflation, risk and uncertainty (including optimism bias) and distributional analysis. The main steps are highlighted in Box 11 below.

Box 11. Navigating the Appraisal Framework and the Shortlist

Rationale for intervention

- ☐ conduct the strategic assessment, research and understand the current position – Business As Usual
- ☐ establish rationale for intervention including the Evidence based Logical Change Process
- ☐ determine whether Place Based, Equalities, and/or Distributional Appraisal is required
- ☐ ensure Strategic Fit and identify SMART objectives (outcomes and outputs) for intervention

Longlist appraisal

- ☐ identify Constraints and Dependencies
- ☐ consider Place Based, Equalities, and/or Distributional objectives
- ☐ identify Critical Success Factors (CSFs)
- ☐ consider unquantifiable and unmonetisable factors
- ☐ consider a longlist of option choices with the Options Framework-Filter
- ☐ consider Place Based, Equalities, and Distributional effects
- ☐ using the Options Framework-Filter create a viable shortlist and preferred way forward

Shortlist appraisal

- ☐ select Social Cost Benefit Analysis or Social Cost Effectiveness Analysis
- ☐ identify and value costs and benefits of all shortlisted options
- ☐ estimate the financial cost to the public sector
- ☐ ensure all values in the economic dimension are in real base year prices with inflation removed
- ☐ qualitatively assess non-monetisable costs and benefits
- ☐ apply appropriate Optimism Bias
- ☐ maintain Risk and Benefits Registers
- ☐ assess Avoidable, Transferable and Retained Risk, build in additional Risk Costs and reduce Optimism Bias accordingly
- ☐ sum the values of costs and benefits in each year
- ☐ discount the yearly sums of costs and benefits in each year to produce Net Present Social Values (NPSVs)
- ☐ add the NPSVs over time to produce The Net Present Social Value (NPSV) of each option
- ☐ calculate BCRs if using CBA or Social Unit Costs if using CEA as appropriate

Identification of the preferred option

- ☐ identify preferred option considering NPSV, BCR, unmonetisable features risks and uncertainties
- ☐ conduct sensitivity analysis and calculate switching values, for each option

Monitoring and evaluation

- ☐ during implementation – inform implementation and operational management
- ☐ in the operational phase – inform both operational management and evaluate the outcome and lessons learned to improve future decisions.

Social Cost Benefit and Cost Effectiveness Analysis

5.2 Social Cost Benefit Analysis (CBA) assesses the impact of different options on social welfare. All relevant costs and benefits are valued in monetary terms, unless it is not proportionate or possible to do so.[9]

5.3 Social CBA is the recommended approach for detailed comparison of the shortlist of options. Social Cost-Effectiveness Analysis (CEA) is a variant of Social CBA which compares the costs of alternative ways of producing the same or similar outputs. Social CEA may sometimes be appropriate where:

- ☐ wider social costs or benefits will remain broadly unchanged or for the delivery of a public good, such as defence
- ☐ output may not be proportionately quantified

5.4 Where wider social outcomes are not affected by the decision being appraised, Social CBA and Social CEA are in effect equivalent. The assumption that there will be no change in output or welfare needs to be objectively validated before choosing the appropriate technique.

5.5 Social CBA and Social CEA techniques are "marginal analysis" principally employed to consider changes between alternative options, and compare alternative options based on a static model of the world. Significant non-marginal issues involving fundamental changes in the relationships on which models, estimates, and forecasts are based must be analysed during the research phase in advance of the longlist stage. They are taken into account there, as is consideration of whether place based appraisal, or consideration of equalities or income distribution effects is required. The outcome of that analysis is fed into shortlist selection. At shortlist stage it may therefore be necessary to undertake appraisal form several perspectives in order to produce balanced advice.

Social costs and benefits

5.6 Identification and valuation of relevant costs and benefits is at the heart of economic appraisal. The principles outlined here are complemented by in-depth discussion of valuation techniques in Chapter 6 and Annex 1.

Scope of costs and benefits

5.7 When considering proposals from a UK perspective the relevant values are viewed from the perspective of UK society as a whole. Where appraising a place based policy or a UK wide proposal with place based effects the relevant values include effects in the place of interest and similar nearby travel to work areas. The relevant costs and benefits which may arise from an intervention should be valued and included in Social CBA unless it is not proportionate to do so. The priority costs and benefits to quantify are those likely to be decisive in determining the differences between alternative options. The appraisal of social value involves the calculation of Net Present Social Value (NPSV) and Benefits Cost Ratios (BCRs) the ratio of benefits to costs.

5.8 UK society generally includes UK residents and not potential residents or visitors. It is sometimes reasonable to include the costs and benefits for people living outside the UK e.g. service personnel posted overseas. Appraisal of Official Development Assistance (ODA) should include the costs and benefits to the recipient countries. The financial cost of ODA should be assessed in the same way as other public spending.

[9] Costs to society are given a negative value and benefits a positive value. After adjusting for inflation and discounting, costs and benefits can be added together to calculate the Net Present Social Value (NPSV) for each option.

5.9 Appraisal of individual spending decisions is largely undertaken in the context of pre-determined budgets. Decisions concerning the overall level of public spending are macro-level decisions made separately from, and in advance of, individual spending decisions. The cost of raising public funds e.g. the cost of issuing debt or the impact of taxes, is therefore not considered in shortlist appraisal.

5.10 A categorisation of potential costs and benefits that may be part of appraising social value is given in Box 12. Not all appraisals involve every category.

Box 12. Classification of Costs and Benefits

Costs in the appraisal of social value

- ☐ total direct public costs (to originating organisation):
  - ○ capital
  - ○ revenue
- ☐ total indirect public costs (to other public sector organisations):
  - ○ capital
  - ○ revenue
- ☐ wider costs to UK society:
  - ○ monetisable including cash costs
  - ○ quantifiable but unmonetisable costs
  - ○ qualitative unquantifiable costs
- ☐ total risk costs (the costs of mitigating or managing risks):
  - ○ optimism bias (decreased as estimated risk costs are included)
  - ○ estimated or measured risk cost

Benefits in the appraisal of social value

- ☐ direct public sector benefits (to originating organisation):
  - ○ cash releasing benefits
  - ○ monetisable non cash releasing benefits
  - ○ quantifiable but not monetisable benefits
  - ○ qualitative unquantifiable benefits
- ☐ indirect public sector benefits (to other public sector organisations):
  - ○ cash releasing benefits
  - ○ monetisable but non cash releasing benefits
  - ○ quantifiable but unmonetisable benefits
  - ○ qualitative unquantifiable benefits
- ☐ wider benefits to UK society (e.g. households, individuals, businesses):
  - ○ monetisable including cash benefits
  - ○ quantifiable but not monetisable benefits
  - ○ qualitative unquantifiable costs and benefits

Adjustments for inflation

5.11 Costs and benefits in appraisal of social value should be estimated in 'real' base year prices (i.e. the first year of the proposal). This means the effects of general inflation should be removed. The effects of converting values from nominal to real terms are shown in Table 1 using a GDP deflator of 2%.

5.12 The following should be used to adjust prices from nominal to real terms:

- for short time horizons, whole economy inflation (the "GDP deflator") from the most recent forecasts by the Office for Budget Responsibility (OBR)
- for long time horizons, forecasts of the GDP deflator published in the OBR Fiscal Sustainability Report (FSR)
- for longer time horizons, beyond the end of the OBR's FSR, the GDP deflator should be extrapolated using the growth rate in the final year of the OBR's projection

Table 1. Adjusting for the Effects of Inflation (Using a 2% GDP Deflator)

Year	0	1	2	3	4	5
Nominal terms	£1,000	£1,000	£1,000	£1,000	£1,000	£1,000
Real terms (year 0 prices)	£1,000	£980	£961	£942	£924	£906

5.13 For some goods or services there may be a relative price effect i.e. the movement of a specific price index (e.g. construction) may differ significantly from the general inflation (such as the GDP deflator). Where there is historical evidence and an expectation this will continue in the future, different rates of inflation can be used to reflect the relative difference. For example, Information Technology has become relatively less expensive over time and land used for development relatively more expensive. How prices change in relation to real incomes will affect this. Similarly, if supply is limited the price of the good may increase relative to inflation.

Time horizon

5.14 Costs and benefits should be calculated over the lifetime of an intervention. As a guideline, a time horizon of 10 years is a suitable working assumption for many interventions. In some cases up to 60 years may be suitable, for example for buildings and infrastructure. In all cases, the maintenance and renewal costs associated with the servicing of these assets should be included. An asset's residual value or liability at the end of the appraisal period should also be included.

5.15 A longer appraisal period may be suitable where intervention is likely to have significant social costs or benefits beyond 60 years. This should be agreed with the approving authority. Possible examples include immunisation programmes, the safe treatment and storage of nuclear waste or interventions that reduce climate change risks.

Estimating costs

5.16 The costs of using assets and resources are defined by the value which reflects the best alternative use a good or service could be put to – its opportunity cost. Market prices are usually the starting point for estimating opportunity costs. Where market prices are not suitable or available non-market valuation techniques can be used.

5.17 Sunk costs refer to expenditure or payments already incurred and should be excluded from the appraisal of social value. What matters are costs and benefits affected by decisions still to be made. The costs of continuing to use resources that are already paid for (e.g. assets or buildings) are relevant and should be included as opportunity costs.

5.18 Private sector costs (including capital and revenue for spending proposals) should be valued on an opportunity cost basis and included in the appraisal. This is particularly important for regulatory options where the costs of regulation would fall largely on private companies.[10] Relevant prices and costs for public and private sector options should be done on a comparable basis.

5.19 Cost and benefit estimation will normally involve input from accountants, economists or other specialists. Consultation with stakeholders, particularly those who will potentially incur costs, is an important part of this.

5.20 Distinguishing between fixed, variable and other costs can be helpful to aid sensitivity analysis (see Box 13). A step change in the cost of one input factor may not apply to others. Costs and cost drivers need to be fully understood and each cost requires its own relevant set of governing assumptions.

Box 13. Definitions of Costs

Costs can be defined as:

- fixed costs or overheads remain constant over wide ranges of activity for a specified time period (e.g. a building)
- variable costs vary according to the volume of activity (e.g. external training costs vary with the number of trainees)
- semi-variable costs include both a fixed and variable component (e.g. maintenance where there is usually a planned programme and a responsive regime such as call-outs, where costs vary with activity)
- semi-fixed, or step costs, are fixed for a given level of activity and eventually increase at a critical point (e.g. after telephone call volumes reach a certain level, a new call centre may be required)

5.21 Other ways of categorising costs may be relevant to support full consideration of opportunity costs and sensitivity analysis:

- capital and resource costs should be accounted for separately, and built up from their fixed, variable, semi-variable and stepped elements
- direct values relate to the originating public sector organisation, while indirect values fall to the wider public sector

Public sector financial cost

5.22 Public sector financial costs are the estimated resource and capital costs for a spending proposal over its expected lifetime. They include all costs and receipts to the public sector but do not include wider social costs. As set out in the HM Treasury Business Case Guidance, public sector costs and benefits appear differently in economic and financial cases. In economic analysis they are recorded in real terms whereas in financial analysis they are recorded in current, nominal

[10] Such additional costs should be recorded at the point they will be incurred and should be discounted by the Social Time Preference rate (STPR).

terms (on the same basis as organisational budgets) and adhere to different accounting rules. Discounting is applied in the economic dimension of the business case, but not to numbers in the financial dimension of the business case.

5.23 Public sector financial costs should be calculated using the international National Accounts statistical framework produced for the UK by the Office of National Statistics. Public sector financial costs are recorded on an accruals basis consistent with departmental budgets, as per the Consolidated Budgeting Guidance. These distinctions apply to any intervention with financial impacts on the public sector.

5.24 For new public spending proposals the financial dimension of a business case would usually require 3 major financial statements, which are the source of public sector financial costs when calculating NPSV:

- a *budget* statement based on accounting principles as per the Consolidated Budgeting Guidance. This shows the resource and capital costs over the lifetime of the proposal. For strategic initiatives, the budget will often include forecast financial statements of a whole organisation over a number of years.
- a *cashflow* statement showing the costs that will be spent on the preferred option if it goes ahead.
- a *funding* statement showing the sources of funds and other resources required i.e. which internal departments, partners and external organisations would provide the resources and funding required.

5.25 Contingency is an allowance made for the cost of residual known risks in case they occur. These are risks that cannot be avoided, shared or managed; they are added to residual optimism bias (OB), which is what remains of OB after the risk costs that can be avoided, shared or otherwise managed have been deducted. This remaining OB is an allowance for uncertainty which by its nature is unknown (see Uncertainty, Risk and Optimism Bias, paragraphs 5.41 to 5.52 below). In the financial case this residual sum is converted into real prices and is used to estimate the contribution to the reserves required to allow the approving authority to provide for its risk liabilities. This is required because government is effectively self-insured. This contingency sum should not therefore be allocated to the programme or project.

5.26 Monitoring of costs and benefits during and after implementation is necessary for management, control and transparent accountability. Longer running programmes and larger projects over several years should maintain regular monitoring against and updates of original projections. This is vital to managing the delivery of social value through benefit realisation and cost control, providing information that supports the design of future interventions.

5.27 Public sector organisations responsible for public expenditure need to undertake cost monitoring, cost modelling and risk monitoring. Forecasting error and associated risks can be reduced by maintaining active cost monitoring systems and improving unit cost estimates by employing cost modelling techniques.

Estimating benefits

5.28 Estimating benefits means they can be compared with costs and net benefit can be calculated i.e. benefits once costs have been taken into account or netted off.

5.29 Real or estimated market prices provide a first point of reference for estimating the value of benefits. As with cost estimation, where no market price or market exists non-market valuation techniques should be used.

5.30 Expected benefits of an intervention and how these will be measured and realised should be set out in a benefits register. This is a key strand of implementation, operational management and a key part of the management dimension of a business case. A benefits register can be used to support the assurance of benefits realisation as a project or programme is implemented. Box 14 below provides a template for the benefits register.

Box 14. Benefits Register Template

Benefit number	Unique within the register
Benefit category & class	Categories e.g. public sector benefits (direct/indirect), wider social benefits. Classes such as: cash/non cash releasing, quantitative/qualitative etc. (see Box 7)
Description	Including enabling programme, project or activity
Service feature	What aspect of the proposal will give rise to the benefit – to facilitate monitoring
Potential costs	Incurred during delivery
Activities required	To secure benefit
Responsible officer	Senior responsible officer for project or programme
Performance measure	Key performance indicators (KPIs) and relationship to SMART objectives
Target improvement	Expected level of change
Full-year value	Value of benefits (£m)
Timescale	Number of years

Unquantified costs and benefits

5.31 It may be disproportionate to quantify some costs and benefits or there may be insufficient evidence to provide reliable estimates. Where this is the case, these effects should be clearly described and visible as part of the results of the appraisal (see Chapter 7 and Annex 2).

Discounting and Social Time Preference

5.32 Discounting is a technique used to compare costs and benefits occurring over different periods of time on a consistent basis. Discounting should be applied to all future costs and benefits. Discounting in appraisal of social value is based on the concept of time preference – that generally people prefer to receive goods and services now rather than later.

5.33 For individuals, time preference can be measured by the real interest rate on money lent or borrowed. Amongst other investments, people invest at fixed, low risk rates, hoping to receive more in the future to compensate for the deferral of consumption now. These real rates of return give some indication of their individual pure time preference rate. Society as a whole, also prefers to receive goods and services sooner rather than later. This is known as 'social time preference'. The discount rate used in the Green Book is known as the 'social time preference rate' (STPR). It is the rate at which society values the present compared to the future.

5.34 The STPR has two components:[11]

- ‘time preference’ – the rate at which consumption and public spending are discounted over time, assuming no change in per capita consumption. This captures the preference for value now rather than later.
- ‘wealth effect’ – this reflects expected growth in per capita consumption over time, where future consumption will be higher relative to current consumption and is expected to have a lower utility.

5.35 The STPR used in the Green Book is set at 3.5% in real terms, with exception for risk to life values which use a lower rate of 1.5%. The derivation of the discount rate can be found in Annex 6. Table 2 shows the present value of £1,000 declines in future years with a discount rate of 3.5%.

Table 2. Present Values and Discount Rate

Year	0	1	2	3	4	5	6	7	8	9	10
Value	£1,000	£966	£934	£902	£871	£842	£814	£786	£759	£734	£709

5.36 The main role of discounting is to put interventions with different time spans and benefit cost profiles on to a common “present value” basis. In the longer term (over 30 years), the STPR declines in a series of steps to allow for future uncertainty in the value of its constituent parts, as explained in Annex 6. The approach to discounting where there are inter-generational wealth transfers is also described in Annex 6. The accompanying tables in Annex 6 and associated tables on the Green Book web pages show both the discount rate and discount factors that can be used to calculate a present value.

5.37 Discounting is solely concerned with adjusting for social time preference and is separate from adjusting for inflation. The recommended Green Book discount rate applies to real values, with the effects of general inflation already removed. To promote transparency the best practice approach is to first convert costs or benefits to a real price basis, and then perform the discounting adjustment. The inflation rate and discount rate should not be added and applied to costs and benefits.[12]

5.38 In appraisal, discounting should never be applied retrospectively to costs and benefits that have already occurred. Values do not increase simply because activities took place in the past (although of course the value of some assets may tend to increase over time). Discounting and the calculation of NPSV are illustrated further in Box 15.

5.39 Costs to government of raising funds (either through taxation or borrowing) are not a decision variable because the planned level of public spending is decided in advance when the budget is decided. It is at this macroeconomic stage that borrowing costs are considered. The decisions that are the concern of the Green Book are about the allocation of the given funds to meet government objectives in way that optimises social 9that is public) value for money. The STPR is therefore not linked to the costs of raising funds (either through taxes or borrowing).

[11] Based on Ramsey F.P. (1928) “A Mathematical Theory of Saving” Economic Journal, Vol. 38, No 152, pp. 543 559.

[12] Some automated systems to calculate costs and benefits are not set up in line with this approach. As long as the calculation provides the same result this is acceptable on grounds of proportionality for this to continue until established data systems are redeveloped.

Box 15. NPSV and Discounting Worked Example

Alternative options, A and B, are both expected to improve the quality of a department's work and reduce staff costs.

Option A requires £10 million in initial capital expenditure to realise benefits of £2.5 million per annum for the following four years (£2 million in reduced staff costs and £0.5 million in quality improvements).

Option B requires £5 million in initial capital expenditure to realise benefits of £1.5 million per annum for the following four years (£1 million reduced staff costs and £0.5 million in quality improvements).

Year	0	1	2	3	4
Option A (£m)					
Costs	-10.00	0	0	0	0
Benefits	0	2.50	2.50	2.50	2.50
Net Benefit	-10.00	2.50	2.50	2.50	2.50
Discounted net benefits	-10.00	2.42	2.33	2.25	2.18
Net Present Social Value -0.82					
Option B (£m)					
Costs	-5.00	0	0	0	0
Benefits	0	1.50	1.50	1.50	1.50
Net Benefit	-5.00	1.50	1.50	1.50	1.50
Discounted net benefits	-5.00	1.45	1.40	1.35	1.31
Net Present Social Value 0.51					
Discount factor	1	0.9662	0.9335	0.9019	0.8714

Option B has positive NPSV of £0.51m compared to -£0.82m for Option A.

Unintended consequences

5.40 Appraisal of the shortlist should consider any likely beneficial or adverse collateral effects and unintended consequences. This may include:

- ☐ effects on particular groups in society
- ☐ possible changes in behaviour as a result of an intervention
- ☐ claims made for efficiency gains from payment-by-results, performance targets or bonus systems, which should be supported by robust evidence ideally from a similar setting, rather than simple assumptions.
- ☐ the potential for gaming and unexpected results

Uncertainty, risk, optimism bias

5.41 There is a wide range of uncertainty that affects interventions, but in appraisal it is often due to lack of evidence or understanding of the likely impact of new interventions. Research and evidence from evaluations of previous interventions, pilot studies and experience of "what works" can help to reduce this uncertainty. The following paragraphs set out a range of techniques for dealing with uncertainty in appraisal.

5.42 As used in the Green Book, risk and optimism bias are closely linked but distinct concepts, for more detail on methods see Annex 5.

Optimism bias

5.43 Optimism bias is the demonstrated systematic tendency for appraisers to be over-optimistic about key project parameters, including capital costs, operating costs, project duration and benefits delivery. Over-optimistic estimates can lock in undeliverable targets.

5.44 To reduce this tendency appraisals should make explicit adjustment for optimism bias. The Green Book recommends applying overall percentage adjustments at the outset of an appraisal. The initial optimism bias estimate should not be "locked in" but can be reduced as an appraisal develops and the cost of specific risks are identified.

5.45 Ideally adjustments should be based on an organisation's own evidence base for historic levels of optimism bias. In the absence of robust organisation-specific estimates generic values are provided in Annex 5. There are currently no generic values available to be applied to benefits, however an adjustment should be applied based on an organisation's own evidence base.[13]

5.46 Optimism bias is a form of reference class forecasting which predicts future outcomes based on the outcomes for a group of similar past projects. It is important to note that adjustments for optimism bias are not the same as financial contingency (a concept explained above).

Risk

5.47 Risk management is defined as a structured approach to managing risks that are identified and assessed when designing an intervention or that materialise later in its lifecycle.

5.48 The public sector's risk exposure arises as a consequence of public policy decisions. Public sector organisations responsible for an intervention cannot opt out of certain risks and achieve risk reduction through 'cherry picking' (as insurance companies may choose to do when refusing cover). The option of managing a balanced risk portfolio is also not usually available (as investment funds may do).

5.49 To optimise social value, risk must consciously and proportionately be managed. Good risk-management practice in appraisal, monitoring and evaluation involves:

- ☐ identifying possible risks in advance and putting mechanisms in place to minimise the likelihood they materialise with adverse effects. The appraisal should include an assessment of how specific risks may be avoided, minimised or managed.
- ☐ including the costs of risk avoidance, transfer and mitigation. A risk register should be created during the development of an intervention (see Annex 5) and maintained through implementation. It should be owned by those responsible for operational delivery.
- ☐ considering how and by whom key risks might be managed. This is this an important part of assessing the longlist and provides important inputs into the design of a procurement process, risk allocation and risk sharing in commercial contractual arrangements. If a procurement process is involved this should be re-examined as a proposal develops, including when contract bids are assessed.
- ☐ ensuring risk is borne by the organisation that is best placed to monitor and manage it, and that this responsibility is clearly agreed with appropriate controls to mitigate adverse consequences if risks materialise.

[13] An example of adjusting benefits for optimism bias at a local level can be found in Supporting public service transformation: cost benefit analysis for local partnerships.

- monitoring of risk and optimism bias which should be undertaken by all public bodies as part of their monitoring and evaluation processes.
- having decision making processes supported by a framework of risk analysis and evaluation, ensuring they are underpinned by good oversight and accountability.

5.50 As the shortlist appraisal is developed, risks and risk costs should be identified and the optimism bias allowance included at the outset of the appraisal should be reduced in accordance with the Green Book guidance (see Annex 5). Box 16 shows an example of applying optimism bias.

5.51 Risk costs are the costs incurred if a risks materialises, they are calculated on an expected value basis. Expected values result from multiplying the expected cost if it occurs by the expected likelihood of it materialising. This requires objectively based estimates of the percentage likelihood of a risk occurring. Low probability high impact risks should be noted in the risk register to make the decision maker aware. Effective risk costing will be supported if organisations put in place well designed risk assessment processes supported by effective routine data recording.

5.52 Risks with low probability but high impact need to be considered seriously by policy makers. In addition to ensuring these risks are part of the risk register, Senior Responsible Owners (SROs) must ensure that the proposal realistically and efficiently manages risk down, placing it where it can be effectively managed, both before and during implementation. Real options analysis (see Annex 5 for a worked example) provides a technique to explore whether additional flexibility can be added in the project design phase and utilised later when further information becomes available. It is particularly useful for projects that exhibit significant uncertainty or are difficult to reverse following initial investment (eg. where future climate change impacts are uncertain).

Box 16. Optimism Bias Case Study

The capital costs of a non-standard civil engineering project within a major change programme are estimated to be £50 million on a present value basis. No detailed risk analysis work has taken place at this stage, although significant costing work has been undertaken.

The project team applies an optimism bias adjustment of 66% showing that, for the scope of the work required, the total cost may increase to £83m. This adjustment was based on evidence and experience from comparable civil engineering projects at a similar stage in the appraisal process.

As the project progresses, more accurate costs and quantified risks are identified. The adjustment for optimism bias can then be reduced to reflect this. When reduced, there will only be a general contingency left for unspecified risks.

Without applying optimism bias adjustments, a false expectation would have been created that a larger project could be delivered at a lower cost.

Preferred option selection

5.53 Preferred option selection starts from a comparison of the alternative options in the shortlist relative to Business As Usual (BAU). The shortlist should include at least BAU, the preferred way forward, a do-minimum option and at least one other viable alternative.

Box 17. Navigating the Appraisal Framework the Option Selection and VfM

Rationale for intervention

- ☐ conduct the strategic assessment, research and understand the current position – Business As Usual
- ☐ establish rationale for intervention including the Evidence based Logical Change Process
- ☐ determine whether Place Based, Equalities, and/or Distributional Appraisal is required
- ☐ ensure Strategic Fit and identify SMART objectives (outcomes and outputs) for intervention

Longlist appraisal

- ☐ identify Constraints and Dependencies
- ☐ consider Place Based, Equalities, and/or Distributional objectives
- ☐ identify Critical Success Factors (CSFs)
- ☐ consider unquantifiable and unmonetisable factors
- ☐ consider a longlist of option choices with the Options Framework-Filter
- ☐ consider Place Based, Equalities, and Distributional effects
- ☐ using the Options Framework-Filter create a viable shortlist and preferred way forward

Shortlist appraisal

- ☐ select Social Cost Benefit Analysis or Social Cost Effectiveness Analysis
- ☐ identify and value costs and benefits of all shortlisted options
- ☐ estimate the financial cost to the public sector
- ☐ ensure all values in the economic dimension are in real base year prices with inflation removed
- ☐ qualitatively assess non-monetisable costs and benefits
- ☐ apply appropriate Optimism Bias
- ☐ maintain Risk and Benefits Registers
- ☐ assess Avoidable, Transferable and Retained Risk, build in additional Risk Costs and reduce Optimism Bias accordingly
- ☐ sum the values of costs and benefits in each year
- ☐ discount the yearly sums of costs and benefits in each year to produce Net Present Social Values (NPSVs)
- ☐ add the NPSVs over time to produce The Net Present Social Value (NPSV) of each option
- ☐ calculate BCRs if using CBA or Social Unit Costs if using CEA as appropriate

Identification of the preferred option

- ☐ identify preferred option considering NPSV, BCR, unmonetisable features risks and uncertainties
- ☐ conduct sensitivity analysis and calculate switching values, for each option

Monitoring and evaluation

- ☐ during implementation – inform implementation and operational management
- ☐ in the operational phase – inform both operational management and evaluate the outcome and lessons learned to improve future decisions.

Summary measures of social welfare

5.54 A variety of measures can be used to summarise Social CBA. Estimates of Net Present Social Value (NPSV) and Benefit Cost Ratios (BCR) are commonly used:

- ☐ NPSV is defined as the present value of benefits less the present value of costs. It provides a measure of the overall *impact* of an option.
- ☐ BCR is defined as the ratio of the present value of benefits to the present value of costs. It provides a measure of the benefits *relative* to costs.

5.55 When calculating the NPSV or BCR:

- future costs and benefits should be adjusted for inflation to 'real' base year prices. The base year should be the first year of the proposal.
- future costs and benefits should be discounted by the Social Time Preference Rate (STPR) to provide the present value.

5.56 The most appropriate summary measures and their construction will depend on the context in which the decision is being made:

- Where optimising over a constrained budget, as is usually the case for government spending, the BCR can be constructed as a measure of social value divided by the relevant public spending constraint (e.g. NPSV/£ or the Present Value of Benefits/£). This assesses the benefits bought per £ of public spending. It can be used to allocate across a portfolio of spending to maximise Value for Money.[14]
- For Regulatory Impact Assessments, where the constraint is based on cost targets for business regulation, an indicator of the cost to business (or deregulatory benefits) of options will be relevant.
- Where departments or types of spend with a constrained budget operate on thresholds, the relevant measures may be framed accordingly. For example 'cost per QALY measure' is commonly used in the health sector to assess Value for Money with a pre-defined threshold that should be met to be considered Value for Money.
- When comparing a range of options a consistent formulation should be used to calculate the BCR of all options. Ideally organisations should use a consistent approach to formulating BCRs for similar types of decision and across time.

5.57 Where non-monetised costs or benefits are significant summary measures alone will not capture the full impact of an option. Similarly, a single measure may fail to adequately reflect the full range of potential costs and benefits to society if there are significant risks attached to an option that have proved challenging to quantify. It may be unrealistic to produce a single number that adequately captures the full impact of an option.

5.58 Appraisal is iterative and involves checks and reworking of steps in the analysis and planning stages of an intervention. If additional evidence is identified at a late stage it may be necessary to reconsider:

- the selection of the shortlist, repeating Social CBA and Social CEA
- the preferred way forward (i.e. the option identified at the longlist stage which is most likely to deliver SMART objectives)
- the choice of preferred option (the chosen option at the shortlist stage)

[14] Public sector budgets are nearly always constrained so it is generally impossible to undertake all projects that would provide benefits that exceed their public-sector costs. This means public spending has an opportunity cost that needs to be considered when assessing options. Considering options in terms of the benefits per £ of the relevant budget constraint allows the opportunity cost to be taken into account.

Box 18. A Definition of Value for Money

Value for Money as mentioned in chapters 2, 3, 4, 6 and 8 is a judgment about the optional use of public resources to achieve stated objectives embodied in the SMART objectives of a proposal (be it a policy, a portfolio, a programme, or a project), based on consideration of the following factors:

- Performance against SMART objectives. Each shortlisted option must achieve the SMART objectives, options which do not deliver against SMART objectives cannot be included in a shortlist, or represent value for money for the proposal being considered
- Net present value to society of all social, economic and environmental benefits – these may be qualitative or quantitative
- Net present public resource costs as measured by whole life costs, including capital and operating costs and the opportunity cost of existing assets employed
- Risk costs associated with managing and mitigating risks that are associated with a proposed option

For each shortlisted option a quantified net present social value and the relevant cost to the public sector are estimated as set out in chapters 4, 5 and 6 and combined in a benefit cost ratio (BCR) to support an initial first ranking of options or proposals based on quantifiable factors. As set out above all shortlisted options must meet the SMART objectives to be considering public/social value for money. Additional features with benefits which are not readily or credibly quantifiable or monetisable, but which are considered decisively important enough to be taken into account must be dealt with at the longlisting stage as follows:

- If they are regarded as essential to provision of the objectives', then they are a constraint and they must be incorporated into all of the options.
- If they are regarded as desirable but not essential, then two versions of the option with the most favourable BCR should be prepared, one with and one without the inclusion of the features concerned. The resulting disparity in costs will enable decision makers to consider if the increase in cost associated with the inclusion of this desirable feature is a price worth paying in terms of public value for money.

Residual hard to quantify risk and uncertainty where it is likely to be significant should also be considered as part of the value for money judgment.

Proposals that are part of a larger programme need to be understood and appraised for public value and value for money in the light of their role in the overarching programme. If such an enabling or supporting proposal has high levels of risk and uncertainty the issue must be referred upwards to the overarching programme for assessment. This may result in the need to consider the effects of delay on the programme or a reassessment of the projects initial SMART objectives and specification.

Sensitivity analysis

5.59 Sensitivity analysis explores the sensitivity of the expected outcomes of an intervention to potential variations in key input variables. It can demonstrate, for example, the changes in key assumptions required to change the preferred option on an NPSV or BCR basis or to turn the NPSV of an option positive.

5.60 A switching value refers to the value a key input variable would need to take for a proposed intervention to switch from a recommended option to another option or for a proposal not to receive funding approval (see Box 19 for a worked example).

5.61 At a minimum sensitivity analysis and the identification of switching values should be carried out on the preferred option from the shortlist appraisal. These results must form part of the presentation of results. If the costs and benefits of the preferred option are highly sensitive to certain values or input variables, sensitivity analysis will probably be required for other options in the shortlist.

Box 19. Switching Values – Worked Example

Officials are appraising the remediation (treatment) of a 39 acre contaminated land site, to be funded by a public sector grant. The remediation of the land would enable new businesses to move close to an existing cluster of businesses in a highly productive sector. The benefits of the intervention can be estimated by the change in the land value of the site (land value uplift). There is data on the current value and likely value of the land post remediation. For simplicity, it is assumed all values are already appropriately discounted.

Variable	Value
Site area	39 acre
Existing use land value estimate	£30,659 per acre
Future use land value estimate	£200,000 per acre
Land value uplift per acre	£169,341 per acre
Total land value uplift	£6.6m
Wider social benefits	£1.4m
Present Value Benefits (PVB) – including land uplift, health and environmental effects)	£8m
Present Value Cost (PVC)	£10m
Benefit Cost Ratio (BCR = PVB / PVC)	0.8
Net Present Social Value (NPSV)	-£2m

The total benefits are £8m when wider social benefits are added to the increase in land value as a result of the remediation. The costs of the remediation exceed the benefits so the BCR is less than 1 and the NPSV is negative. The switching value to turn the NPSV positive, so benefits outweigh costs, would be an approximate future land use value of £251,000 per acre equal to a land value uplift of approximately £221,000 per acre.

Source: Ministry of Housing, Communities and Local Government

5.62 Scenario analysis is a form of 'what if' analysis that is useful where there are significant future uncertainties. Scenarios may be chosen to explore significant technical, economic and political uncertainties which will affect the success of an intervention. Scenario analysis must always be proportionate to the costs and risks involved.

5.63 Low cost, low risk proposals may look at simple 'what if' questions. Major policies and more expensive, higher risk options may require modelling exercises which test the impact of different states of the world on expected costs and benefits.

5.64 Monte Carlo analysis is a simulation-based risk modelling technique that can be used when there are a number of variables with significant uncertainty. Further explanation can be found in Annex 5.

5.65 Decision trees and real options analysis are alternative approaches to dealing with uncertainty in appraisal. They illustrate more complex alternative options and risks over time, especially when decisions are sequential. They can be used to illustrate alternative scenarios where key external risks

are likely. They can also be used to clarify alternatives where decisions taken are either irrevocable or expensive to reverse. More detail can be found in Annex 5 along with an example of real options analysis.

Equalities analysis at the shortlist stage

5.66 As outlined in Chapter 4 the Public Sector Equality Duty (PSED) requires that public sector bodies have due regard to advancing equality, for groups of individuals with protected characteristics identified in the Equality Act. The need for equalities analysis will apply when considering a shortlist of options and the results must be visible to decision makers. Public Sector Equality Duty Guidance is available from the Equality and Human Rights Commission. Separately there is a need to consider effects on Families.

5.67 It is important to consider the likelihood and extent to which average impacts will differ across groups and places, including where several distributional factors might apply in combination. Where this is likely to be significant, the possibility of avoiding, or mitigate adverse effects needs to be understood. Where there are significant uncertainties or gaps in the evidence concerning such effects, further consultation and research should be undertaken to inform a proportionate judgement. Consideration should be also given to capturing evidence as part of the evaluation plan. Where suitable, implementation options should be considered, such as piloting to test what works and to understand distributional risks and to adapt the scheme as required.

Distributional analysis at the shortlist stage

5.68 Where distributional effects (e.g. on income) are relevant, they should be appraised. Assessment of distributional impacts could range from a simple quantitative or descriptive approach where the scale of the effect is relatively low, to an in-depth appraisal and detailed calculation of distributional effects where the scale is relatively high. Depending on the scope and type of intervention distributional analysis may involve considering the impact on businesses of different size, for example focussing on small and micro businesses.

5.69 Where effects are significant for a group concerned, a clearly presented analysis identifying gaining and losing groups and estimating the effects on their welfare should be carried out. Presentation alongside the overall UK effects improves visibility and transparency of distributional impacts, so that the effects of decisions are properly understood and, where necessary, options for mitigation may be considered.

5.70 Distributional weights are factors that increase the monetary value of benefits or costs that accrue to lower income individuals or households. They are based on the principle that the value of an additional pound of income may be higher for a low-income recipient than a high-income recipient.

5.71 Distributional weights can be used as part of the distributional analysis where there is understood to be a social value that differs from simple additionality due to who gains or loses. To account for the uncertainties, sensitivity analysis is recommended and it may be useful to estimate switching values i.e. the distributional weights required to change the preferred option. This provides an estimate of the certainty of the results based on the weights used.

5.72 In practice the use of distributional weighting is challenging. This is due to uncertainty in the assumptions relating to the groups between whom redistribution is measured and uncertainty in estimation of distributional weights.

5.73 Distributional results should be presented transparently. For example, if distributional weightings are used to adjust estimated costs or benefits depending on which groups in society they fall on, the analysis with weightings should be presented alongside the analysis without weightings.

5.74 It may be necessary to undertake additional distributional analysis for interventions with sub-national or regional distributional effects (e.g. those that involve redistribution of welfare to different parts of the UK), those which are targeted at one or more types of geographic area (e.g. rural areas) or those which are targeted at one or more geographic area (e.g. a specific city or town). Results should be shown separately alongside the calculation of UK-wide NPSV, which allows the local effects to be clearly identified. It may also be necessary to assess the differential impact of new interventions in devolved administrations, due to differences in existing policies.

5.75 This type of appraisal must include, as far as possible, the effects on other areas affected by the proposal. It cannot be assumed that resources are diverted from other parts of the UK 'on average'. Interventions will often divert resources from areas that are nearby and/or have very similar characteristics to the areas receiving an intervention. The effects of deadweight, displacement, transfers, substitution and leakage must be estimated based on credible, objective evidence that relates to the areas or issues of concern (See Annex 3 for more detail).

5.76 Distributional issues should also be considered when conducting research to calculate generic reference values for appraisal. For example, the income distribution of a sample population may be taken into account in order to adjust a generic value to represent the total population.

Appraising projects and programmes

5.77 Programmes usually form part of a wider organisational strategy and contribute to organisational objectives. The key differences between projects and programmes which should be reflected in the way they are appraised are:[15]

- ☐ programmes focus on the delivery of outcomes and projects usually focus on the delivery of outputs
- ☐ programmes are usually made up of enabling projects and activities
- ☐ programmes usually have a longer life span, involving a series of projects or stages and take a number of years to deliver
- ☐ programmes are usually more complex, with a wider scope and provide an umbrella for enabling projects to be co-ordinated and delivered

5.78 Individual projects within a programme are subject to the usual approval, development and processes set out in the HM Treasury Business Case guidance available at the link shown. The existence of a programme business case should shorten and simplify the business case for the constituent projects. In some cases the business case process can be shortened with agreement of the approving authority. Guidance is available to support planning and approval of Agile digital and IT projects.

[15] The differences affect the way they are appraised, approved and evaluated as further explained in HM Treasury Business Case Guidance and the Treasury Approvals Process.

Portfolio appraisal

5.79 Portfolio appraisal involves the optimisation of a portfolio of programmes and projects within a limited budget. The objective is to optimise the social value of the portfolio taking account of total whole life cost of projects, when subject to a budget constraint.

5.80 An example of portfolio appraisal is the capital allocation process at a Spending Review. Public capital spending is a readily controlled form of expenditure. This is because proposals that are not yet started or fully implemented can be more easily delayed, reduced in scope, re-phased or abandoned. When a decision is made to go ahead with capital expenditure it creates substantial whole of life costs e.g. maintenance and running costs for infrastructure or service provision for schools or hospitals. As a result, public sector capital spending is usually a relatively small percentage of the total cost of project. When ranking a set of projects with substantial capital spending, the BCR including whole life costs should be used. However, the cut off or budget constraint for considering which options are affordable should be the capital budget.

5.81 All capital spending proposals should be assessed on the basis of contribution to Government priorities as well as their BCR including whole life costs. Account may also be taken of unquantifiable and unmonetised factors and risks, and consideration may be given to the overall balance of the portfolio in terms of factors such as risk, uncertainty or the distribution of impacts. Future spending commitments should be taken into account in approval of individual spending decisions and when strategically reviewing a portfolio.

Competitive bids

5.82 In some cases, public expenditure will be allocated via competitive bidding, rather than through the standard business case process. In such cases the challenge is to design and construct a process that optimises the social efficiency of the final allocation at a strategic level. To achieve such an efficient use of public resources the allocating authority should define, in consultation with potential bidders, the overarching objectives that the bidding process is designed to support. To allow for variations between the needs of different bidders the overarching objectives may be supported by a number of SMART criteria developed in discussion with potential bidders. The bidding organisations should then prepare proposals based on their objectives using the business case methodology, and bids should be initially completed up to conclusion of the outline business case stage. Allocation of funds should initially be provisional and be based on the social value for money criteria. That is focusing on the agreed objectives, taking account of costs, benefits, unquantifiable features, risks and uncertainty. Final allocation of funds should be conditional on a satisfactory full business case in which costs are tied down. An agreed margin of error needs to be agreed at the outset beyond which further funding is not necessarily supported. In developing competitive processes, organisations should weigh the benefit of competitive process against the administrative costs and potential impacts on the ability of bidding organisations to plan strategically. Consideration should also be given to:

- ☐ the appropriate size and scope of the competition
- ☐ alignment with wider government objectives
- ☐ ensuring that the assessment criteria cover all relevant considerations, including strategic fit
- ☐ ensuring fairness in the assessment process

6 Valuation of Costs and Benefits

6.1 Chapter 6 sets out the approach to the valuation of costs and benefits in more detail. This includes further explanation of opportunity costs, which costs and benefits to include and approaches to non-market valuation. It covers land use valuation, assets and infrastructure, valuation of risks to life and health, natural capital and travel time.

Opportunity cost

6.2 The costs of using assets and resources are defined by the value which reflects the best alternative use a good or service could be put to, or opportunity cost. The starting point for estimating opportunity costs is usually market prices. It is important to understand the best alternative use of an asset being valued, since better alternatives may exist. The opportunity cost of labour should include the total value of the output produced by employees. This is the cost of employees' time, based on Full Time Equivalent (FTE) costs and includes pension costs, National Insurance, allowances, benefits and basic salary.

Employment and productivity effects

6.3 Productivity effects should be included in the calculation of UK costs and benefits where they can be objectively demonstrated. Productivity effects may arise from movement to more or less productive jobs, changes in the structure of the economy, benefits from dynamic clustering or agglomeration (benefits that arise through close location of businesses and/or people), private investment, product market competition or the generation and flow of ideas. Productivity effects will typically lead to higher wages, rather than higher employment. The benefits can be calculated from the different levels of total employment costs under different options.

6.4 Interventions which increase human capital, job-search activity or provide better access to jobs can have positive labour supply and macroeconomic effects. Provided they can be supported by clear, objective evidence labour supply effects can be included in appraisal.

6.5 Green Book appraisal is not concerned with the macroeconomic effects of spending which is the concern of government when it makes macro spending decisions on the overall level of spending and taxation. Green Book appraisal concerns effects on welfare and wellbeing at a micro level. It may be used to inform public resource allocation as when used in a spending review. Its principle focus and function is most frequently to support the development and selection of optimised spending proposals in the development of business cases. It is not generally possible to estimate objectively based, credible and statistically significant differences in macroeconomic variables arising from alternative options within a business case.

6.6 Therefore, changes to Gross Domestic Product (GDP), or Gross Value Added (GVA) or the use of Keynesian[16] type multipliers arising from different options cannot provide useful information for choosing between options within a scheme and are therefore not part of the Green Book appraisal process. However, macro variables may well form part of the higher level analytical research that informs identification of policy, and policy priorities.

[16] Keynesian multipliers consider an increase in demand arising from an increase in employment leading to subsequent further increased employment leading to further demand, continuing on a diminishing scale due to savings and any other leakage from the spending and employment cycle.

Economic transfers

6.7 Transfers of resources between people (e.g. gifts, taxes, grants, subsidies or social security payments) should be excluded from the overall estimate of Net Present Social Value (NPSV). Transfers pass purchasing power from one person to another and do not involve the consumption of resources. Transfers benefit the recipient and are a cost to the donor and therefore do not make society as a whole better or worse off.

6.8 Where transfers may have a distributional impact it may be appropriate to quantify and show these effects alongside the estimate of UK NPSV. This could involve showing the transfer of equivalent costs or benefits from one group in society to another, particularly when relevant to distributional objectives. It may be appropriate in those circumstances to undertake distributional analysis as set out in Annex 3.

6.9 Redundancy payments are a transfer payment and should not be part of the estimate of UK NPSV. Redundancy costs (or potential costs) should be included in the calculation of the financial costs to the public sector. In addition, where there are significant wider social effects of redundancy these should be calculated and included.

6.10 Payments of tax and national insurance made from an employee's gross earnings are part of the output or value produced by the workforce. They are therefore not a transfer payment and should be included where relevant in calculations of social value. HM Treasury should be contacted if there is uncertainty about whether costs or benefits in appraisal represent a transfer payment.

Residual values and other adjustments

6.11 An asset's residual value or liability at the end of the appraisal period should be included to reflect its opportunity cost. Residual values do not depend on the actual sale of an asset. The market price at the end of the asset's lifetime – the best value obtainable from its sale, lease or alternative use – is part of the value created as a result of the cost to the public sector of creating the asset.

6.12 Contingent liabilities – potential future expenditure if certain events occur – should be appraised and included as part of the expected cost of risk. They sometimes result from decisions that do not involve direct public expenditure. One example of a contingent liability is the cancellation costs if a public sector organisation terminates a contract prematurely. The HM Treasury contingent liability approval framework provides further discussion on calculating expected costs.

6.13 Depreciation is not included in the estimate of NPSV, although it is included in the estimate of public sector costs in financial analysis. Depreciation is used in accounting to spread an allowance for loss in value of an asset over its lifetime. In calculating NPSV, costs are not spread over time but register when total costs are reflected in the accounts.

Non-market valuation

6.14 When there is no market price for costs and benefits to society they need to be estimated and are known as shadow prices. This is particularly important for environmental, social and health effects. Some have generic values generated, for example, through surveys of a sample of the population. These are included, with information on how to use them, in Annex 1 and the Green Book webpages. To ensure appropriate use it is important to understand the difference between the characteristics of the sample population and an intervention's intended target population. The advice of professional economists is required when dealing with non-market valuation.

Non-market price calculation and estimation

6.15 Social costs and benefits without a market price can be estimated using a range of techniques. Box 20 summarises a hierarchy of the main techniques that can be used. These approaches have strengths and weaknesses that need to be considered when they are used for Social CBA.[17]

Box 20. Valuation Methods for Non-Market Prices

Market prices

Prices from the relevant market (excluding taxes and subsidies). In some cases a closely comparable market can be used where a direct market price is unavailable.

Generic prices

Use of a Green Book approved transferable price applicable to the proposal.

Revealed preference

Techniques which involve inferring the implicit price placed on a good by consumers by examining their behaviour in a similar or related market. Hedonic pricing is an example of this where econometric techniques are used to estimate values from existing data.

Stated preference willingness to pay

Research study by professionally designed questionnaire eliciting willingness to pay to receive or avoid an outcome.

Stated preference willingness to accept

Research study by professionally designed questionnaire eliciting compensation to accept a loss.

Wellbeing

Use of direct wellbeing based responses (in existing data or from research by questionnaire) to estimate relative prices of non-market goods.

Estimation of a central reference value and a range

Based on available data.

6.16 Market prices will not represent total costs and benefits where a market is distorted because of restricted competition, such as a monopoly in supply (only one seller), or monopsony in purchasing (only one buyer). If this is the case valuation may be required and discussion is advised between the responsible organisation and their approving authority, or HM Treasury in the case of major expenditure.

6.17 For non-market valuation in general, research studies may be commissioned where there are no reliable values and it is justified by the size of the cost, benefit or risks. Where a research study is not feasible and transferable values are not available, desk-based research and other data sources may shed light on the likely range of values. In these cases a range of estimates should be used. The basis should be made clear, and they must be included in the sensitivity analysis, to test whether the benefit valuation is critical to the decision to be made.

6.18 Sometimes it is possible to identify the implied value of non-market goods from other decisions people make where prices are available. This gives a revealed preference – the value revealed as a result of people's actions. Hedonic pricing is an example of this approach. For example, the relationship between house prices and levels of environmental amenity, such as peace and quiet, may be analysed in order to assign a monetary value to the environmental benefit. Another example is the travel cost method, which involves estimating the costs people incur in order to consume a non-market good such as a recreational site.

[17] Fujiwara and Campbell (2011) discuss the strengths and weaknesses of revealed and stated preference techniques and use of subjective wellbeing evidence.

6.19 If robust revealed preference data is not available, surveys that use willingness to pay and willingness to accept are an established alternative method known as stated preference techniques.

6.20 Revealed and stated preference techniques are commonly used to elicit estimates of what individuals are willing to pay or accept for a specific outcome. They underpin many of the valuation techniques outlined in Annex 1, for example stated preference techniques are used to value health outcomes using Quality Adjusted Life Years (QALYs).

Subjective wellbeing approaches

6.21 Subjective wellbeing evidence aims to capture the direct impact of a policy on wellbeing. The evidence can challenge decision makers to think carefully about the full range of an intervention's impacts and to consider a wider range of interventions. The evidence can also help challenge implicit values placed on impacts by providing a better idea of the relative value of non-market goods.

6.22 The use of subjective wellbeing approaches in assessing the longlist of options is explained in Chapter 4. For use in shortlist appraisal it may be appropriate to use subjective wellbeing as the outcome variable for Social CEA in certain circumstances.[18] It is recognised that the methodology continues to evolve[19] and it may be particularly useful in certain policy areas, for example community cohesion, children and families. Where valuations are considered robust enough for inclusion in Social CBA, benefits or costs must not be double counted, which could occur if a benefit or cost arising from a policy were counted by different valuation methods.

Specific approaches to valuation

Land use values

6.23 The value of land is determined by factors such as use, location, nearby infrastructure and the cost of development for an alternative use. The potential net benefits of new land used can be assessed using values arising from a change. The change in value is defined as the value of the land in its new use (e.g. commercial or residential) minus the value of the land in its existing use.

6.24 Any increase in land value as a result of a change in its use reflects the economic benefits of conversion to a more productive use. The value to society of a development can therefore be derived from the land value. This estimate should be adjusted for any change likely without the development, displacement from the original land use and wider effects of the resulting development, e.g. any change in amenity value, environmental or health outcomes. Any double counting should be adjusted for. See Annex 1 for more detail.

Asset maintenance

6.25 Asset maintenance costs may be substantial, occur over long time periods and need to be accounted for over an asset's likely lifetime. These estimates should be based on an organisation's asset maintenance policies. In the absence of policy any assumption should be based on maintaining the service level and quality at the outset for the asset's lifetime.

[18] Where there is evidence that wellbeing fully captures all the outcomes affected by a proposal and there is sufficient evidence available for different options being considered.

[19] The What Works Centre for Wellbeing have published a guide on the use of wellbeing evidence in cost-effectiveness analysis, available on the analyst web page: https://www.whatworkswellbeing.org/appraisal.

Asset sales

6.26 The design of an asset sale is subject to the Green Book and HM Treasury Business Case Guidance. Estimates of social value should include wider social costs and benefits that may be affected by a sale.

6.27 The value of existing assets is their opportunity cost. For asset sales this is usually the value in the market and must be estimated where no comparable market value exists. Where there is a known stream of income arising from an asset's ownership (e.g. interest, repayment of a debt, or rental/lease income) the value should be estimated based on a discounted value of the future income stream (using Social Time Preference Rate, STPR). Where there is no income stream, market value can be estimated using comparable sale values or comparable potential income streams. The asset value used should inform the estimate of social value and public sector income.

6.28 Where an asset is unused, there may still be positive benefit of an alternative use if transferred to the private sector or a wider social cost of disposal. These costs and benefits may be affected by the method and timing of the sale and any provisions attached. There may also be public sector or social costs associated with ongoing ownership of an asset which will need to be considered as part of any assessment to hold or dispose of an asset.

6.29 Social CBA and Social CEA are not relevant when the benefit of an asset sale is only public sector revenue, with no change in public service output. If there is no change in the output of public or other services, there is simply a saving in the overall public sector. The focus should then be on ensuring an efficient sale to deliver best value to public sector finances and should be registered in the financial dimension of a business case.

6.30 Valuation of financial asset sales is covered by the Green Book, except for the sale of government debt which is exempt. Financial assets are generally priced according to a valuation of their discounted income stream, using the STPR. The composition of the STPR means it excludes project or programme specific risks, so the cost of risks should be explicitly included in an intervention's cost.

6.31 A market risk premium must be estimated to price a financial asset for sale and should be added to the risk-free component of the STPR, which is 2.5%. The STPR is 3.5% and includes a 1 percentage point allowance for catastrophic risk which is excluded to give the risk-free component of 2.5% (Annex 6 provides a breakdown of the STPR). A projection of the future stream of income from the asset is also required. The variability of this income stream and the reliability of the projections will directly affect the size of the risk premium.

6.32 Potential purchasers may have other reasons for finding a financial asset attractive, such as its risk profile. This can be irrelevant to the public sector but of material value to a financial institution seeking to balance risk in a portfolio. This may increase the price that potential purchasers are willing to pay. More information on valuing financial assets can be found in Green Book supplementary guidance: asset valuation.

Infrastructure

6.33 Infrastructure interventions should be appraised and valued in the same way as all other interventions. Infrastructure is a broad term relating to the assets, networks and systems that support the operation of a modern society and economy. In the UK, the term economic infrastructure refers to businesses and their assets that are concerned with transportation, water and sewage, waste management, energy, communications, and flood and coastal erosion. Economic infrastructure has particular characteristics that need to be recognised and taken into account.

6.34 Economic infrastructure can be geographically extensive and involve significant investment in physical assets. Many of these assets have grown organically over time and are often highly interdependent. Because of their size, and in certain cases complexity, some decisions may have effects on future flexibility of an organisation or industry affected and other infrastructure service providers. Productivity benefits should be considered as part of appraisal, including agglomeration effects or changes in the structure of the economy that may result from infrastructure investment.

6.35 Infrastructure, long term planning and high interdependence levels need to be taken into account at the longlisting stage and when selecting the optimum shortlist (Chapter 4). It is vital that this is supported by sufficient good quality research and evidence, for example on previous similar interventions.

Valuing risks to life and health

6.36 Changes in risks to life or health as a result of government interventions should be valued as part of appraisal and will usually require non-market valuation techniques. The choice of technique will depend on the nature of the specific intervention being appraised.

6.37 The Value of a Prevented Fatality (VPF) measures the social value of changes in risk to life. It is used to value small changes in fatality risks, where levels of human safety vary between options. This is not the value of a life, it is the value of a small change in the risk or probability of losing a statistical life. Not to value this in appraisal would effectively value human safety at zero.

6.38 In cases where alternative levels of fatality risk are involved in option design, VPF allows this to be taken into account. The value concerned is known as the value of the risk of "a statistically prevented fatality." It has been widely used for many years, particularly in transport. The current value and how it may be applied is discussed in Annex 1.

6.39 Valuation can also involve estimating the impact of risks to the length of life, measured using Statistical Life Years (SLYs), and risks to health related quality of life (QoL) measured using Quality-Adjusted Life Years (QALYs). In practice, particularly in the health sector, QoL can be thought of as different dimensions of health (e.g. the capacities for mobility, self-care, usual activities, pain or discomfort and anxiety or depression).[20] Observations used will be based on self-reported health and provide equal weight to whatever full health means to each respondent.

6.40 The value of a SLY is derived from the social value of a small change in the probability (the risk) of losing or gaining a year of life expectancy. This value can be of use when appraising options that involve different changes to life expectancy. These risks may involve regulation or provision of goods and services that affect or directly relate to human life and health.

6.41 The gain or loss of a QALY can represent the social value of an improvement in life expectancy and QoL in a way that is comparable to the gain or loss of a SLY. The QALY is two dimensional, combining both longevity and level of health in a single measure. This is useful when appraising options that result in different effects on both longevity and QoL. The current values of a SLY and a QALY, how they can be applied, and background information is contained in Annex 1.

6.42 On grounds of equity in appraisal, the VPF, QALY and SLY values are based on average values from representative samples of the population. For the avoidance of doubt VPF, QALYs and SLYs are used when analysing and planning the provision of assets, goods and services at a population or sub-population level. They are not designed for contexts such as situations of emergency or rescue.

[20] These are dimensions of health as measured using the EQ-5D instrument. This is a tool that individuals complete to show changes in self-reported health over time or before/after receiving health care treatment.

Greenhouse gas emissions and energy efficiency values

6.43 Greenhouse gas (GHG) emissions occur as a result of many decisions to create assets or provide public services, particularly where direct energy consumption is required. They may also result from the energy required to produce basic input materials used in construction. The creation of GHGs has a social cost based on its contribution to climate change.

6.44 To estimate the social cost of an intervention it is necessary to include the costs of emitting GHGs. Energy efficiency has a direct social value, in addition to the value of a reduction in GHGs, as the energy saved itself has a direct benefit to society (similarly, activities that create extra demand for energy have a direct energy cost). The approach and values to quantify GHGs and energy efficiency can be found in Annex 1.

Assessing and valuing effects on the natural environment

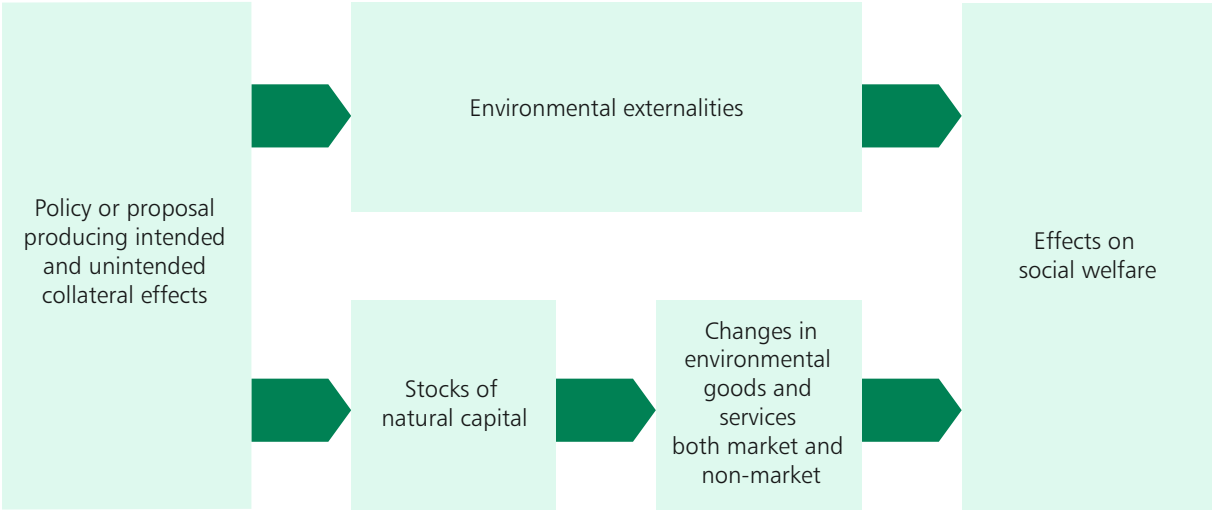
6.45 Natural capital includes certain stocks of the elements of nature that have value to society, such as forests, fisheries, rivers, biodiversity, land and minerals. Natural capital includes both the living and non-living aspects of ecosystems.

6.46 Stocks of natural capital provide flows of environmental or 'ecosystem' services over time. These services, often in combination with other forms of capital (human, produced and social) produce a wide range of benefits. These include use values that involve interaction with the resource and which can have a market value (e.g. minerals, timber, fresh water) or non-market value (e.g. outdoor recreation, landscape amenity). They also include non-use values, such as the value people place on the existence of particular habitats or species. Where service flows are not marketed, or market prices do not include their full value to society, non-market values may be estimated using the range of non-market valuation techniques or tools.

6.47 Understanding natural capital provides a framework for improved appraisal of a range of environmental effects alongside potentially harmful externalities such as air pollution, noise, waste and GHGs.

6.48 Natural capital stock levels should be systematically measured and monitored for the social costs and benefits of their use to be understood and controlled (see report to the Natural Capital Committee). A focus solely on the marginal valuation of a loss in services may overlook the potential for large reductions in stocks. This could then lead to dramatic reductions in present or future services. Similarly, the cumulative effects of multiple decisions on natural capital stocks need to be considered. Where appropriate therefore, and particularly for major impacts, assessments should consider whether affected natural assets are being used sustainably.

Figure 9. The Natural Capital Framework



6.49 Figure 9 shows the natural capital framework. This does not replace existing approaches to appraising and valuing environmental effects. Rather, by providing a more comprehensive framework within which to develop and appraise policy, it suggests additional options to meet policy goals and enables all options to be assessed more accurately for potential improvements and/or damage to the environment.

6.50 As a first step, the following questions can be used to consider the impact on natural capital. Is the option likely to affect, directly or indirectly:

- ☐ the use or management of land, or landscape?
- ☐ the atmosphere, including air quality, GHG emissions, noise levels or tranquillity?
- ☐ an inland, coastal or marine water body?[21]
- ☐ wildlife and/or wild vegetation, which are indicators of biodiversity?[22]
- ☐ the supply of natural raw materials, renewable and non-renewable, or the natural environment from which they are extracted?
- ☐ opportunities for recreation in the natural environment, including in urban areas?

6.51 If the answer to one or more of these questions is "yes" or "maybe", further assessment is recommended as outlined in Annex 1.

Travel time

6.52 The value of a change in travel time is the change in welfare expressed in monetary terms. The values of travel time savings represent the opportunity costs of time spent by travellers during their journeys. For example, the opportunity cost of travel time for a visiting care worker during working hours is the social value of the time which would otherwise be spent caring for service users. More detail on travel time valuation can be found in Annex 1.

PPP, tax and other adjustments

6.53 Comparison of Public Private Partnerships (PPP) options with a comparable public sector option is required. A suitable public sector option should be created to provide a benchmark for comparison of direct public provision and partnership options, costs and value on a level playing field. This requires the comparable public sector option to be based on the same provision of services in terms of quantity and quality and provide the same level and length of asset maintenance as the partnership option. It is therefore necessary for adjustments to be made for tax (see Annex 4).

6.54 A choice involving PPP options should not be reduced to a binary choice between public and private. Having a partnership option and public sector comparator on the shortlist does not rule out other options. There may be more than one partnership option and where this is the case each one requires its own public sector comparator. There may also be other directly provided public sector options not comparable to the PPP options (e.g. different in terms of scope or benefits offered) in addition to the public sector comparator.

6.55 Payments of tax on foreign procurements are included in market prices in the social value calculations, in the same way as they are for UK purchases. Manufacturing and supply chains are generally global in nature, meaning all procurements on average are likely to have elements of

[21] The water cycle cuts across natural assets, and includes non-tidal rivers, lakes, ponds, wetlands, floodplains as well as groundwater, coastal estuaries, the marine environment.

[22] Wildlife can be affected by direct changes to protected sites and by disrupting or creating connections between sites.

foreign origin, manufacture and taxation applied to their production. It would not be proportionate, or likely to add value to the decision process, to attempt an analysis of each procurement's degree of embedded foreign taxation and then to make an adjustment.

6.56 The existence of a UK supply chain or the location of companies involved in maintenance and repair may be important for policy or wider social objectives. When this is the case this should be considered at the longlist stage and in selection of the shortlist. Such priorities should be used when developing the economic dimension of a business case, and should feed through into the specification of the procurement process in the commercial dimension.

6.57 If competition effects resulting from a proposal are deemed likely during consideration at the longlisting stage (Chapter 4), further in-depth assessment of these impacts should be undertaken and incorporated into any Social CBA or Social CEA. Guidance on quantifying competition effects can be found at the CMA webpages.

Unmonetisable and unquantifiable costs and benefits

6.58 If there are significant unmonetisable effects associated with an intervention, efforts should be made (where it is possible and meaningful) to quantify them in some other way. Significant benefits and risks that are beyond direct monetisation should be considered at the longlist stage and in selection of the shortlist. Options with and without their inclusion provide alternative scenarios, which can be used to reveal their costs. This informs choice by considering whether these cost differences are a price worth paying. For example, Bateman et al. (2013)[23] apply this when examining the costs of changing policy on land use when faced with unmonetisable impacts on biodiversity.

6.59 The focus of appraisal should be on benefits and costs important to the decision being considered. The treatment of unmonetisable and unquantifiable benefits is discussed further in Annex 1.

[23] Bateman et al. (2013) "Bringing ecosystem services into economic decision making: Land use in the UK" Science, Vol 341, No. 6141: 45-50, 5th July 2013. DOI: 10.1126/science.1234379.

7 Presentation of Results

7.1 Chapter 7 outlines how to present appraisal results.

7.2 The role of appraisal and evaluation is to provide objective evidence and analysis that feeds information into the design, scrutiny and approval processes that support government decision making. Accordingly appraisal results should be presented transparently to show clearly the social value of alternative options in a consistent way.

7.3 The presentation of appraisal results is at the heart of the recommendation of the preferred option. Results should be clearly and transparently reported in summary form with clear cross references to more detailed tables and graphical presentation where appropriate, as well as sources for assumptions and data. Results should be supported by an executive summary that summarises the objective evidence, analysis and any recommendations. All tables and data including the appraisal summary table and key figures in the executive summary should be cross referenced to their sources in the main body of the business case, key data and assumptions should be identified and cross referenced to the original evidence and sources from which they are derived.

The executive summary should refer to:

- ☐ the strategic dimension of the case, and explain the strategic fit of the proposal with wider public policy and other proposals to which it is directly related, and should be revisited as part of the advice on a recommendation
- ☐ constraints and dependencies where relevant, and significant residual risks and uncertainties explained
- ☐ the logical change process to demonstrate how delivery of the SMART objectives will be produced by making the changes proposed
- ☐ distributional issues where relevant, and evidence provided including for place based issues, equalities effects or income distribution
- ☐ key parameters and assumptions that have a significant effect on selection of the recommended option
- ☐ a clear explanation of the sensitivity analysis and switching values as part of an explanation of residual risks, their management, likelihood and costs
- ☐ a clear discussion of the recommended option and the reasons for the recommendation and the balance in judgment between the benefit to cost ratio, the costs of including any key features that have been included the benefits of which are not monetisable and the overall level of risk, as well as a description of the contingency plan.

Appraisal Summary Tables

7.4 The generic core appraisal summary table shown below is intended as a template that can be extended within reason so as not to obscure the key points that are the basis of advice on the preferred option. A set of summary table templates is provided on the Green Book web page and should be used. Where a place based appraisal is involved an appraisal summary table showing

place based results and a table showing UK results are needed, multiple places will require a table each as will travel to work areas if a place based proposal results in significant effects there. The relationships between them should be covered in the single executive summary.

7.5 Figures are to be presented in absolute terms not as incremental differences from "BAU" or the "Do Minimum." This makes each option more transparent and allows clear straightforward comparisons between options in a variety of ways. Relative differences can be explained where they are relevant to the advice contained in the executive summary.

7.6 Assumptions which have a significant effect on the decision must be clearly indicated in the summary and the objective basis on which all assumptions are based must be explained with links to sources of data and assumptions provided. The quantified Business As Usual must be shown.

7.7 A generic, core Appraisal Summary Table (AST) is shown in Figure 10. It can be used as a starting point for summarising results, and it represents the minimum set of core information to be used in presenting results. Some government departments already use standard ASTs to bring together key information that is tailored to their needs, these should include the generic table as an overview.

7.8 The AST is a template intended to be spread horizontally across two facing A4 pages to provide an at a glance summary of the key factors in a public spending and non-regulatory decisions.

7.9 This approach to presentation of results and the AST template applies to Place Based Appraisal in the same way as for UK wide appraisal results. In such cases two or more ASTs will be appropriate one for the UK wide results and one for the place of interest with a single unified executive summary.

7.10 If income distribution or equalities effects have been appraised, then clear simple supplementary summary tables on the results should be provided for presentation with the ASTs.

7.11 The AST should also record any significant unmonetisable and unquantifiable effects that are important for a decision. Extensions to this template and supporting tables setting out costs and benefits over time are downloadable from the Green Book web pages.

7.12 Regulatory decisions with impacts on business are subject to the Better Regulation Framework issued by the Better Regulation Executive. In some circumstances specific requirements may apply (e.g. use of an IA toolkit and template). The AST here does not replace the summary sheet on the front of the IA template but it should be proportionately used to support the presenting results within the evidence base section of the IA template.

7.13 Where proposals are not conventional and higher levels of uncertainty on costs and benefits are involved then the confidence interval should be agreed with the Treasury at the start of the process. This higher degree of uncertainty should be explained, and the confidence level justified from the outset. Care must be taken to explore sensitivity and switching values as part of the sensitivity exercise and these values clearly shown in the summary table. Optimism bias must be fully included as set out in the guidance and the cost risks should be as far as possible realistically reduced through option selection, risk management, and sharing. Additional useful templates can be found in the supplementary guidance on Business Cases.

Figure 10. Generic Core Appraisal Summary table template

BAU and alternative options at least 4				
Option label	**1. Business As Usual BAU**	**2. Do Minimum Option**	**3. Preferred Option if not Do Min**	**4. More and less Ambitious Options 4-to-N → as needed**
NPSV for CBA or Net Present Unit Cost, NPUC for CEA	90% Confidence* Interval and expected value	→	→	→
Relevant present vale public sector cost	90% Confidence* Interval and expected value	→	→	→
Appropriate BCR or NPUC	90% Confidence* Interval and expected value	→	→	→
Significant Quantified but unmonetisable benefits	Brief description* Who benefits 90% Confidence range & expected.	→	→	→
Significant Unquantifiable benefits	Brief description if included	→	→	→
Residual risk and optimism bias allowances	90% Confidence Interval and expected value	→	→	→
Switching values of key variables	90% Confidence Interval and expected value	→	→	→
Life span of the option	Months and /or Years	→	→	→

*The 90% level may need to be wider for exceptional non-standard costs where this is significant a wider confidence interval must be agreed with the Treasury at the start of the process, see paragraph 7.13 above.

8 Monitoring and Evaluation

8.1 Chapter 8 sets out the approach to monitoring and evaluation including different types of evaluation and uses before, during and after implementation.

8.2 Monitoring and evaluation should be part of the development and planning of an intervention from the start. They are important to ensure successful implementation and the responsible, transparent management of public resources. Guidance on conducting evaluation is contained in the Magenta Book.

8.3 Evaluation is a systematic assessment of an intervention's design, implementation and outcomes. It involves:

- ☐ understanding how an intervention is being or has been implemented, what effects it had, for whom and why
- ☐ comparing what happens with what was expected under Business As Usual (the appropriate counterfactual)
- ☐ identifying what can be improved, estimating overall impacts and cost-effectiveness.

8.4 When used properly, evaluation can inform thinking before, during and after implementation as set out in Box 21.

8.5 It is important to incorporate consideration of monitoring and evaluation into the development, design and appraisal stage of a policy, programme or project. Pilots can be used to test policy effectiveness of what works. Policies can also be designed with inbuilt variation to test the effectiveness of different approaches in real time. And some implementations are able to benefit from use of controlled experimental methods or the use of phased pilot roll outs in which adaptation and learning about what works are part of a programme.

Box 21. Uses of Evaluation

During Implementation – Monitoring allowing improved management and adaptation of implementation in response to evidence based on live data collection and analysis and inform subsequent operational delivery.	☐ Is the intervention being delivered as intended? ☐ Is the intervention working as intended?
After Implementation – Evaluation provides an assessment of the outcome of the intervention and a summative assessment of the lessons learned throughout design and delivery.	☐ How well did the intervention meet its SMART objectives? ☐ Were there unexpected outputs and outcomes? ☐ Were costs benefits and delivery times as predicted at approval? ☐ Was delivery achieved as expected and were any changes needed? ☐ What can be learnt for future interventions

8.6 Evaluation is often broken down as follows:

- Process Evaluation – involves assessing whether an intervention is being implemented as intended within its cost envelope, whether the design is working, what is working more or less well and why. It supports understanding of internal processes used to deliver outputs, alongside what was actually delivered and when.
- Impact Evaluation – involves an objective test of what changes have occurred, the extent of those changes, an assessment of whether they can be attributed to the intervention and a comparison of benefits to costs. It supports understanding of the intended and unintended effects of outputs, as well as how well SMART objectives were achieved.

8.7 Regulations may require post-implementation reviews (PIRs) which are closely related to policy evaluations. The aim is to review regulations at timely intervals to assess whether they are still necessary, whether they are having the intended effects and what the costs to business are. PIRs will generally focus on measures with significant impacts on business and should be conducted proportionately, supported by appropriate monitoring and evaluation. Better Regulation guidance provides more information on conducting PIRs.

8.8 The planning of monitoring and evaluation for spending proposals should follow the HM Treasury Business Case guidance for both programmes and projects available at this link. This allows a wide range of analytical and logical thinking tools to be used when initially considering the objectives and potential solutions. Planning and provision of resources for monitoring and evaluation should be proportionate when judged against the costs, benefits and risks of a proposal both to society and the public sector.

8.9 Monitoring and evaluation typically use a mixture of qualitative and quantitative methodologies to gather evidence and understand different aspects of an intervention's operation. Surveys, and interviews may be needed to understand effects on a wide range of stakeholders. At each stage questions should reflect the need- to manage and assess an intervention. Evaluation is important because:

- it can be used to improve current interventions
- it supports transparency, accountability
- it adds to the evidence base available for future decision making
- importantly by improving understanding of change and how it is caused, it improves understanding of the logical change processes informing future proposals about what works and why.

8.10 Monitoring and evaluation typically use a mixture of qualitative and quantitative methodologies to gather evidence and understand different aspects of an intervention's operation. Surveys, interviews and focus groups may be needed to understand the views of a wide range of stakeholders, evaluation questions should reflect immediate needs to manage and assess the success an intervention. Evaluation is important as:

- it facilitates transparency, accountability and development of the evidence base
- it can be used to improve current interventions
- it expands learning of 'what works and why' to inform the design and planning of future interventions.

8.11 Building monitoring and evaluation into the design of a proposal, and building resources into a proposal, supports provision of timely, accurate and comprehensive data. Data collection should be done alongside the monitoring of costs; either within the intervention itself, or as part of the organisation's wider cost monitoring. Well designed data collection:

- ensures monitoring and evaluation can take place
- allows for relatively minor adjustments to be made to the implementation design which can greatly improve the delivery of benefits
- supports provision of high-quality evaluation evidence and reduces the likelihood of retrospectively attempting the collection of data.
- where creation of a natural comparison group is possible as part of the implementation it allows valuable insights into what works and why
- informs management during implementation enabling identification of threats to delivery.

8.12 Monitoring and evaluation objectives should be aligned with the proposal's intended outputs, outcomes and the internal processes, although they may also be wider. Policies and programmes that involve a series of related sub-programmes must also be subject to monitoring and evaluation in programme terms during and after implementation.

8.13 SMART objectives should be objectively observable and measurable. Their design should take into account monitoring and evaluation processes. Their suitability for use in monitoring and evaluation is a necessary condition for inclusion as SMART objectives (Chapter 4). Without verifiable and measurable objectives success cannot be measured, proposals will lack focus and be less likely to achieve Value for Money.

8.14 Data on Business As Usual, along with continuing data collection, is vital to manage delivery and monitor the intervention during and after implementation. Monitoring and evaluation should examine what happens compared to:

- the objectives expected at the outset, in the business case or impact assessment if available
- the BAU situation at the start of implementation.

8.15 In terms of the Five Case Model, a core set of questions to consider are set out in Box 22. A more detailed set of evaluation questions can be found in the Magenta Book.

Box 22. Core Evaluation Questions

To what extent were the SMART objectives achieved and by when, in particular:

- ☐ to what extent were outputs delivered and when?
- ☐ to what extent were the anticipated outcomes produced and by when?
- ☐ what continuing change is expected as a result of the above?
- ☐ how well did the process of delivering the outputs and outcomes work?
- ☐ were there significant unintended effects?
- ☐ what social value was created as defined in the economic dimension?
- ☐ what level of confidence can be attributed to the estimates of impact, including social value?
- ☐ what was the cost to the public sector as defined in the financial dimension?

8.16 Monitoring and evaluation evidence and reports should be actively owned by the Senior Responsible Officer and the team responsible for an intervention's delivery. Data and findings should be reported regularly, and reports should be timed to correspond to decision points where they can be of maximum use. Major findings should also be reported to the organisation's Accounting Officer and to the relevant external approving organisation.

8.17 Evaluation reports, and the research that informs them, should be placed in the public domain in line with government transparency standards and Government Social Research: Publication Protocol, subject to appropriate exemptions.

A1. Non-market Valuation and Unmonetisable Values

A1.1 This Annex provides detail on specific approaches to non-market valuation techniques and generic values for use in appraisal. It covers:

- a range of environmental techniques
- land values
- energy efficiency and Greenhouse Gases
- life and health
- travel time

Environmental and natural capital

A1.2 Where potential effects on natural capital are identified by the screening questions in Chapter 6, the 4-step approach in Box 23 can be used to identify whether and how an intervention may affect stocks of natural capital and the benefits they provide. Further guidance by Department for Environment Food and Rural Affairs (DEFRA) called "Enabling a Natural Capital Approach (ENCA) is available at this link.

A1.3 In addition to the process in Box 23, further points relevant to the natural capital approach include:

- an understanding of biological and physical changes in natural assets is the starting point of the appraisal and associated economic valuation (for example, understanding the impacts of a woodland creation and carbon sequestration project).
- environmental effects and associated values are often geographically specific. The recreational value of new or destroyed woodlands, publicly accessible green space or changes in air quality may be greater in or near densely populated locations than more remote areas. Recreational values may be greater where there are fewer alternative sites.
- the sustainable use of natural assets should also be considered. In addition to the marginal valuation of a loss in services, the degradation of a renewable asset should be assessed, such as the exploitation of a fishery or a loss in condition of the underlying biodiversity. Non-marginal effects such as reaching ecological tipping points might lead to dramatic or irreversible loss in the asset under consideration. This would result in a loss of environmental services and welfare. Cumulative effects of multiple investment decisions upon the underpinning stocks of natural capital should also be considered.
- future scarcity values for goods and services are likely to rise over time. This is due to the rising demand for goods and services which depend on natural capital and the services it provides, combined with limited, and in some cases diminishing, underlying stocks. This is not a problem easily addressed through the appraisal of individual project level interventions, as diminishing underlying stocks and potential tipping points in complex

systems may well involve non-marginal effects. In addition, if assumptions about future prices exceed the long term growth of per-capita real income, this must be agreed with HM Treasury.

Box 23. Identifying whether an intervention may affect Natural Capital

The four steps to consider whether and how and intervention may affect stocks of natural capital are:

- ☐ **Step 1** – identify the environmental context of the proposal ("what and where?"):
  - identify scale, location, outputs and spatial reach of the intervention.
  - what types of land cover and natural system will the proposal affect, directly or indirectly (e.g. farmland, urban green space, woodland, freshwaters, moorland, coastal margins)?
- ☐ **Step 2** – consider bio-physical effects on natural assets ("how?"):
  - which natural assets (such as land use, water bodies, species, wildlife habitats and soils) are specifically likely to be affected?
  - this step facilitates the assessment of relevant welfare effects in Step 3, as well as informing on the physical sustainability of natural stocks.
- ☐ **Step 3** – consider the social welfare implications of the bio-physical effects identified in Step 2 ("what consequences?"):
  - how are environmental goods and services to society affected by the changes to the assets? These goods and services may be classified as:
    - i **"provisioning"** services such as supply of food, fuel, fibre and water which typically have market values.
    - ii **"regulating"** services such as water quality and quantity regulation, climate regulation, pollination, air quality regulation.
    - iii **"cultural"** services such as landscape and environmental spaces for recreation amenity, and cultural heritage.
  - "regulating" and "cultural" services do not typically have direct market values. The effects should be identified as far as possible and proportionately quantified and monetised. Unmonetised factors should be treated as recommended for all interventions.
- ☐ **Step 4** – consider uncertainties and implementation:
  - environmental effects may be uncertain. Therefore, consideration needs to be given to quantifying these uncertainties as risks that must be costed and managed, so that they can be minimised, mitigated or where possible avoided.
  - critical factors should be identified and arrangements for monitoring included as part of intervention proposals in order to manage risks and optimise outcomes. See Annex 5 on risk management.
  - identification of mitigating measures is particularly important so that risks to natural assets can be minimised and benefits maximised.

A1.4 Multiple impacts may need to be measured and valued. For example, the costs of a proposal that would destroy woodland could include the loss of the following: timber value, carbon sequestration, recreational value, biodiversity and "non-use" values, as well as direct externalities such as noise and air quality. Care should be taken to avoid double-counting where impacts overlap.

Approaches to environmental valuation

A1.5 For initial estimates of environmental impacts, or valuing secondary impacts, Defra's Enabling a Natural Capital Approach guidance known as (ENCA) provides access to environmental valuation evidence. These indicative values should be combined with changes in the physical quantity of the environmental good or impact under consideration.

A1.6 ENCA provides a starting point for scoping the requirements for more robust valuation, and access to a number of Value Transfer methods or commissioning bespoke economic valuation studies. Value Transfer refers to the use of existing economic valuation evidence in a new appraisal context.[24] Other sources for Value Transfer include:

- the international Environmental Valuation Reference Inventory which contains over 400 UK environmental valuation studies
- the Forestry Commission's searchable Woodland Valuation Tool now published by Scottish Forestry collates all valuation studies relevant to the various services provided by woodland

A1.7 The following sections summarise valuation approaches and provide indicative estimates for specific environmental services and effects. A primary valuation study may be justified where there is no relevant valuation evidence and environmental benefits are critical to decision making.

Effects on air quality

A1.8 Atmospheric pollution can have significant effects on health, quality of life, economic activity and the functioning of ecosystems. Three approaches can be used for valuation:[25]

1. if impacts are likely to be less than £50 million and do not affect compliance with legal limits then a "damage cost" approach is appropriate. This involves multiplying emissions changes by pre-calculated unit costs, described further below. This is often used to value the consequences of changes in pollution e.g. on health, crops and buildings.
2. if impacts are greater than £50 million then the "impact pathway" approach should be considered. This involves bespoke modelling specific to the intervention.
3. an "abatement cost" approach should be used in the limited instances where a proposal could affect compliance with legal limits. This involves estimating the least costly way of mitigating the impact of the proposal to ensure continued compliance with legal obligations.

A1.9 Damage costs are a relatively simple way to value changes in air pollution, as full modelling can be resource intensive. Damage costs are estimates of the societal cost of a change in emissions of different pollutants. This approach is appropriate for small air quality impacts (below £50 million) provided the proposal does not affect areas likely to breach legal air quality limits. Damage costs are calculated per year and should be multiplied by the number of years to which they apply. Full guidance and the latest damage cost estimates are available from Defra.

Noise

A1.10 Noise has a social cost. It can affect health, wellbeing, productivity and the natural environment. Generic appraisal values are shown in Table 3 and Table 4. These are marginal annual values for changes in total road, rail and aircraft noise exposure. These values can be added for changes of more than one decibel and should be multiplied by the number of years and

[24] Further information on Value Transfer methods is available on the DEFRA web pages.

[25] Please contact IGCB@defra.gsi.gov.uk to discuss the most appropriate approach.

households to which they apply. Where the effect of noise is likely to be a substantial or a decisive factor for an intervention, a detailed assessment may be justified. Full tables, more information on how the values in the table below are calculated and further guidance can be found on the DEFRA webpages.

Table 3. Change in Noise Metric by Decibel (dBA) – Daytime per Household per Decibel Change, Central Values (2014 Prices)

Change in noise metric by decibel (dBA) – daytime		Road	Rail	Aircraft
45.0	46.0	£11.28	£3.90	£15.61
55.0	56.0	£51.22	£16.98	£49.01
65.0	66.0	£103.96	£46.34	£79.82
75.0	76.0	£175.04	£93.31	£114.75

Table 4. Change in Noise Metric by Decibel (dBA) – Night Time per Household per Decibel Change, Central Values (2014 Prices)

Change in noise metric by decibel (dBA) – night time		Road	Rail	Aircraft
45.0	46.0	£29.20	£13.59	£37.93
55.0	56.0	£57.91	£28.25	£66.56
65.0	66.0	£86.62	£42.92	£95.19
75.0	76.0	£86.62	£42.92	£95.19

Waste

A1.11 Where a proposal affects the flow of materials or waste it may be possible to access data on environmental externalities from Life Cycle Assessment (LCA) studies.[26] LCA is the compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle. LCA studies and databases cover air pollution, greenhouse gas emissions, resource depletion, aquatic eco-toxicity, human toxicity and other issues. These are expressed either as mid-point indicators (e.g. tonnes of CO2 equivalent emissions) or end-point indicators (e.g. human health measured in Disability Adjusted Life Years).

A1.12 European data to feed into LCAs are publicised via the EU, although a range of other databases are in common use. When using published studies, it is important to ensure that the study is representative of the situation to which the data is being applied.

Recreation

A1.13 The recreational value of the natural environment varies with the type of habitat, location, population density and the availability of substitute recreational opportunities. The University of Exeter has developed a map-based web interface which captures these complexities. The Outdoor Recreation Valuation (ORVal) Tool uses a range of spatial data layers to model the visitation rates and recreational welfare benefits that are provided by accessible green space in England and Wales. The ORVal Tool allows users to explore existing recreational values of individual or multiple sites as well as the welfare effects of creating or altering sites. It is relevant for national and local appraisals where outdoor recreational opportunities are likely to be affected.

[26] Government analysis on carbon emissions for multiple sectors, including material use and waste disposal, are based on multiple LCA studies that estimate greenhouse gas reporting conversion factors. The latest data are available online on the Department for Business, Energy and Industrial Strategy web pages.

Effects on amenity value

A1.14 Activities such as waste disposal and quarrying of minerals and aggregates have social costs such as noise, congestion, dust, odours and visual intrusion. These can undermine public enjoyment of an area and generate adverse health impacts. Land contaminated from past industrial activity and pollution can also result in costs to society. Interventions that address these problems can generate benefits to residents, visitors and businesses.

A1.15 Hedonic pricing studies use econometric techniques to estimate a value for a good or service from a related market. The technique has been used to estimate the value of a wide range of environmental costs and benefits as they are reflected in local property prices. For example, analysis of house prices suggests that proximity to habitats, designated areas, heritage sites, domestic gardens and other natural amenities can add as much as £68,000 to the price of a £200,000 house in the UK, a premium of one-third.[27]

A1.16 Hedonic valuation techniques using property price data help estimate relevant amenity values.[28] Research for Defra on the value of remediating contaminated land identified statistically significant differences in local property prices from remediation in a number of case study sites. More generally, changes in amenity value will depend on many factors including local circumstances, population density and the environmental change in question. Therefore, care needs to be taken in using or transferring values from existing studies. Amenity value can potentially overlap with local recreational values so where both are being used, care should be taken not to double count. In addition, property value effects reflect capitalised rather than annual changes in value.

Landscape

A1.17 Landscape provides the setting for people's day-to-day lives. It does not only refer to special or designated landscapes or the countryside. In the context of appraisal of environmental impacts, landscape benefits can relate to opportunities for recreational activities including nature viewing (e.g. bird watching), hiking, and the opportunities to experience views, sounds and scents. It can include aesthetic experience and visual amenity. Since landscape incorporates values for recreation, aesthetic values and cultural heritage, care is needed in order not to double count impacts.

Water quality and water resources

A1.18 Water use, water quality and flood risk are likely to be affected where land use is changed, development or infrastructure is promoted or certain technological change is facilitated. For example, transport schemes may lead to social costs where polluted water runs off from new roads into local watercourses, a housing development may place pressure on local water supplies and new types of power station may increase freshwater abstraction to the detriment of local natural assets. Water or flooding impacts should be considered and valued as part of options appraisal.

Valuation of water resources

A1.19 Valuation evidence is publicly available from Water Resources Management Plans developed by water companies in England and Wales. These include marginal costs (known as "average incremental social costs") of providing extra water output which may be used as a proxy for the economic value of water resource impacts. In the 2014 round of Management Plans, the industry average incremental social cost of provision of an additional million litres (a marginal mega litre) per day was around £1.5 million. This can be interpreted as the typical economic cost of replacing a marginal mega litre of water and may be suitable for high-level assessment of the value of water

[27] Gibbons et al. (2014) "The amenity value of English nature: a hedonic price approach" Environmental Resource Economics, 57: pp. 175-196.
[28] For eample, see Ham et al. (2013) "The valuation of landfill disamenities in Birmingham" Ecological Economics, 85: pp. 116-129.

resource impacts. However regional variation can be significant, because options to augment resources are constrained to varying degrees, in part reflecting wider water scarcity. Care should therefore be taken in using these figures. For significant interventions, the relevant local Water Resource Management Plan should be consulted and Defra can advise at watereconomics@defra.gsi.gov.uk.

A1.20 The quality of water in the environment has an effect on biodiversity, amenity and recreation and was the subject of a major study in 2007, updated in 2013, called the National Water Environment Benefits Survey.[29] Estimates[30] of the average benefits of improvements in the quality of water in rivers, lakes, canals & coastal waters are:

- £17,400/km/year – value of improving water quality from bad to poor
- £20,100/km/year – value of improving water quality from poor to moderate
- £23,300/km/year – value of improving water quality from moderate to good

A1.21 For river basins with higher population densities, benefits are above these averages. Economic valuation of ecosystem services provided by the water environment, particularly in urban areas, is an active area of research. For additional information Defra can be contacted at watereconomics@defra.gsi.gov.uk.

Flood risk and coastal erosion

A1.22 Flooding and coastal erosion can lead to social costs (e.g. harm to people and damage to property, infrastructure and the environment). Typical damage per property, per flood event varies from around £7,000 to £10,000 for a flood of less than 0.1 metres in depth, to between £37,000 and £42,000 for a flood in excess of 1.2 metres in depth.

A1.23 To estimate the changing risk of flooding and coastal erosion over time, risk is generally measured in terms of changes to Annual Average Damages (AAD). This is the probability-weighted resource cost of flood damage to property and infrastructure, plus adverse health impacts and the resource costs of disruption. Estimating AADs for large scale flood and coastal erosion requires complex hydraulic modelling to estimate the probability and severity of flooding and/or coastal erosion, and its likely impact on people and assets in a defined spatial area.

A1.24 Generic national Weighted Annual Average Damage (WAAD) estimates are available for broader-scale, high-level scoping analysis. These are national average, per property, annual damage estimates and have been developed for residential properties across flood events with different probabilities and levels of flood warning service. The estimates for an average house in 2017 prices range from the following:

- a property with no flood protection and no flood warning service – £5,054 per property, per annum
- a property with existing protection against a "1 in 200 chance" (0.5% annual probability) and a flood warning service of more than 8 hours – £39 per property, per annum

[29] For a summary of values see the Environment Agency web pages. In addition, the water companies run customer surveys ahead of each five-yearly business planning round (most recently in 2013) which include stated preference elements to determine customers' local willingness to pay for various improvements in water services, often including the quality of the local water environment.

[30] Based on estimates for each river basin and catchment in England and Wales.

A1.25 Local economic output and employment impacts of flooding can be material, though as with other local impacts, the potential for displacement at the national level should be recognised. Defra provides a toolkit for assessing such impacts.[31] For further guidance see the Environment Agency's Flood and Coastal Erosion Risk Management Appraisal Guidance (Environment Agency 2010) and the online Flood and Coastal Erosion Risk Management Handbook and Data for Economic Appraisal 2017.

Vulnerability to climate change

A1.26 The Climate Change Risk Assessment (CCRA) should be used to consider current and potential future climate risks and vulnerability to risks of an intervention. The CCRA provides a framework that quantifies interactions with climate risk. It enables a consideration of the role of climate in altering the scale and distribution of costs and benefits over the lifetime of the proposal. Supplementary guidance, Accounting for the effects of Climate Change provides steps to determine whether climate risks are relevant in relation to the appraisal of an intervention.

Biodiversity

A1.27 Biodiversity can be thought of as a core component of natural capital that supports the provision of environmental goods and services to people. It is defined by the Convention on Biological Diversity as 'the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and ecosystems'.

A1.28 Valuation is typically estimated per hectare or per household, using stated preference methods. Biodiversity may be reflected by, or associated with other benefits e.g. recreation, pollination, water quality and amenity. To avoid double counting, biodiversity should only be valued where it directly impacts human wellbeing and where it is additional to other benefits. For example, non-use value for biodiversity represents a legitimate additional category of value that can be added to direct and indirect use values for final goods and services.

A1.29 Defra have published a discussion paper which presents a broad discussion on valuing diversity in the appraisal context and specific guidance on biodiversity values. In cases where available stated preference estimates of biodiversity value are insufficiently robust for use, an alternative is to use quantitative metrics of biodiversity change as objectives and calculate the costs of delivering those objectives.[32]

Land values

A1.30 Land value changes arising from a change in land use may be used to derive a social value for use in appraisal. This can provide a convenient way of estimating the impact of an intervention rather than valuing the underlying factors that caused the value to change.

A1.31 Land prices reflect different attributes of the land's use including planning permission, amenity value, proximity to urban centres and transport connectivity. Land values increased by transport improvements may rise due both to the change in planning status that facilitates development and the benefits from the transport scheme.

[31] "Flood and Coastal Erosion Risk Management (FCERM) and the Wider Economy" Frontier Economics for Defra, 2014. Available at http://randd.defra.gov.uk by searching on "FD2662".

[32] For an example see Bateman et al (2013) "Bringing ecosystem services into economic decision making: Land use in the UK" Science, Vol 341, No. 6141: 45-50, 5th July 2013. DOI: 10.1126/science.1234379.

A1.32 The value of an intervention that enables a change in use and subsequent new development may include:

- the private benefit associated with the change in land use, as represented by the uplift in land value due to a more productive use. This is defined as the value of the land in its new use (e.g. commercial or residential) minus the value of the land in its existing use and it typically accrues to landowners.
- the net external effects of the resulting development on society, such as loss or gain in amenity value, transport costs, health or environmental effects and land use value changes etc.

A1.33 To understand how land values can help in the appraisal of a potential development, it is important to understand the factors that determine the land's price. The private benefit or Gross Development Value (GDV) is the estimated total revenue that could be obtained from a development, for housing it would be:

GDV = house prices x *number of dwellings*

A1.34 The residual method of land valuation stipulates the maximum price that will be paid for the land (commercially) after accounting for development costs and a minimum level of profit:

Land price = GDV – (development costs + fees + profit)

A1.35 Therefore the land price reflects the value of the land in its new use (the GDV) less the expected development costs and minimum required profit. In a well-functioning market, competition for the right to develop the land drives the price of land up to a point where a normal level of profit is achieved, where the change is equal to the economic rent extracted from the land.

A1.36 In appraisal terms, the difference between this new land value and its previous land value represents the net private benefits of the development. This is the final value of the site, less development costs, less the value of the land in its "old" use. Any increase as a result of a change in use reflects the economic efficiency benefits of converting this land into a more productive use.

A1.37 To estimate the full value to society of the change in use wider effects need to be accounted for. The Net Present Social Value (NPSV) of a development is the discounted sum of the land value uplift and the net value of wider effects, taking into account potential deadweight and displacement. The range of wider effects associated with a development includes the amenity cost or benefit associated with a development, potential health effects and any transportation effects arising from the development. Further details of potential external effects and appraisal values are given in the MHCLG Appraisal Guide. When considering the wide range of positive and negative effects, double counting of benefits needs to be avoided. For transport appraisal the Department for Transport's (DfT) Web-Tag guidance should be used.

A1.38 Land value data is derived from market data which is dependent on individuals' and firms' valuation of a specific piece of land. Where local land value data is available, this information can be used to appraise the net impact of a development. However, where this data is not readily available, illustrative land value data from the Valuation Office Agency (VOA) is available. This is included in the MHCLG Appraisal Guide and the MHCLG publication Land value estimates for policy appraisal. It provides estimates for the average prices of residential, greenfield and brownfield land in England from 2014, with residential land split by local authority. Further guidance on the appraisal of transport dependent land developments can be found in WebTAG Unit A2.3.

Energy efficiency and Greenhouse Gas (GHG) values

A1.39 This is a high-level guide to valuing Greenhouse Gas (GHG) emissions and energy use for appraisal purposes. BEIS publish more extensive guidance, background, rationale and relevant data tables that should be used.

A1.40 The steps given below are based on a change in fuel or energy use. Most interventions will have other objectives and will involve energy use as part of a wider effect. In both cases, total energy use and total GHG emissions should be quantified and costed, using the data tables referred to above and included with other costs.

A1.41 Multiplying the fuel use in each year by the Long Run Variable Cost (LRVC) for that fuel will give the societal value in fuel usage for that period (excluding GHG emissions, which are calculated separately):

Social cost of energy = fuel consumption x *Long Run Variable Cost (LRVC)*

- **Step 1 – quantify energy use or efficiency**. Identify the fuel or electricity consumption for each year, distinguished by type of fuel and the sector in which the changes are incurred (e.g. residential, commercial, industry). Changes should be measured in megawatt hours (MWh).[33]
- **Step 2 – value energy or fuel use.** The LRVC reflects the production and supply costs of energy which vary according to the amount of energy supplied. They will vary according to the type of fuel, sector being supplied and prevailing fuel prices. Low, central and high LRVC assumptions for different fuels and sectors are published on the BEIS webpages in data tables.
- **Step 3 – convert energy use into GHG emissions.** The formula below shows how to quantify GHG emissions for a given energy use. This uses the energy changes estimated in 'Step 1', converted into a GHG measure. An emission factor is used to estimate the amount of GHG emissions from burning a unit of fuel. These vary by fuel type and reflect the mix of fuels required for electricity. The global warming potential of GHG emissions is measured as the equivalent amount of carbon dioxide (CO_2) that would give this warming. The standard unit of account is equivalent tonnes (tCO_2e) or kilograms ($kgCO_2e$) of carbon dioxide. Various emission factors can be found in the data tables. For electricity, the consumption-based long-run marginal emission factor should be used for changes in energy demand. The generation-based emission factors are only used for energy production rather than energy demand. Energy production is generally greater than energy demand to account for losses during the transport of energy to final consumers.

GHG = fuel use x *emissions factor*

Cost of GHG = GHG ($kgCO_2e$) x *value of carbon*

[33] Conversion factors for converting between calorific units of measurement (i.e. tonnes of oil equivalent, calories, therms, joules, or watt hours) are available in Annex B of the online guidance "Valuation of energy use and greenhouse gas emissions for appraisal " available on the Business, Energy and Industrial Strategy webpages. Conversion factors for converting volume-based or weight-based measurements into calorific units of measurement (which will vary according to the fuel) can be found in Table A1, Annex A, of the Digest of UK Energy Statistics.

- **Step 4 – value to society of emissions.** GHG values are based on the economic cost of mitigating a unit of carbon. The carbon value will vary depending on the sector from which the emissions occur:
  - **the traded sector** is defined as those activities covered by the EU Emissions Trading System (EU ETS) which sets a market price for carbon. It generally covers all power generation, many energy-intensive industries, and intra-EU aviation. Therefore, all electricity consumption is covered by the EU ETS and is in the traded sector.
  - **the non-traded sector** – includes all other energy consumption, including all household and non-aviation transport fuel use (excluding electricity).

A1.42 Carbon value assumptions for the traded and non-traded sectors are available for 3 different scenarios (low, central, and high) to enable sensitivity analysis. The values can be found in the data tables. Further detail on how to map energy use to the traded and non-traded sectors is available in the BEIS online guidance.

Life and health

Risks to life and health

A1.43 This section outlines some approaches to the measurement and valuation of risks to life and health. In addition to valuing changes to the risk of a statistically prevented fatality, other methods most often used in appraisal are statistical life-years (SLYs), quality-adjusted life-years (QALYs) and sometimes disability-adjusted life-years (DALYs) which are explained further below. The choice will depend on the appraisal and should be agreed with the approving authority.

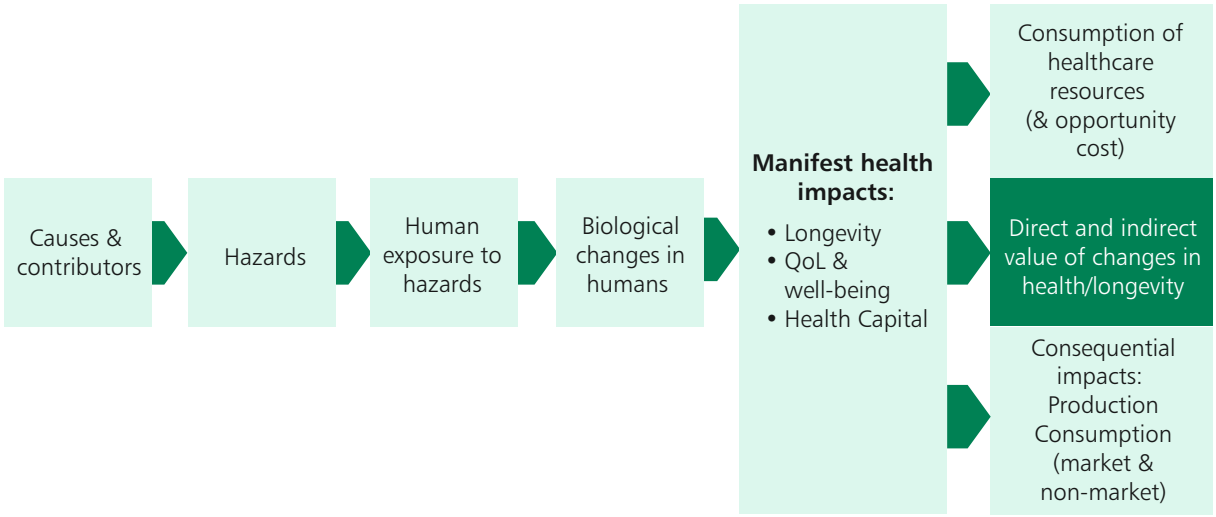
A1.44 Measurement of health impact may be expressed in the two dimensions of length of life (longevity), and health-related quality of life (QoL). Different risks, and interventions to reduce those risks, may affect different dimensions. Some risks entail significant loss of longevity, some QoL rather than longevity and some both. Measurements using numbers of fatalities or SLYs reflect the longevity dimension only, while QALYs reflect both longevity and QoL dimensions.

A1.45 On grounds of equity in appraisal QALY values, SLY values and the valuation of a statistically prevented fatality (VPF) are based on average values from representative samples of the population (who differ in their incomes, preferences, age, states of health and other circumstances). These values are used when analysing and planning the provision of assets, goods and services at a population or sub-population level. They are not designed for use in contexts such as situations of emergency or rescue.

Life and health effects

A1.46 Health affects the ability to produce and consume goods or services and the ability to derive welfare and well-being directly. The impact pathway approach is a way of structuring analysis of the effects of external factors from causes to consequences for health and life. A general model which, is used to structure this approach, is shown in Figure 5.

Figure 11. The Impact Pathway Approach



A1.47 An example of a biological change could be hypertension (high blood pressure). This can be caused by human exposure to hazards such as lead in petrol, sustained environmental noise, salty food, high consumption of alcohol, smoking, and lack of exercise. Hypertension is a cause of angina, heart attacks and stroke, typically affecting life expectancy, QoL and the consumption of healthcare resources. These then affect participation in paid and unpaid production, paid for consumption and not paid for consumption (such as informal care), and the health or welfare of others (e.g. family members). Interventions at any point in the pathway may have health and longevity consequences. At whatever stage the intervention occurs, consequential impacts along the pathway should be considered, including:

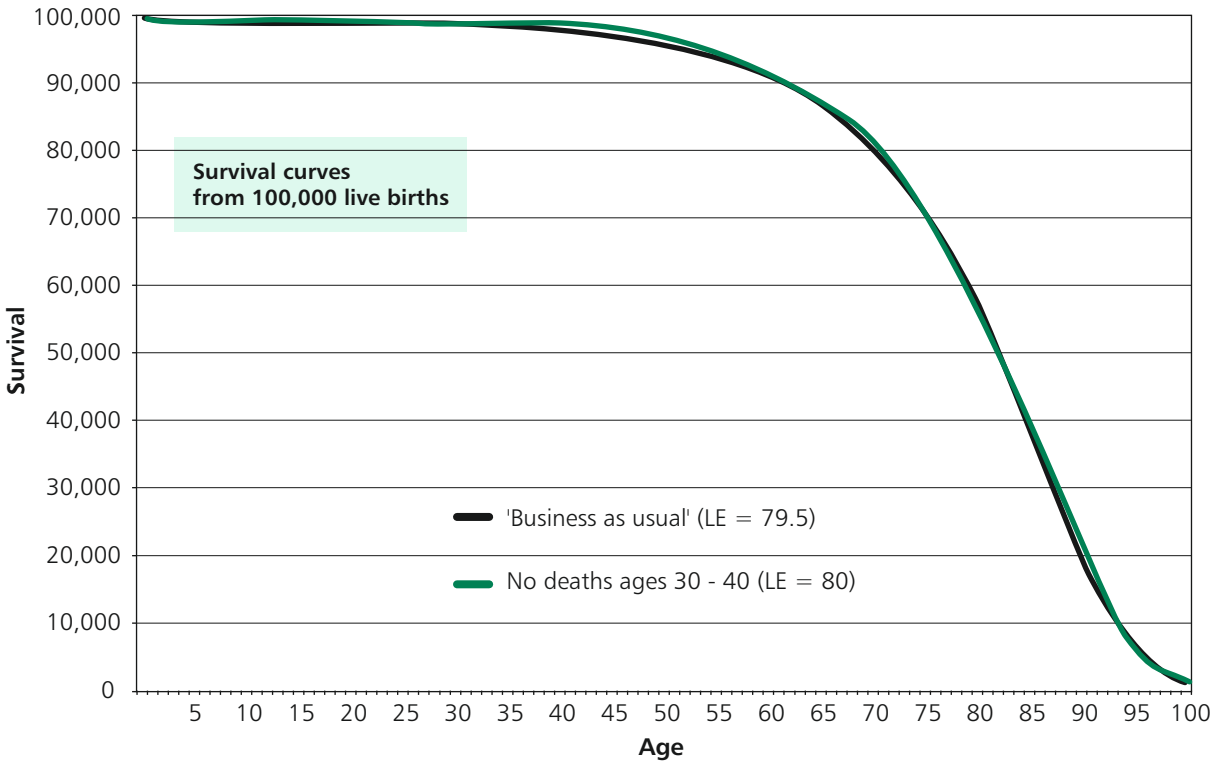
- ☐ the opportunity cost (or benefit) of shifts in the consumption of healthcare resources alongside other costs of the intervention
- ☐ the direct value of the change in health or longevity
- ☐ indirect and consequential impacts

Measuring and valuing risks to longevity

A1.48 For Social Cost Benefit Analysis involving risks to longevity, clarity is required concerning how length of life is affected by the risk or intervention. Longevity can be measured as life expectancy. This can be expressed as the area under a survival curve, which shows the likelihood of surviving to any given age, as illustrated in Figure 12. Life expectancy is a statistical expectation of the risk of dying at any given age, rather than a specific number of years. If for example a cohort of 100,000 people faced a 1% risk of dying aged 30 to 40, and an intervention could eliminate this risk, the intervention could be described as preventing 1,000 fatalities.

A1.49 The black line in Figure 12 represents the survival profile without the intervention and the green line with elimination of all 1,000 deaths between the ages of 30 and 40. The cohort collectively would live an extra 45,000 statistical life-years (SLYs), compared with Business As Usual. The cohort's life expectancy would increase by 0.45 years per person; and the unknown 1,000 people whose early deaths are prevented would each gain, on average, 45 years of life expectancy. They are not certain to live an extra 45 years, this is their average statistical expectation of life. This valuation method does not relate to "life-or-death" circumstances affecting specific individuals. It is unknown which members of the cohort would be the prevented fatalities.

Figure 12. Illustration of longevity effects



Source: Illustrative analysis provided by the Department of Health and Social Care

A1.50 Monetary valuations of a VPF have been used in transport appraisals for several decades. They derive from research conducted on behalf of DfT. The current value and references to the research on which it is based can be found on the DFT webpages.

A1.51 The value of a SLY is derived from the same empirical evidence as a VPF. SLYs help with the appraisal of options where the number of years of life expectancy at risk differs between options; valuing impacts in terms of SLYs offers a way of allowing for this difference. The current monetary value for a SLY is £60,000 and is updated annually (see DFT web pages for further information).

Measuring health-related quality of life and QALYs

A1.52 QoL is the other key dimension used in health-related appraisal. The two dimensions of longevity and QoL are aggregated in the concept of a QALY. As risks, and interventions to reduce them, can affect QoL as well as longevity, QALYs can reflect this additional dimension. QALYs are calculated by multiplying the change in QoL by the duration (in years) – for example a reduction in QoL from 1.0 to 0.5 for 6 months equals the loss of 0.25 QALYs. While not necessarily as straightforward as measuring length of life, measuring QoL can be undertaken with simple instruments such as questionnaires. The most widely used of these in the UK is the EQ-5D. This measures QoL in 5 dimensions:

- mobility
- ability to self-care
- ability to carry out usual activities
- pain/discomfort
- anxiety/depression

A1.53 Each dimension is rated at one of 5 levels: no problems / slight problems / moderate problems / severe problems / extreme problems or unable. With 5 levels on 5 dimensions, EQ-5D is able to describe 3,125 (i.e. 5^5) "health states". Cardinal ratings for these health states – on a scale where 1 is equivalent to the best of health, and 0 to being dead – are available for the UK, based on the preferences of the population.

- Ratings between 0 and 1 for different health states described by the EQ-5D tool are available from the EuroQol website
- ideally the QoL ratings under the options being considered should, if possible, be sourced from people like those who would be affected (as commonly happens in clinical trials). However, if that is not feasible, QoL ratings for some common health states are available.[34]
- monetary valuations of QALYs are available for the UK. The current monetary WTP value for a QALY is £60,000. Further information on the basis for the value of a QALY can be obtained by contacting the Department of Health and Social Care.

A1.54 Discounting of resources relating to health and life issues is carried out using the appropriate standard discount rate of 3.5% declining after 30 years. The value of VPFs, SLYs and QALY effects should be discounted at the health rate of 1.5%, declining after 30 years. See Annex 6 for further information on the discount rate.

A1.55 DALYs are a measure of life-years adjusted for loss of quality of life and loss of life expectancy for people living with a health condition or its consequences. Unlike life expectancy, which is measured by the area below profiles such as the survival curves illustrated above, DALYs measure a loss of longevity aggregated with loss of quality of life (the area above a curve). Appraisal of an intervention is concerned with estimating the difference that it makes – hence the intervention's impacts could be described in terms of QALYs gained or DALYs prevented. However, in practice, DALYs differ in some subtler ways and are used less often in the UK.

Travel Time

A1.56 Values of Travel Time Savings (VTTS) vary according to journey purposes, the characteristics of the journeys being made and the preferences of individual travellers. In the context of transport appraisal, it is standard practice to disaggregate VTTS by 3 journey purpose types:

- commuting – often to/from a usual place of work
- employer's business – journeys made in the course of work
- other non-work – all other trips (such as shopping, leisure and personal trips)

A1.57 The VTTS for employer's business trips represents the opportunity cost to the employer of time spent travelling by their employee. Businesses benefit from reduced travel times include improved access to suppliers or customers, which increase productivity by lowering the cost or raising the quality of inputs and widening the market a business can serve. It is these benefits that form the basis of values of employer's business VTTS.

A1.58 For non-work (commuting and other non-work trips) the VTTS represents the value travellers place on the preferable activities they can undertake in the saved time. For instance, in response to a quicker commute a traveller could choose to spend more time at home with their families or move to a bigger house further away from work.

[34] See for example Stouthard, M. E. A., et al (1997) "Disability weights for diseases in the Netherlands" Amsterdam: Inst. Sociale Geneeskunde.

A1.59 VTTS differs by travelling conditions, for example:

- a higher value is placed on saving walking or waiting time than on saving time spent in a vehicle
- time spent in overcrowded conditions on public transport also carries a higher weight, the value being determined by the severity of the overcrowding
- reliability can also carry a premium and is commonly measured in terms of the standard deviation of journey time or average lateness in the case of public transport

A1.60 Values for use in VTTS are available in the WebTAG data book which is maintained and updated annually by DfT. Further, more detailed guidance on the use of VTTS in transport appraisal and information on the derivation of DFT's recommended VTTS can be found on the DFT webpages.

Value transfer considerations for VTTS

A1.61 The DfT's published VTTS represent the typical values of time savings resulting from transport interventions. Therefore, the recommended standard VTTS may not be appropriate if the characteristics of the affected group are not similar transport users, or differ significantly from those of a typical transport scheme. In these circumstances the DfT values may still be used as an indication of the order of magnitude of impacts.

Unmonetisable values

A1.62 As part of shortlist appraisal proportionate effort should be made to monetise the significant costs and benefits of each option (as set out in Chapter 5). The resources and effort should be related to the scale of the proposals under consideration. The scale may be judged in terms of financial costs or savings, social welfare costs or benefits and risks involved to society and the public sector.

A1.63 Where it is not possible to monetise certain costs or benefits they should be recorded and presented as part of the appraisal. Where possible these unmonetisable values should be assessed in another way, providing an understanding of their magnitude.

Straightforward unmonetisable values

A1.64 Significant unmonetisable values that are important enough to affect key choices about options should be considered at the longlist stage. Strategic examination of the longlist of options can deal with many factors that are likely to be unmonetisable when framing the analysis (as set out in Chapter 4). If valuing social benefits is likely to be difficult, it may still be possible to have an idea of potential costs. As part of indicative costing at the longlist stage this could involve estimating the additional costs of an option which delivers these greater benefits and considering whether the additional costs are worthwhile.

A1.65 At the shortlist stage unmonetisable values should form part of the consideration for determining the preferred option. This will involve presenting an assessment of unmonetisable effects alongside estimates of NPSV and describing the potential impacts on a decision.

Complex unmonetisable values

A1.66 Complex, unmonetisable trade-offs occur where there are a number of important unmonetisable costs or benefits in different options that need to be balanced. Such trade-offs are often strategic in nature and involve the design of solutions based around alternative benefits against a limited budget.

A1.67 Multi-Criteria Decision Analysis (MCDA) using swing weighting is a technique that can be employed at the longlisting stage to consider unmonetised trade-offs. Where there are a number of competing often complex technical trade offs to be made, it can helpfully be applied to the choices for service scope and service delivery. This occurs during longlisting and selection of the shortlist. MCDA should not be confused with simple weighting and scoring, sometimes referred to as Multi Criteria Analysis (MCA). This latter is not a recognised Green Book approach because of its lack of transparent objectivity. MCDA should not be used as a substitute for cost benefit analysis in appraising the shortlist. To work effectively MCDA requires top level decision makers, senior experts and stakeholders to be assembled in a workshop, facilitated by an independent expert facilitator experienced in MCDA, and the use of swing weighting. They should also be accredited at least to foundation level in understanding the Green Book five case model. To justify this level of involvement by senior decision makers experts and stakeholders it is likely to be employed on proposals with very significant associated costs and, or risks, as well as the complexities outlined above. Supplementary Green Book guidance available from the Green Book web pages provides detailed guidance on how to undertake MCDA in accordance with the Green Book.

Users of MCDA must:

- ☐ ensure the MCDA facilitator is independent and experienced and understands the limitations of the method
- ☐ involve stakeholders representing the interests of those affected by and implementing the options under consideration
- ☐ explore the problem under consideration in advance to ensure that all key criteria which influence social value are included
- ☐ ensure that bias is eliminated through requiring justification of preferences captured including their impact on social value and employment of other techniques by the facilitator
- ☐ ensure the independence of criteria used where a linear weighted-sum model is used
- ☐ use swing a weighting method, in which the weights represent the relative value attached to the swing in preference between least and most preferred option in each of the criteria
- ☐ ensure an independent reviewer oversee the analysis.

A2. Place Based Analysis

Definition

A2.1 Place based analysis concerns appraisal applied to geographically defined areas within the UK. This definition includes a wide range of obvious categories such as, villages, towns, cities, counties and regions and the home countries that make up the UK, it also includes other geographically based definitions such as "rural areas" or "areas of urban deprivation."

A2.2 Place based analysis is be required for two broad categories of proposal:

- ☐ proposals with an objective that is specific to a particular place or area or type of area;
- ☐ proposals which do not have geographically defined objectives but which appear likely to have different implications either positive or negative for parts of the UK that decision makers will need to understand and may need to take into account.

A2.3 Where a proposal has geographically defined objectives, then the principle frame of reference relating to the analysis of costs, benefits and value concerns the area in question. There should also be proportionate analysis of the whole home country effects or the whole UK effects. The choice will depend on the legislative reach or the proposal being considered. As always in the Green Book proportionality relates to the costs, benefits and risks involved to society and to the public sector.

When to employ place based analysis

A2.4 As outlined above, where proposals have a focus on a specific part of the UK, place based analysis should be performed and be central to appraisal advice. Where proposals are not principally focused on a specific part of the UK, the potential for significant differential place based impacts should be considered, and a decision taken about whether to undertake more detailed analysis. This decision should balance the cost and feasibility of such analysis against the likelihood of significant positive or negative consequences for parts of the UK that decision makers need to understand and may wish to take in to account. Where place based analysis is not undertaken then the decision not to do so should be explained and justified.

A2.5 The relevance and extent of place based analysis will be context specific and a matter of judgement for those developing, appraising and scrutinising business cases. The research and analysis that takes place before the start of a business case should consider whether a place based analysis is likely to be required. The decision criteria should be based on the likely significance of consequential effects in areas of particular concern. The analysis should be proportionate to the scale of the effects on the affected areas in relation to their existing situation, and a list of questions to consider is provided in Boxes 24 and 25 below. Consideration should be given to both positive and negative effects:

Box 24. Place Based analysis for projects without a specific spatial focus

Where proposals are not principally focused on a specific part of the UK, the potential for place based impacts should be considered, and a decision taken about whether place-based analysis is required. The following questions should be considered as part of this analysis.

Differential spatial impacts

- ☐ Do you expect impacts to be differ significantly in different areas, or types of area (at any spatial scale)?
- ☐ Where data is available at a spatial area level can this be presented graphically (i.e. on a map)?
- ☐ Where data is not available, can improvements be made to data collection to ensure that it can be provided in future?
- ☐ If effects are significant what is a proportionate level of analysis and can this be built into monitoring and evaluation arrangements?
- ☐ In areas experiencing significantly different effects will any of the protected groups identified by the Equality Act or Families Act be significantly affected by the proposal? If so, there is a duty to proportionately consider these effects and determine whether action is required as a result.

Alignment with local plans and strategies

- ☐ Where impacts are significant, to what extent does the intervention align with wider strategic objectives for the relevant area/s?
- ☐ Where impacts are significant, is the VFM of the intervention dependent on the successful delivery of other interventions in the relevant area/s?

Box 25. Place Based analysis for projects with a specific spatial focus

Where the objectives of proposals have a specific spatial focus then place based analysis should be central to appraisal and the advice it supports. The following questions may be considered as part of this analysis.

- ☐ Is the proposal part of a wider programme that has been agreed in principle, if not are there external dependencies that significantly effect its viability?
- ☐ What are the expected effects in the target area/s?
- ☐ Are there likely to be unintended negative or positive collateral effects in the target area or within wider spatial area such as nearby travel to work areas?
- ☐ Within the identified areas will any of the protected groups identified by the Equality Act or will Families be significantly adversely affected by the proposal, proportionately consider these effects and determine whether action is required as a result.
- ☐ Will there be significantly different impacts by income group? All significant gaining and losing groups of a policy should be identified.
- ☐ Where relevant data is unsatisfactory or unavailable can improvements be made to produce it in the future?

Alignment with local plans and strategies

- ☐ What are the views of local stakeholders?
- ☐ To what extent does the proposal align with wider public policy in the relevant area/s and the UK as a whole/s

Interdependencies with other local or national interventions

- ☐ Is achievement of the proposal's SMART objectives dependent on the successful delivery of other proposals, if so, are they part of the same programme? If not, how is this risk being managed.

Inclusion of employment and productivity effects

A2.6 An explanation of when and how productivity, labour supply and demand effects may be included in the estimation of social value at the UK level is given in Chapter 6. New employment may not be included in UK level appraisal where the relevant focus of advice is the aggregate UK effect and it is not possible to reliably and credibly calculate the effects to a level of accuracy required to support differentiation between alternative options. The choice to target interventions to specific employment sectors or geographical areas should be set at the level of strategy, guided by appropriate research. If a place based competitive bidding process is employed, then the approach recommended at paragraph 5.82 must be followed.

A2.7 There are some differences in the approach permitted for place based appraisal where the primary objective is to analyse the impact on the place or places in question. The effects on the relevant travel to work areas should also be included if they are liable to be affected. Box 26 summarises the differences. Larger effects of a strategic nature should be taken into account within a programme of which the project under consideration is a part. Project decisions should take place within a programme's overall context.

A2.8 In addition to the effects considered for UK level appraisal, place based appraisal may also include employment changes in the area under consideration. Where the proposal has geographically targeted objectives, appraisers should clearly specify whether the employment objectives relate to employment located in the area (including those taken by in-commuters), or to employment of residents of the local area (including in jobs outside the target area). Employment effects should be adjusted for leakage, substitution and displacement as set out below, noting that treatment of these effects depends on the employment objective above. Where appropriate, employment multipliers can also be applied.

Leakage, displacement, and substitution

A2.9 Place based effects should be adjusted for:

- **substitution** where firms substitute one type of labour for another to benefit from an intervention but do not increase employment or output.
- **leakage** which is the extent to which effects "leak out" of a target area into others. For an intervention designed to increase employment in a particular area, leakage could take the form of increased employment in neighbouring areas. For the example in Box 27, some of the employment creation occurs in the surrounding area. This leakage of employment effects into neighbouring areas reduces employment effects in the target areas. However, leakage is not always a 'zero sum' game. For example, a place-based crime intervention might decrease crime in neighbouring areas (leakage) without reducing the effect in the target area.
- **displacement** which is the extent to which an increase in economic activity or other desired outcome is offset by reductions in economic activity or other desired outcome in the area under consideration or in areas close by. For example, where a supported business takes market share from an unsupported business.

A2.10 The above adjustments needed to be based upon objective evidence. Public bodies that routinely engage in place based interventions should collect data to develop an objectively based, well researched evidence base to support decision making. From the outset, research and use of previous evaluation evidence is vital, made more important by the relative scarcity of well supported objective data. Data provided by the prospective beneficiaries of an intervention should be independently verified. Ranges should be presented and variability in data should be clearly

shown and used in sensitivity analysis to test the results. This uncertainty should be allowed for when setting SMART objectives by using ranges and expected values and the evaluation of results. Application of assumptions with no basis on objective data is not a satisfactory approach.

Place Based Employment Multipliers

A2.11 Where appropriate, employment multipliers can be applied following the adjustment for leakage, displacement and substitution. The recommended values in Box 26 are based on empirical research and provide estimates of the additional jobs that will be generated in the area via both supply and demand linkages. These multipliers apply only where an intervention creates jobs in 'tradable' sectors, i.e. those the output of which is sold mostly outside the local area. Conversely non tradable applies to occupations the output of which is mostly only deliverable within the local area. Care must be taken to apply the appropriate multiplier and to use ranges to indicate low and high estimates. The appropriate multipliers to use will depend on the functioning of the local labour market. Where the employment rate is at or above the national average and/or projected local employment numbers are large relative to the local unemployment rate, multipliers at the lower end of the range would be expected as the likely level of displacement will be greater. An illustrative example is provided in Box 27 to illustrate how the analysis can be applied.

A2.12 Deadweight refers to allowing for outcomes that would have taken place without the intervention under consideration. It applies to any proposed intervention and it will be revealed when the total outcome of an option for intervention is compared with business as usual, the (BAU), since comparison with the BAU reveals what would have occurred without intervention.

Box 26. Place Based (i.e. Sub-UK) Employment multipliers[35]

Direct employment category	Tradable	Tradable	High tech tradable	High skilled tradable	Public sector
Effect on employment sectors:	**Non-tradable**	**Tradable**	**Non-tradable**	**Non-tradable**	**Private sector**
Central	0.9	0.4	1.9	2.6	0.25
Low	0.1	0.3	0.7	2.5	–0.7
High	1.6	0.6	4.9	3.0	1.3

[35] Source: What Works Centre for Local Growth *Toolkit: Local Multipliers* based on 18 studies meeting their evidence standards. Multipliers are for use on place based studies within the UK only, not for use on UK wide appraisals.

Box 27. Hypothetical Illustration: Calculating place based employment effects

A proposed intervention aimed at improving levels of youth unemployment among residents would create 200 new apprentice jobs in Loweville, a central borough within a wider travel to work area, Highton. The place based appraisal should estimate the net employment effects in both areas. The proposed jobs are in the tradable sector (i.e. that sell mostly outside the local area), so the relevant multipliers are 0.9 and 0.4 (i.e. every 10 new net jobs generates a further 9 jobs in the non-tradeable sector and 4 in the tradable sector).

Research suggests that 80% of all jobs, across all sectors, in Loweville are filled by Loweville residents, with the remainder commuting from the surrounding TTWA. Conversely, 20% of Highton jobs are filled by Loweville residents.

Job creation, loss and displacement			
	Loweville	**Highton TTWA (excludes Loweville)**	**Total TTWA**
CREATION 200 new apprentice places	200	0	200
SUBSTITUTION 50 employees lose their jobs in the same firms	-50	0	-50
DISPLACEMENT 20 jobs are lost in other Loweville firms and a further 20 are lost in other Highton firms	-20	-20	-40
Net 'direct' job creation	130	-20	110
Direct employment effects			
	Loweville	**Highton TTWA (excludes Loweville)**	**Total TTWA**
LEAKAGE Direct employment in each area as a result of job creation	(0.8 x 130) = 104 (0.2 x -20) = -4	(0.8 x -20) = -16 (0.2 x 130) = 26	110
Net 'direct' employment effects	100	10	110
Indirect employment effects			
	Loweville	**Highton TTWA (excludes Loweville)**	**Total TTWA**
MULTIPLIER Indirect employment creation in the non-tradable sector	(0.9 x 100) = 90	(0.9 x 10) = 9	99
Indirect employment creation in the tradable sector	(0.4 x 100) = 40	(0.4 x 10) = 4	44
Net 'indirect' employment effects	130	13	143
Total net employment in each area	**230**	**23**	**253**

Employment effects should be translated into monetised value of employment to represent the welfare effect. In this example, the multiplier effects are applied based on the residence of the worker, rather than the location of the job. The choice of which is most appropriate is dependent on the objective of the calculation in each case.

A2.13 Income and Welfare distribution considerations and calculations apply in place based proposals in the same way as for UK wide appraisal as set out in Chapter 4 paragraphs 4.18 - 4.19 and Chapter 5 paragraphs 5.66 - 5.76 and in Annex 3.

A2.14 Equalities considerations and calculations apply in place based appraisal in the same way as in UK wide proposals.

A2.15 When calculating place based values other social costs and benefits should be treated in the same way as for UK wide appraisal and proportionality should be judged in the same way.

A3. Distributional Appraisal

A3.1 Distributional analysis is a term used to describe the assessment of the impact of interventions on different groups in society. Interventions may have different effects on individuals according to their characteristics (e.g. income level or geographical location). These effects could be a deliberate government objective or the unintended consequences of an intervention. These concepts are introduced in Chapter 4 paragraphs 4.18 - 4.19 and Chapter 5 paragraphs 5.66 - 5.76.

A3.2 It is not proportionate to calculate all distributional effects. The appraisal method employed for considering distributional effects should be proportionate to the likely consequences for those affected and may be judged based on:

- Where the impact on those affected is minor it may be sufficient to ensure that decision makers are made aware of the effect and its likely scale, and possible options for avoidance or mitigation.
- Where it is a significant collateral effect of another policy a straightforward monetary analysis may be required.
- Where redistribution is a policy objective such as payments under the welfare system or if it is highly significant in terms of the impact on incomes and welfare of those affected then a weighted and equivalised income distribution analysis may be justified

When considering how to apply a weighted analysis consider the following:

- is the analysis targeted at individuals or a mixture of households of different size and composition? If the latter then equivalisation may be required, prior to applying weights
- is the income of the group affected by the intervention known? If known and a welfare weighting approach is proportionate it should be used to calculate the welfare weight. If not, then the HBAI income groups can be used.

Distributional weighting

A3.3 When assessing costs and benefits of different options it may be necessary or desirable to "weight" these costs and benefits, depending on which groups in society they fall on. This is in addition to estimating the "unweighted" costs and benefits, which is the minimum requirement of Social CBA. In weighted analysis, financial benefits for lower income households are given a higher social value than the equivalent benefits for higher income households. Weighted estimates should be presented alongside unweighted estimates to demonstrate the impact of the weighting process.

A3.4 The basis for distributional weights is the economic principle of the diminishing marginal utility of income. It states that the value of an additional pound of income is higher for a low-income recipient and lower for a high-income recipient. Broadly a value of 1 for the marginal utility of income would indicate that the utility of an additional pound is inversely proportional to the income of the recipient. An additional £1 of consumption received by someone earning £20,000 per year would be worth twice as much than to a person earning £40,000. Higher estimates of the marginal utility of income will mean the value of an additional pound declines more quickly relative to increases in income.

A3.5 A review of international evidence provides an estimate of the marginal utility of income at 1.3.[36] This is used by DWP in distributional analysis. The estimate of the marginal utility of income can be used to calculate welfare weights to adjust costs and benefits.

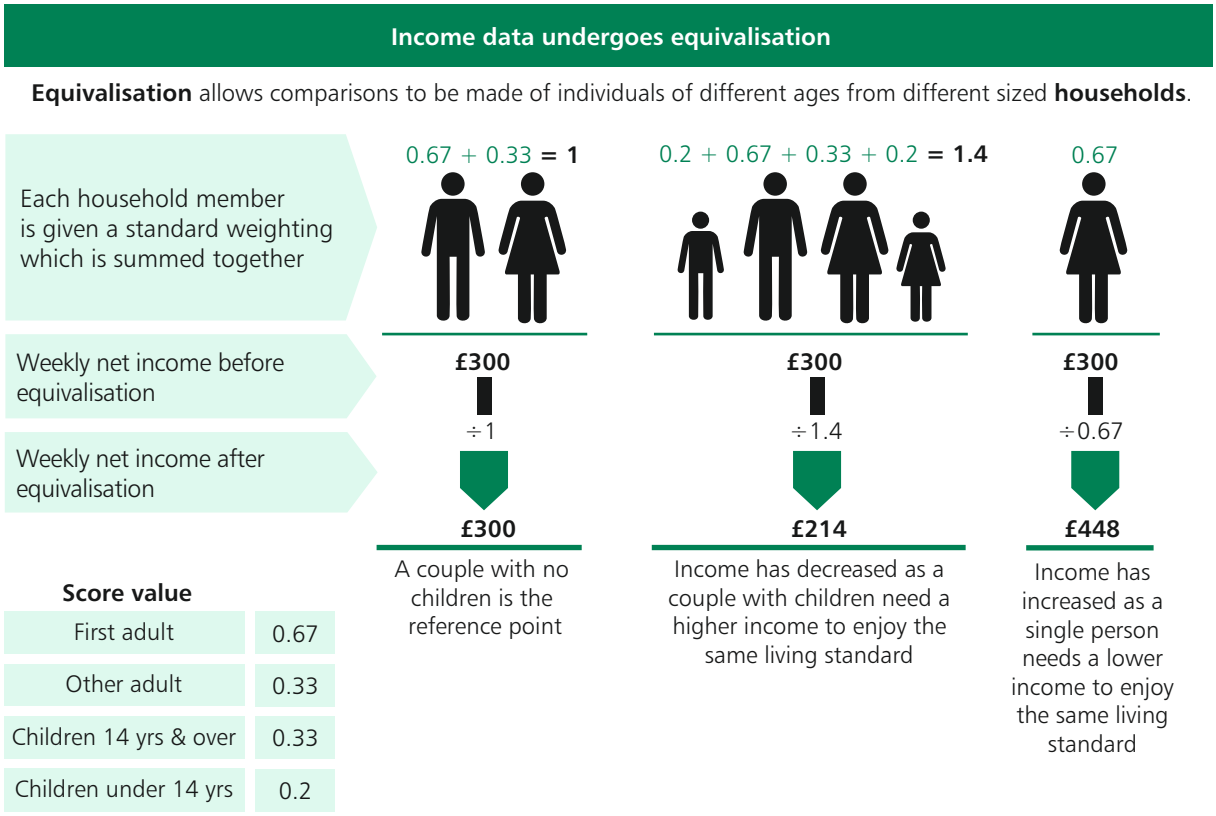
Equivalisation

A3.6 Where distributional effects are quantified by applying weights, it may also be necessary to apply "equivalisation" techniques. Often the distributional impact of policy will be estimated by household, however households can have different structures.

A3.7 Equivalisation applies a scaling factor to household income to adjust for composition (factors such as age, income and size) to standardise the welfare impact. This allows a consistent comparison in welfare terms between households of different structures. For example, where a single person would have a higher standard of living than a couple with the same household income, equivalisation produces a higher "equivalised income" for the single person to reflect this.

A3.8 An example of equivalisation is set out in Figure 13, which DWP use in the annual statistical publication on poverty at the UK level, entitled Households Below Average Income (HBAI). The government commonly bases analyses on the household as this is the level at which budgeting decisions and benefit incomes are considered. In some circumstances, however, it may be appropriate to consider relative incomes at an individual level.

Figure 13. Methodology for Income Equivalisation



A3.9 If specific data is not available for an intervention's target population, then data on incomes by quintile may be used. This is provided by the ONS and HBAI and summarised in Table 5 below. HBAI (2017) presents weekly equivalised income (£) by quintile in 2015/16 prices and is updated annually. Ensuring this is representative of the income for the group concerned in a particular proposal is important and affects the accuracy of any estimates produced.

[36] Layard et al. (2008) "The marginal utility of income" Journal of Public Economics, Vol. 92, pp. 1846-1857.

Table 5. Quintile Groups of all Households Ranked by Equivalised Disposable Income (Based on Weekly Income Before Housing Costs 2015/16)

	Bottom	2nd	3rd (Median)	4th	Top	Mean of All Households
Final income (£)	244	363	481	638	946	593

Calculating welfare weights: practical steps

A3.10 To appraise the impact of policies using distributional weights, the equivalised income for two groups is estimated:

- taxpayers as funders of policies (group **t**) – who are assumed to have an average income (using median equivalised income)
- programme participants who benefit from the policies (group **p**) – who are assumed to be in the lowest equivalised income group, given DWP's overall objectives. For other departments applying this approach, interventions may be targeted at groups with higher incomes. If that is the case a higher income estimate should be used.

A3.11 Using the "taxpayer" and "programme participant" approach welfare weights can be estimated as follows:

- divide median equivalised income of average taxpayers (proxied by median of all households) by the median equivalised income of programme participants (proxied by the quintile that matches the target for distributive effects)
- raise this number by the power of 1.3 (the estimate of elasticity of marginal utility of income as set out above)
- the result is the redistributive effect for an individual member of the group being affected by a policy change
- Fujiwara (2010) uses this methodology to estimate a welfare weight of 2.5, based on income figures from the Office for National Statistics. Using more recent 2015 data[37] yields a slightly lower welfare weight of 2.4.

A3.12 The weighted impact resulting from any redistribution is as follows:

*impact on society = change in income, group **p** * welfare + change in income, group **t***

A3.13 There is uncertainty in both weighting and equivalisation methods. Presenting unweighted and weighted costs and benefits side-by-side shows the impact of the weightings. Testing the estimated weights through sensitivity analysis, including switching values where appropriate, is recommended. Switching values estimate the value that a key input variable (in this case the income weights) would need to take for a proposed intervention to be not worth pursuing (see Chapter 5).

[37] With median equivalised income per week for the bottom and middle quintile, respectively £244 and £481.

A4. Public Private Partnerships

A4.1 This Annex provides further detail on how Public Private Partnership (PPP) options should be considered in appraisal. More detail is available in the HM Treasury Business Case Guidance.

A4.2 A variety of PPP options may be relevant to consider in options appraisal alongside other options as part of public service provision. These include different possibilities for purchase or outsourcing of service delivery covering construction, operation, delivery and risk sharing. All of these have potentially different costs, benefits and degrees of complexity relative to public sector provision or funding. There are also different commercial and contractual issues for example, the costs of flexibility and risks, to consider in an assessment of specific PPP options.

Overview of PPP options

A4.3 PPPs can be included as an option in longlist appraisal (set out in Chapter 4) alongside delivery alternatives such as direct public provision, outsourcing, market creation, not-for-profit solutions, changes to regulation, the use of nudge techniques and grant giving. The choice for how an option is delivered should be closely linked to the nature of the intervention and some interventions will be more amenable to PPP options than others.

PPP appraisal at the longlist stage

A4.4 When considering PPP at the longlist stage, qualitative questions help to identify whether PPP should be the "preferred way forward" or form part of the shortlist. In addition to assessing a PPP option against critical success factors set out in Chapter 4, the issues in Box 28 should also be considered.

A4.5 Public sector organisations putting forward PPP proposals (the responsible organisation) will need to secure as much evidence as possible against the questions in Box 28 as part of the long-list process. In particular, they need to consider the lifetime costs and risks involved in the project, including those arising from early termination. The risk assessment should also consider any major financial and operational risks that could affect the private partner over the life of the project.

Box 28. Qualitative Issues when Considering PPP Options

	Issues to Consider
Ability of the public sector to define and measure objectives and outputs	☐ Is the responsible organisation satisfied that long term contracts could be constructed for projects in the sector and that any contractual outputs could be objectively measured and assessed?
Risk allocation and management of risk by the private sector	☐ Is the responsible organisation sure that optimal risk allocation and service delivery is achieved through a PPP delivery model (including practical risk transfer to the private sector for better management)? ☐ Is the private sector able to manage the risks associated with the programme more effectively than the responsible organisation? ☐ Have service demand and income risks been fully assessed in the context of proposed contract length for the PPP option?
Operational flexibility	☐ Is the responsible organisation sure that there is an appropriate balance between the degree of operational flexibility desired and long term contracting based on up-front capital investment? ☐ The responsible organisation should assess the likelihood and nature of variations during the life of the contract. ☐ Can the service be implemented without unacceptably constraining the responsible organisation in Value for Money delivery of future operational objectives?
Equity, efficiency and accountability	☐ Is the responsible organisation sure there are no factors that mean direct service delivery is required, rather than a PPP contract?
Innovation by the private sector	☐ Is there scope for innovation in the design of the solution or the provision of services, including the need for removal of constraints by the public sector organisation?
Contract duration and residual value	☐ Is the responsible organisation sure that the advantages and disadvantages of the proposed contract length are understood? ☐ This consideration should include how far into the future service demand can reasonably be predicted, the expected life of any assets, what the expected use of any asset or service could be post-contract, the residual value of any assets and the affordability of the contract.
Incentives and monitoring	☐ Can the contracts be drafted to avoid perverse incentives for the private sector? Are private sector partners actively able to manage the risks they will hold and be held accountable for doing so? ☐ The responsible organisation should assess whether incentives for delivery or service levels can be enhanced through the proposed PPP payment mechanism. They should also be satisfied that the service can be independently assessed against an agreed standard.
The Market	☐ Is the private sector capable of delivering the required outcome? ☐ The responsible organisation should assess whether a significant market with sufficient capacity for these services exists in the private sector. ☐ They should also assess whether there is sufficient market appetite and whether other similar projects have been tendered to market. ☐ Do potential private partners have the financial and managerial resources to manage the risks it is taking on?

	Issues to Consider
Timescale	☐ The responsible organisation should ensure that the procurement is feasible within the required timescale and that there is enough time for the resolution of key procurement issues.
Skills and resources	☐ The responsible organisation should ensure that it has the management expertise and capacity to define, deliver and support the service throughout the procurement and the subsequent delivery period.

PPP appraisal at the shortlist stage

A4.6 Shortlist appraisal of PPP options should take place in the same way as other options. This includes calculation of social value, valuation of wider social costs and benefits, consideration of unmonetisable benefits, application of optimism bias, risk costing and sensitivity analysis.

A4.7 The Green Book recommends that, Business As Usual, a do-minimum option, the preferred way forward and at least one other viable alternative option are included in the shortlist. At least two viable options other than the preferred way forward are required. At the longlist stage, if any form of Public Private Partnership (PPP) option including an outsourcing or insourcing change, is selected as a preferred way forward, then at least one of the viable alternative options must be for comparable direct public provision. This is required option is the "Public Sector Comparator," it provides a benchmark as a fair counterfactual that is used to test the social value for money of the preferred way forwards. This is referred to in some documents as a "should cost model."

A4.8 The public sector comparator should be comparable to the PPP option, in terms of service quality and output and also levels and quality of asset maintenance. There should also be an additional PPP version of the do-minimum to check for gold plating of the PPP option. Public sector comparators must be adjusted to remove distortions caused by differences in effective tax rates between the public and the private sector. This is to enable a true comparison of costs and value to be made. Adjustments for tax treatment should reflect as far as possible estimates of the effective tax rate based on tax paid rather than a theoretical maximum.

A4.9 When part of a business case changes through the process which alters cost, distribution of risk across different points in time or the transfer of risk between participants, this should be included and updated as part of Net Present Social Value (NPSV) and budget calculations. Changes to costs and risk which occur during contract negotiations, should be fed into the NPSV and public sector cost calculations. This means the appraisal of the preferred option is properly informed before a final contract is agreed.

Benefits and risks of PPP options

A4.10 In PPP contracts the quality of service provided and performance of the contractor are central to the delivery of VfM. Complexity and change hinder effective risk management. To be successful partnership arrangements need to be thoughtfully designed. Principal-agent theory explains that if the interests of an agent (in this case a private partner) employed by a principal (in this case a public sector organisation) are not aligned, then the agent is likely to act in their own interest. Therefore, from the principal's viewpoint, unintended and undesirable results may occur.[38]

A4.11 The need to align the interests of agents and principals with minimum complexity means shared objectives need to be high level rather than minutely complex. The need to build in flexibility for future change should be considered. In the longer term, unforeseen changes in the wider environment are likely e.g. the demand or funding for a service may change. Being committed

[38] Principal-agent theory here refers to the economic and organisational theory only and not to the concept of a principal or an agent in legal terms.

to an inflexible long term contract, that cannot be altered at a realistic cost, should be avoided. It is important to take account of previous evidence and the value of flexibility in longer term commercial arrangements.

A4.12 PPP options are about more than financial issues, although these are important. For example PPPs are cited as potentially offering higher levels of specialist and operational management expertise, greater management flexibility and focus and improved risk management. These issues should be considered on a case-by-case basis to produce realistic and objective estimates of costs and benefits arising from an option involving PPP, to compare against alternative options. The bundling of design, build and maintenance activities can create better value in the right circumstances, by creating an incentive for high quality design and build.

Treatment of costs in PPP options

A4.13 A PPP option will still register as part of total public sector debt, but in certain circumstances may make capital available at an earlier date than other options. Costs may be brought forward in time and will also impact on future spending. The costs should be counted at the point at which they will accrue to the accounts of the organisation responsible. To reflect the true cost of the PPP option, appropriate provision for the full cost of the additional capital should be included in Cost Benefit calculations. This involves including private finance charges as a cost to the public sector. Additional costs of privately financed options need to be fully offset by additional benefits before a PPP option demonstrates a favourable Benefit Cost Ratio comparable with a directly financed option.

A4.14 National Accounts treatment of PPP should not be a reason for project approval. However, as recording in departmental budgets follows the National Accounts then it is necessary to ensure the correct treatment of costs. The classification of PPP projects and other procurement options in the National Accounts have different budgeting implications and this should be reflected in the methodology used to assess affordability.

A4.15 It is the responsibility of the organisation to come to a view on the expected classification of a proposal in the National Accounts. It should take an informed view on classification from the outset, keep this under review as the proposal and contract negotiation develops and reflect this in any business case. The features of the proposal may change during its development, which could change its classification. The responsible organisation should retain the budget flexibility necessary to deal with any such change. If the organisation requires advice contact HM Treasury as per the Consolidated Budgeting Guidance.

A4.16 The UK National Accounting rules are set by the Office of National Statistics. (ONS). The Manual on Government Deficit and Debt (MGDD) sets out the rules that classification of a programme or project depends upon. A project may be classified to the public sector in the National Accounts for various reasons, even where significant risk transfer is involved. The value of risk transferred should be included in the calculation of public sector costs and benefits and be included in the calculation of NPSV and sensitivity analysis.

Treatment of PPP options classified to the private sector

A4.17 For PPP options where costs are classified to the private sector in the National Accounts, the financial costs of the proposal are spread over the course of the contract. This is because they are part of the unitary payments made by the public sector to the private sector and public sector costs are charged to the year in which they accrue in accounts. See Chapter 5 of the main Green Book text for the treatment of costs in economic analysis (estimates of social value) and financial analysis (estimates of public sector financial costs).

Treatment of PPP options classified to the public sector

A4.18 For PPP options where costs are classified to the public sector, capital costs are not spread over a scheme's lifetime. They instead occur relatively early in its implementation. As is the case for all other public capital spending, the costs accrue to the National Accounts (and therefore to the procuring public body's accounts) during the creation of the asset.

A4.19 The overall fiscal envelope is centrally determined in the Budget, as are departmental and other public sector bodies' budget allocations. Capital used should therefore be accounted for in the spending body's capital budgets in accordance with accounting rules. Payments that account for provision of services as part of a scheme and other costs to the PPP partner, including their cost of capital required to fund the scheme, are accrued to the accounts as they are charged during the life of the scheme.

A5. Uncertainty, Optimism Bias and Risk

A5.1 This Annex covers the Green Book approach to uncertainty, optimism bias and risk, covering:

- ☐ definitions
- ☐ adjusting for optimism bias
- ☐ risk quantification
- ☐ risk management and categories of risk
- ☐ the interaction between risk and optimism bias
- ☐ reducing optimism bias
- ☐ project or programme contingency and optimism bias
- ☐ presentation of optimism bias in appraisal results

A5.2 The focus is on the application of optimism bias and quantification of risk, in the context of uncertainty about costs, benefits and time taken to deliver interventions. See also Chapter 5 paragraphs 5.25 and 5.41 to 5.49. The approach set out here primarily applies to the appraisal and management of projects and programmes, usually associated with new public spending, but the principles are applicable to government appraisal more widely. When considering infrastructure values further information is provided by the Green Book supplementary guidance on infrastructure costing.

Definitions

A5.3 In appraisal, uncertainty is often due to lack of evidence or understanding of the likely impact of new interventions. Research and previous evaluation evidence, pilot studies and evidence of what works can help to reduce this uncertainty.

A5.4 Optimism bias is the demonstrated systematic tendency for appraisers to be over-optimistic about key project parameters, including capital costs, operating costs, project duration and benefits delivery. The Green Book recommends applying specific adjustments for this at the outset of an appraisal. Optimism bias estimates are a form of reference class forecasting, which predicts future outcomes based on the outcomes for a group of similar past projects.

A5.5 Risks are specific uncertainties that arise from activities such as forecasting or implementation, the costs of which have been estimated. They are specific to an intervention and may be quantified and managed.

Adjusting for optimism bias

A5.6 The aim of adjusting for optimism bias is to provide a more realistic assessment of the initial estimates of costs, benefits and time taken to implement a project. As the appraisal develops, more accurate costing of project or programme specific risk management should be undertaken.

Accordingly, adjustments for optimism bias may be reduced as more reliable estimates of specific risks are made. Any reductions should be presented transparently and tested with sensitivity analysis where appropriate.

A5.7 Supplementary guidance on the application of optimism bias and risk together with appropriate spending categories and values is provided on HM Treasury's Green Book web page. In the absence of systematic data collected and made transparently available at an organisation level this guidance and the values it contains must be followed. The identification of ways in which exposure can be reduced including risk avoidance, risk sharing and mitigation through contingency are important management issues covered by this guidance.

A5.8 Optimism bias adjustment should be reduced in proportion to risk avoidance or risk mitigation measures taken. Objective and transparent evidence of the mitigation of contributory factors should be observed and verified independently before reductions are made. Procedures for this include the Gateway Review process. Further information can be found on the Infrastructure and Projects Authority's assurance review toolkit webpages.

A5.9 Closer to implementation the optimism bias adjustment for a project can be reduced to its lower bound provided mitigating evidence is robust. This assumes that the cost of mitigation is less than the cost of managing any residual risks. The costs of risk avoidance should be built into the proposal in their entirety since they will be incurred irrespective of whether the risks materialise. The costs of mitigation are included as expected costs, which is cost of mitigation multiplied by likelihood of the risk occurring.

A5.10 Optimism bias should be applied to operating costs and benefits, as well as capital costs. Where there is no appropriate measurement of typical bias, the confidence intervals of key input variables can be used.

Monitoring and Sensitivity Analysis

A5.11 The time taken to complete policies, programmes or projects and the benefits achieved relative to expectations should be monitored and recorded. Monitoring costs in public organisations is an important factor in delivering Value for Money. Quantitative evaluation of schemes after implementation is vital for producing realistic estimates of optimism bias to be used in future. Monitoring and evaluation will also support improvements in costs, benefits and timing for use in appraisal.

A5.12 Switching values should also be checked to explore the following questions:

- ☐ by how much can benefits fall short of expectations if a proposal is to remain Value for Money? How likely is this?
- ☐ by how much can costs increase if the proposal is to remain worthwhile? How likely is this to happen?
- ☐ what will be the impact on benefits if costs are constrained?

Risk quantification

A5.13 Risk should be quantified and costed in a proportionate way. Where relevant this should include the costs of mitigation and the expected costs if risks materialise. The extent to which risk is identified allows the initial estimates of optimism bias to be reduced (as set out in Step 4 above). As an appraisal develops the cost of risk should be estimated and included in the estimated costs

of an intervention. This is not a mechanistic relationship and will be a judgement of the extent to which relevant risks have been identified and quantified. There are various techniques set out in the next sections that can be used to calculate risk costs.

Single point probability analysis

A5.14 An 'expected value' can be calculated by multiplying the probability of a risk occurring by the costs associated with a risk materialising – see Box 29 below.

Box 29. Example of Single Point Probability

Case study: Single point analysis	
Annual cost of service	£2 million
Estimated additional cost of project overrun	£200,000
Estimated probability of risk occurring	10%
Estimated value of risk = £200,000 x 10%	£20,000

Multi-point probability analysis

A5.15 There are a range of possible values for any risk. A probability distribution recognises some are more likely than others. An example is given below in Box 30. While some risks have low probability, they may have significant impacts on project outcomes and need to be closely managed by Senior Responsible Officers (SROs).

Box 30. Example of Multi-Point Probability

Case study: Expected costs of a construction project using multi-point analysis

A facility is estimated to cost £50m to build. The expected costs associated with construction uncertainties are:

Possible cost (£m)	Difference from estimated cost (£m)	Estimated probability of the event occurring	Risk value (£m)
45	-5	0.1	-0.5
50	0	0.6	0
55	+5	0.3	+1.5

The most likely result is no extra cost (probability 60%). However, the expected additional cost (the sum of each possible result multiplied by its probability) is £1 million.

Decision trees and real options analysis

A5.16 Decision trees and real options analysis illustrate more complex alternative options and risks over time, especially when decisions are sequential. They can be used to illustrate alternative scenarios where key external risks are likely. They can also be used to clarify alternatives where decisions taken are either irrevocable or expensive to reverse. Where information is likely to increase over time this can illustrate the value of delaying decisions or leaving options open by making smaller decisions now that allow for larger decisions later.

A5.17 Decision trees provide a structure for calculating expected values in complex situations. They can be used to map out and understand the sequence of actions, decision points and events along an activity's path. Decision trees require that probabilities are either known or can be reasonably estimated. They can also be populated with information on costs and benefits.

Real Options Analysis

A5.18 A 'real option' is a choice that becomes available through an action or an investment opportunity. Real options analysis recognises information about uncertainty can change over time through research and learning, and initial decisions can be changed as a result. If the value of this flexibility is not accounted for, the social value of an option will be systematically underestimated.

A5.19 Real options analysis is particularly applicable to proposals that exhibit significant uncertainty following initial investment, but where learning opportunities and flexibility in future decisions can help mitigate this. It is most useful where knowledge that is relevant to the choice of options is growing. If there is limited flexibility in the future, the benefits of new information are unlikely to be realised.

A5.20 Decisions should be taken with the best available information, recognising that this may change in future and flexibility to respond should not be used to justify delay. In addition to considering the range of options available, describing how information is likely to be acquired through monitoring and evaluation should be incorporated into appraisal. In practice, a decision will only have value if it can be enforced. The length of time before exercising a decision will also affect its value. The greater the time for useful information to become available, the greater the scope for the value of a decision to vary.

A5.21 An example of real options analysis can be found in Box 31 below.

Box 31. Example of Real Options Analysis

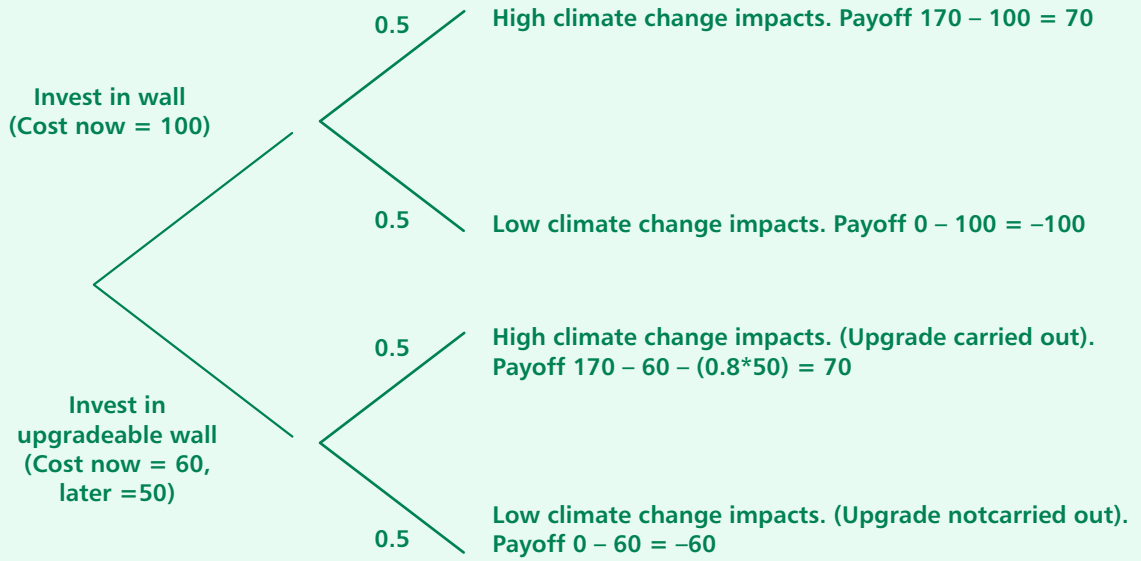
Case Study: Appraisal using a real options approach

Consider a proposal for investing in infrastructure protecting against the impacts of river flooding due to climate change. Because of time required to build the infrastructure, this is best done in advance but there is uncertainty about future impacts.

There are two options: invest in a wall, or invest in groundworks for a wall which has the option to be fully upgraded quickly in the future. There is an equal probability of high or low climate change impacts in the future.

The standard wall costs 100, and has benefits of 170 from avoided flooding if high climate change impacts occur (zero otherwise). The groundworks for the upgradeable wall cost 60, the future upgrade costs 50 and the benefit is also 170 if high climate change impacts occur. The upgrade can however be put off until there is more certainty about climate change.

The information can be set out in a decision tree:



Simplifying assumptions: residual damages under the "do not invest" strategies have been ignored; the discount factor for the future decision to upgrade or not is 0.8.

The expected value of investing in the standard wall is a simple net present calculation, calculating the expected costs and benefits of the investment. The NPV is (0.5*70) + (0.5*-100) = -15. This suggests the investment should not proceed.

Flexibility over the investment decision allows the possibility to upgrade in the future if the impacts of climate change are observed to be high. The expected value of this option can be calculated.

If the impacts of climate change turn out to be high enough to warrant upgrading, then the value of the investment is 70 in net present value terms. If the impacts are low, no upgrade is carried out but the earlier groundworks are sunk costs, totalling 60. However, these sunk costs are lower than in the case of the "standard" wall and overall, the expected value of investing now with the option to upgrade in the future is (0.5*70) + (0.5*–60) = +5.

Comparing the two approaches shows an NPV of -15 for the standard approach, and +5 for the Real Options approach. The Real Options approach also has an unmonetised benefit in allowing better views of the river for longer. Flexibility to upgrade in the future is reflected in the higher NPV, and switches the investment decision.

Source: Department for Environment, Food and Rural Affairs

Monte Carlo Analysis

A5.22 Monte Carlo analysis can be used to understand the impact of uncertainty in key evidence or assumptions that are inputs into estimates of cost, benefits or risks as part of an appraisal.

A5.23 Monte Carlo analysis is a simulation-based risk modelling technique that produces expected values and confidence intervals. The outputs are the result of many simulations that model the collective impact of a number of uncertainties. It is useful when there are a number of variables with significant uncertainties, which have known, or reasonably estimated, independent probability distributions. It requires a well estimated model of the likely impacts of an intervention and expert professional input from an operational researcher, statistician, econometrician, or other experienced practitioner.

A5.24 The technique is useful where variations in key inputs are expected and where they are associated with significant levels of risk mitigation costs, such as flood prevention. This can be used to determine what level of investment might be required to deal with extreme events such as rainfall events, which will have a statistical likelihood.

Risk management and categories of risk

A5.25 Risk management is defined as a structured approach to identifying, assessing and managing risks that are identified when designing an intervention or that materialise during its later lifecycle.

A5.26 Effective risk management helps the achievement of wider aims, such as change management, the efficient use of resources, better project management, minimising waste and fraud and supporting innovation.

Options for risk mitigation and management

A5.27 The public sector's risk exposure arises as a result of public policy decisions. Therefore, to optimise social value, risk must be consciously and proportionately managed. Good practice involves:

- ☐ identifying possible risks in advance
- ☐ putting mechanisms in place to minimise the likelihood risks materialise with adverse effects
- ☐ having processes in place to monitor risks and access reliable, up-to-date information
- ☐ having the right balance of control in place to mitigate the adverse consequences of risks if they materialise
- ☐ having decision making processes supported by a framework of risk analysis and evaluation
- ☐ early consultation with stakeholders – experience suggests costs tend to increase as more requirements to mitigate risk are identified. Early consultation will help to identify what those requirements are and how they may be addressed
- ☐ avoidance of irreversible decisions and a full assessment of costs, including the potential to delay decisions, allowing more time for the investigation of risks or alternative options
- ☐ pilot studies – acquiring more information about risks affecting a project through pilots allows steps to be taken to mitigate risk or increase the benefits

- design flexibility – where future demand and relative prices are uncertain, it may be worth choosing a flexible design. Breaking a project into stages, with reviews at points when it could be stopped or changed, can increase flexibility
- precautionary principle – precautionary action can be taken to mitigate risk. The precautionary principle states that because some outcomes are so undesirable, even though they may be very unlikely, precautionary action is justified. In cases where such risks have been identified, they should be drawn to the attention of senior management and expert advice sought
- procurement contractual risk – that can be contractually transferred to other parties and maintained through good contractual relationships e.g. insurance
- use of proven, rather than leading edge, technology – should be preferred if it reduces risk significantly while providing a proportion of the benefits of higher risk alternatives
- reinstating or developing different options – following the risk analysis, it may be desirable to reinstate options, or develop alternatives that are either less inherently risky or which deal with the risks more efficiently
- abandoning the proposal – finally, the proposal may be so risky that, whatever option is considered, it has to be abandoned

A5.28 Additional guidance on risk management can be obtained from The Orange Book Management of Risk – Principles and Concepts and further background information can be found in Risk Analysis and Management for Projects (RAMP).

Types of risk

A5.29 Risks can be assigned to 3 main categories which are not mutually exclusive – business, service and external risks.

A5.30 Business risks (Box 32) remain with the public sector and cannot be transferred. These include the loss of opportunity and poor Value for Money that occurs when schemes under-deliver or fail completely.

Box 32. Business Risks

Risk	Non-transferable risks of failure to the organisation.
Business risk	The risk an organisation fails to deliver its commitments and cannot meet its business objectives.
Reputational risk	The risk confidence in an organisation's ability to fulfil its business objectives will be undermined.

A5.31 Service related risks may be shared between the public and private sectors. These are listed in Box 33.

Box 33. Service Risks

Service risks	The risk a service is not fit for purpose.
Design risk	The risk a design cannot deliver services to required quality standards.
Planning risk	The risk implementation of a project fails to meet planning permission conditions, planning permission cannot be obtained or if obtained, can only be implemented at costs greater than in the original budget.
Build risk	The risk the construction of physical assets is not completed on time, to budget and specification.
Decant risk	The risk in accommodation projects of needing to decant staff/clients from one site to another.
Environmental risk	The risk the nature of the project has a major impact on an adjacent area and there is a strong likelihood of objection from the public.
Contractual risk	The risk from the contractual arrangements between two parties.
Operational risk	The risk operating costs vary from budget and that performance standards slip, or a service cannot be provided.
Availability and performance risk	The risk the amount of service provided is less than required under the contract.
Demand risk	The risk the demand for a service does not match the levels planned, projected or assumed. As the demand for a service may be partially controllable by the public body concerned, the risk to the public sector may be less than perceived by the private sector.
Volume risk	The risk actual usage of the service varies from the levels forecast.
Maintenance risk	The risk that the costs of keeping the assets in good condition vary from budget.
Technology risk	The risk that changes in technology result in services being provided using old technology.
Funding risk	The risk that the availability of funding leads to delays and reductions in scope.
Residual value risk	The risk due to the uncertainty of the physical asset at the end of the contract period.

A5.32 External risks (Box 34 below) arise from the wider environment, not the intervention being appraised.

Box 34. External Risks

External Risk	The risks that are not connected to the proposal being considered.
Catastrophe risks	These unpredictable risks, which may be related to changes in economic growth, are allowed for in the social discount rate and do not have to be costed separately e.g. technological disruption, natural disasters, unexpected policy changes and other unforeseeable occurrences.
Regulatory risk	The risk a change in law or regulations will affect the costs or benefits of a project.

Transferring risk

A5.33 The responsibility for management of risk should be allocated to the organisation best placed to manage it whether in the public or private sector. The objective is optimal allocation of risk, not maximum transfer, and this is important to deliver Value for Money. Not all risks can be transferred.

A5.34 Successful risk transfer from the public sector to the private sector requires a clear understanding of risks, the likely impact they may have on the suppliers' incentives and financing costs and the limits of risk transfer which are possible. Commercial arrangements should reflect where the private sector has clear ownership, responsibility and control of certain risks it can manage more effectively.

A5.35 Public Private Partnership (PPP) arrangements may provide cost-effective and efficient risk management through risk transfer and sharing. Generally PPP schemes should transfer risks to the private sector when a supplier is better able to manage or influence the outcome. For example, the bundling of design, build and maintenance into a commercial agreement may affect the way they are planned, implemented and managed, and can lead to a higher quality outcome at the operational stage. Risks to be considered include:

- ☐ design and construction risk (to cost and/or time)
- ☐ technology and obsolescence risks
- ☐ commissioning and operating risks (including maintenance)
- ☐ regulation and similar risks (including taxation, planning permission)
- ☐ demand (or volume/usage), funding or income risks
- ☐ residual value risk
- ☐ project financing risk

Policy, programme and project level risk management

A5.36 Risk management strategies should be adopted in a way that is appropriate to their scale. A risk register is required to identify, quantify and value risk. It should identify who owns each risk, provide an assessment of the likelihood and an estimate of the impact on project outcomes. The purpose of the risk register is to provide oversight of risks and their management. Information on the status of each risk is also included and the register should be updated, maintained and reviewed. A basic risk register template is provided in Box 35. A risk allocation table is also recommended, an example is set out in Box 36.

Box 35. Risk Register

Risk number (unique within register)	
Risk type	
Author (who raised it)	
Date identified	
Date last updated	
Description	
Likelihood	
Interdependencies with other sources of risk	
Expected impact	
Bearer of risk	
Countermeasures	
Risk status and risk action status	

Box 36. Example of Risk Allocation Table

Risk	Scale	Bearer		Key Issues
		Purchaser	Provider	
Obsolescence	Low		✓	Assets require low levels of technology
Demand Risk	Med	✓		…
Design Risk	High		✓	…
Residual Value	Low	✓		…
3rd Party Revenues	Low		✓	…
Regulatory Change	High	✓		…
Etc.	…			…

The interaction between risk, optimism bias and contingency

A5.37 As set out previously, as an appraisal is developed, risks and risk costs should be identified and the optimism bias allowance included at the outset should be reduced.

A5.38 The contributory factors leading to the need for optimism bias should be reviewed by appraisers. The main strategies for reducing the adjustment are:

- ☐ full identification of stakeholder requirements (including consultation)
- ☐ realistic scoping when selecting the shortlisted options
- ☐ accurate costing
- ☐ risk mitigation and management

A5.39 Only those measures where the costs of avoidance, sharing or mitigation are lower than the cost of bearing the risk should have been adopted. The contingency provision in the financial case (at nominal prices) should be estimated on conversion to nominal prices of data in the economic case which is the sum of residual optimism bias adjustment and residual risk costs (which in the economic case are all in real base year prices), calculated as:

- the value of the residual optimism bias adjustment (that is the original OB adjustment less the values of identified risks.
- plus residual measured risk (that is the all of the identified risk values less the risk values- of risks avoided, shared and/or otherwise mitigated – all estimated on an expected likelihood basis (which is cost times probability)

A5.40 Contingency provision in the financial dimension of the case should be used to inform the approving authority of its potential liabilities. Government is self-insured and contingency should not be credited to the approved proposal. It should be used to support estimation of the approving organisations potential risk liabilities and hence the reserves required by the approving body. Note that the costs of avoiding sharing and mitigating risks have been built into firm costs.

A6. Discounting

A6.1 This Annex sets out the role of discounting in appraisal and how the 3.5% discount rate is derived. It also provides guidance on long term discounting and the treatment of intergenerational wealth transfers. Discounting and its role in appraisal are introduced in Chapter 2 paragraphs 2.22 - 2.23 and Chapter 5 Paragraphs 5.32 - 5.38 and Box 15.

Role of discounting

A6.2 Discounting in the public sector allows costs and benefits with different time spans to be compared on a common "present value" basis. The public sector discount rate adjusts for social time preference, defined as the value society attaches to present, as opposed to future, consumption. It is based on comparisons of utility across different points in time or different generations.

A6.3 The Green Book discount rate, known as the Social Time Preference Rate (STPR), for use in UK government appraisal is set at 3.5% in real terms. This rate has been used in the UK since 2003. Exceptions to the use of the standard STPR are outlined below.

A6.4 The use of the STPR in public sector appraisal differs from private sector discounting. Decisions about the overall size of public spending and allocation of budgets are taken on a top down basis. The costs associated with raising funds (i.e. through taxes or debt issuance) are not used when appraising individual projects, programmes or policies. The cost of borrowing is not included as a decision variable on whether to go ahead with an individual project or not. In addition, there is no allowance for project specific risk in the STPR as risks should be identified and costed explicitly in appraisal. This approach to the STPR contrasts with private sector discounting which incorporates allowances for the cost of raising capital and compensation for risk.

Breakdown of the discount rate

A6.5 The STPR has two components:[39]

- 'time preference' – the rate at which consumption and public spending are discounted over time, assuming no change in per capita consumption. This captures the preference for value now rather than later.
- 'wealth effect' – this reflects expected growth in per capita consumption over time, where future consumption will be higher relative to current consumption and is expected to have a lower utility.

A6.6 The STPR is expressed as:

- $\mathbf{r = \rho + \mu g}$

where:

- **r** is the STPR

[39] Based on Ramsey F.P. (1928) "A Mathematical Theory of Saving" Economic Journal, Vol. 38, No. 152, pp. 543-559.

- **ρ** (rho) is time preference comprising pure time preference (**δ**, delta) and catastrophic risk (**L**)
- **μg** is the wealth effect. The marginal utility of consumption (**μ,** mu), multiplied by expected growth rate of future real per capita consumption **g**

A6.7 As recognised in the 2003 Green Book there are a range of estimates of the individual components of the discount rate.[40] Research continues to illustrate a range of plausible estimates but concludes that the overall discount rate of 3.5% remains within that range and is justifiable.[41]

A6.8 The way in which the STPR is applied in the Green Book requires each component to be specified. This facilitates sensitivity analysis and clarifies treatment where individual components of the discount rate should be adjusted (e.g. for health discounting). The overall values ascribed to specific components of the STPR are retained from the 2003 edition as set out below. The calculation of the STPR is shown in Box 37.

Estimates of ρ

A6.9 The estimate of **ρ** (rho) is the sum of:

- an allowance for time preference (**δ**)
- an allowance for unpredictable risks not normally included in appraisal, known as 'catastrophic' and 'systemic' risk (**L**)

A6.10 The risks contained in **L** could, for example, be disruptions due to unforeseeable and rapid technological advances that lead to obsolescence, or natural disasters that are not directly connected to the appraisal. **L** also includes a small premium for 'systemic risk' because costs and benefits are usually positively correlated to real income per capita. With regard to time preference, **δ**, Freeman, Groom and Spackman (2018)[42] survey the evidence and show that plausible values range from 0% to 1%. Coupled with an estimate of 1% for the risk component, **L**, this is compatible with a value of 1.5% for the overall value of **ρ.**

A6.11 For the purposes of the STPR the estimate of δ is retained at 0.5% and the estimate of L is retained at 1%. The estimate of ρ is therefore 1.5%.

Estimates of μ and g

A6.12 Available evidence suggests a range of plausible values of **μ** (mu). The 2003 edition of the Green Book set a value of 1. As set out in Annex 3, the estimate used by DWP for distributional weighting is 1.3 (based on Layard et al. 2008[43]), while Groom and Maddison (2018)[44] use a number of techniques to estimate a pooled value of 1.5.

A6.13 Historic growth rates in consumption per capita depend on the time period considered and the extent to which more recent growth rates or projections are considered to be representative of long term trends. The 2003 Green Book set **g** at 2%. Freeman, Groom and

[40] See discussion paper: Spackman, M. (2016) "Appropriate time discounting in the public sector" GRI Working Paper No. 182. Grantham Research Institute on Climate Change and Environment. London School of Economics.
[41] See Freeman, Groom and Spackman (2018) "Social Discount Rates for Cost-Benefit Analysis: A Report for HM Treasury" published on the HMT Green Book web page.
[42] ibid.
[43] Layard et al. (2008) "The marginal utility of income" Journal of Public Economics, Vol. 92, pp. 1846-1857.
[44] Groom and Maddison (2018) "New Estimates of the Elasticity of Marginal Utility for the UK" forthcoming in Environmental and Resource Economics. Working paper version (2013) Centre for Climate Change Economics and Policy Working Paper No. 141.

Spackman (2018)[45] reference average real annual per capita consumption growth for the UK for the period 1949 – 2016 of 2.2% per year. Estimates based on ONS data from the recent past, for example 1996 to 2016, are lower at 1.7% per year.[46]

A6.14 Future projected growth rates are also relevant. Long-run forecasts of GDP growth (rather than consumption) from the Office of Budget Responsibility are for growth of 2.2% per year in real terms. This implies an annual projected growth rate of GDP per capita of 1.9%.[47]

A6.15 Taken together, the range of estimates of μ and g suggest 2% remains plausible as an estimate of the overall wealth effect. For the purposes of the STPR the estimate of μ is retained at 1 and g at 2%.

Box 37. Calcuation Of STPR

$$r = \rho + \mu g$$

Where $\boldsymbol{\rho} = 1.5\%$; $\boldsymbol{\mu} = 1.0$; and $\boldsymbol{g} = 2\%$

$$0.015 + 1*0.02 = 3.5\%$$

Exceptions to the standard STPR

A6.16 The recommended discount rate for risk to health and life values is 1.5%. This is because the 'wealth effect', or real per capita consumption growth element of the discount rate, is excluded. As set out in Annex 2, health and life effects are expressed using welfare or utility values, such as Quality Adjusted Life Years (QALYs), as opposed to monetary values. The diminishing marginal utility associated with higher incomes does not apply as the welfare or utility associated with additional years of life will not decline as real incomes rise.

A6.17 The standard UK discount rate may not be appropriate for appraisal of Official Development Assistance (ODA) expenditure. For example, long term growth rates, the probability of catastrophic risk and the macro-economic effects associated with expenditure may differ. An appropriate estimate of the STPR for the recipient country should be used. Government departments should contact Department for International Development if they require further information.

Long term discounting

A6.18 Policies or projects which involve long term effects may require a different approach. This can be particularly important for policies expected to have significant environmental effects. Where long term effects are expected to occur, the appraisal of proposals may involve longer timescales. Generally, the maximum life span of an intervention is assumed to be up to 60 years. This may be extended where there is evidence a longer time period is required for the full effects of an intervention to materialise.

A6.19 The standard STPR of 3.5% applied in appraisal should decline over the long term due to uncertainty about future values of its components. To support practical application in appraisal, standard declining discount rates and discount factors by year can be found in Table 7 and the corresponding values for the reduced health rate are given in Table 8.

[45] See Freeman, Groom and Spackman (2018) "Social Discount Rates for Cost-Benefit Analysis: A Report for HM Treasury" published on the HMT Green Book web page.

[46] The ONS quarterly national accounts publication provides historic consumption data. Based on analysis in December 2017 the approximate compound annual growth rate in consumptions per capita between 1996 and 2016 was 1.7%. Freeman, Groom and Spackman (2018) provide a range of estimates for different historical horizons.

[47] Long-run forecast of GDP growth from the Office for Budget Responsibility – Long-term economic determinants – November 2017 Economic and fiscal outlook – supplementary documents published on 24th of January 2018. Estimate of average long-term GDP per capita growth consistent with OBR's long term economic determinants.

Intergenerational effects

A6.20 Where the possible effects of an intervention being examined as part of an appraisal are long term and involve very substantial or irreversible wealth transfers between generations further sensitivity analysis is appropriate. **This could include irreversible changes to the natural environment**. This involves applying both the standard Green Book discount rate and a reduced discount rate (excluding pure social time preference, **δ**) to costs and benefits.

A6.21 When applying this approach the Net Present Social Value (NPSV) using the standard STPR and the reduced rate STPR should both be included in the results of the appraisal and explained clearly. The difference between these two estimates of NPSV provides an estimate of the intergenerational wealth transfer attributable to pure social time preference which should be part of the explanation of the approach. The basis for the approach to long-term discounting set out here can be found in supplementary guidance on intergenerational wealth transfers and social discounting.

Table 6. Declining Long Term Discount Rate

Year	0 – 30	31 – 75	76 – 125
STPR (standard)	3.50%	3.00%	2.50%
STPR (reduced rate where pure STP = 0)	3.00%	2.57%	2.14%
Health	1.50%	1.29%	1.07%
Health (reduced rate where pure STP = 0)	1.00%	0.86%	0.71%

A6.22 In addition to declining values for the standard STPR and a reduced rate STPR further sensitivity analysis to increase transparency and visibility of long term effects can be undertaken. This involves presenting:

- the average discounted annual cost of the effect over the first 30 years, alongside the calculation of UK welfare
- an indication of how long the effect is expected to persist
- an indication of the level of accuracy indicated by a range of reasonable values
- an explanation of how the value may be expected to change in the future

A6.23 Further information on the basis for this approach to intergenerational effects can be found in supplementary guidance on intergenerational wealth transfers and social discounting.

Discounting and inflation

A6.24 Discounting is solely concerned with adjusting for social time preference and has nothing to do with adjusting for inflation. The recommended Green Book discount rate applies to real values, with the effects of general inflation already removed. To promote transparency the best practice approach is to first convert costs or benefits to a real price basis, and then perform the discounting adjustment. The inflation rate and discount rate should not be added and applied to costs and benefits, as it gives an arithmetically incorrect result.

Table 7. Standard Discount Rates and Associated Discount Factors

Year	Discount Rate	Discount Factor	Year	Discount Rate	Discount Factor
0		1	**31**	3.000%	0.3459
1	3.500%	0.9662	**32**	3.000%	0.3358
2	3.500%	0.9335	**33**	3.000%	0.3260
3	3.500%	0.9019	**34**	3.000%	0.3165
4	3.500%	0.8714	**35**	3.000%	0.3073
5	3.500%	0.8420	**36**	3.000%	0.2984
6	3.500%	0.8135	**37**	3.000%	0.2897
7	3.500%	0.7860	**38**	3.000%	0.2812
8	3.500%	0.7594	**39**	3.000%	0.2731
9	3.500%	0.7337	**40**	3.000%	0.2651
10	3.500%	0.7089	**41**	3.000%	0.2574
11	3.500%	0.6849	**42**	3.000%	0.2499
12	3.500%	0.6618	**43**	3.000%	0.2426
13	3.500%	0.6394	**44**	3.000%	0.2355
14	3.500%	0.6178	**45**	3.000%	0.2287
15	3.500%	0.5969	**46**	3.000%	0.2220
16	3.500%	0.5767	**47**	3.000%	0.2156
17	3.500%	0.5572	**48**	3.000%	0.2093
18	3.500%	0.5384	**49**	3.000%	0.2032
19	3.500%	0.5202	**50**	3.000%	0.1973
20	3.500%	0.5026	**51**	3.000%	0.1915
21	3.500%	0.4856	**52**	3.000%	0.1859
22	3.500%	0.4692	**53**	3.000%	0.1805
23	3.500%	0.4533	**54**	3.000%	0.1753
24	3.500%	0.4380	**55**	3.000%	0.1702
25	3.500%	0.4231	**56**	3.000%	0.1652
26	3.500%	0.4088	**57**	3.000%	0.1604
27	3.500%	0.3950	**58**	3.000%	0.1557
28	3.500%	0.3817	**59**	3.000%	0.1512
29	3.500%	0.3687	**60**	3.000%	0.1468
30	3.500%	0.3563	**61**	3.000%	0.1425

Table 8. Health Discount Rates and Associated Discount Factors

Year	Health Discount Rate	Health Discount Factor	Year	Health Discount Rate	Health Discount Factor
0		1	31	1.286%	0.6316
1	1.500%	0.9852	32	1.286%	0.6236
2	1.500%	0.9707	33	1.286%	0.6157
3	1.500%	0.9563	34	1.286%	0.6079
4	1.500%	0.9422	35	1.286%	0.6002
5	1.500%	0.9283	36	1.286%	0.5926
6	1.500%	0.9145	37	1.286%	0.5850
7	1.500%	0.9010	38	1.286%	0.5776
8	1.500%	0.8877	39	1.286%	0.5703
9	1.500%	0.8746	40	1.286%	0.5630
10	1.500%	0.8617	41	1.286%	0.5559
11	1.500%	0.8489	42	1.286%	0.5488
12	1.500%	0.8364	43	1.286%	0.5419
13	1.500%	0.8240	44	1.286%	0.5350
14	1.500%	0.8118	45	1.286%	0.5282
15	1.500%	0.7999	46	1.286%	0.5215
16	1.500%	0.7880	47	1.286%	0.5149
17	1.500%	0.7764	48	1.286%	0.5083
18	1.500%	0.7649	49	1.286%	0.5019
19	1.500%	0.7536	50	1.286%	0.4955
20	1.500%	0.7425	51	1.286%	0.4892
21	1.500%	0.7315	52	1.286%	0.4830
22	1.500%	0.7207	53	1.286%	0.4769
23	1.500%	0.7100	54	1.286%	0.4708
24	1.500%	0.6995	55	1.286%	0.4649
25	1.500%	0.6892	56	1.286%	0.4590
26	1.500%	0.6790	57	1.286%	0.4531
27	1.500%	0.6690	58	1.286%	0.4474
28	1.500%	0.6591	59	1.286%	0.4417
29	1.500%	0.6494	60	1.286%	0.4361
30	1.500%	0.6398	61	1.286%	0.4306

List of Green Book Supplementary Guidance

A7. Transformation, Systems and Dynamic Change

A7.1 This Annex provides more detail on the Green Book definitions and use of the terms "Transformation, Systems, and Dynamic Analysis", including how they can be taken into account in Green Book appraisal within the framework outlined in Chapters 3 and 4. It covers:

- ☐ the definition of transformation and important characteristics of the transformational change processes
- ☐ the interrelationship with Systems and Dynamic methods, in both the analytical research that precedes a business case and when developing a business case
- ☐ risk and uncertainty and appraising transformational outcomes
- ☐ Where in the policy process transformation, systems and dynamic change should be considered
- ☐ Value for Money assessment of transformational outcomes

Definition of Transformation and roles of Systems and Dynamic considerations

A7.2 While Transformation has a range of meanings in general use, it is defined more precisely for the purposes of Green Book analysis.

> **In Green Book terms transformational change refers to a radical permanent qualitative change in the subject being transformed, so that the subject when transformed has very different properties and behaves or operates in a different way.**

In this definition permanence refers to a "practically irreversible change in a system" that causes self-sustaining internal feedback effects that result in continuing change, or a new stable state, but not reversion to the original state. This transformation persists after the initial stimulus is withdrawn. This definition excludes the less specific use of the term as sometimes applied to projects that are simply significant in terms of their costs and/or impact. A very clear statement of the logical process of change that will cause the transformation is required and it must be supported by objective evidence that recognises the uncertainties inherent in the proposition. Examples of transformation are given in the Oxford dictionary as *"photochemical reactions transform the light into electrical impulses"* And *"London's Docklands have been radically transformed over the last 20 years."* This goes much further than just a change in quantity, although changes in quantity can have transformational consequences. Transformation is not always a necessary result of quantitative change but on occasion where a system is close to a tipping point, small changes may cause it pass that point and to change qualitatively.

A7.3 There are three main contexts in which transformational change may be of concern in an understanding of the analysis and appraisal of policies, strategic portfolios, programmes and projects. These are where:

- creating or supporting a transformation change is a specific policy objective
- transformational change is not the specific policy objective but may result as a collateral unintended effect
- transformational change is taking place externally in the operational environment that the proposal is concerned with.

Dynamic Changes and Systems Effects

A7.4 In each of these contexts, transformational changes can bring about change that may have widespread effects across complex systems such as the economy and society. Changes in the fundamental properties of a system and the way it behaves have important implications for analysis and the estimation or forecasting of future outcomes. Simple extrapolation from past experience will fail to foresee the way that a system may behave after it has been transformed or once the process of change has started. For these reasons research and analysis which considers transformational possibilities needs to consider wider systemic effects and do so with an awareness of dynamic changes in the ways that parts of the system behave in relation to each other. Such analytical work should precede the use of longlist or shortlist analysis which uses a form of comparative statics based on marginal changes to select preferred option choices. Such analysis relies on high quality input that accounts for non-marginal effects such as dynamic changes in relationships and wide systems effects.

Uncertainty and Risk in the context of Transformation

A7.5 Changes in complex systems can sometimes involve tipping points when a build-up in a quantitative input variable reaches a critical level and the system tips over fairly quickly into a different state, e.g. when water becomes steam or ice as a result of heat energy being added or removed. While in physical sciences the properties of materials and their tipping points are largely well understood and quantified, the tipping points of very complex systems are often more challenging with high levels of uncertainty. For example climate change science faces significant uncertainty in prediction of meteorological tipping points. The social sciences are similarly challenged in dealing with the complex problems of predicting dynamic and systems outcomes.

A7.6 Systems in general usually involve feedback effects, as opposed to simple linear processes and in complex systems there can be many such effects all interacting across the system. This leads to the possible presence of tipping points that result in the entire system tipping over into an altered – transformed – state when a certain point is reached. As a result, relatively modest interventions in a system at certain points may possibly produce very large transformational effects. Systems can also form nodes where feedback effects converge. These are leverage points where the effects of an intervention are amplified and can cause increased system wide effects, intended or otherwise. Within systems there will also be barriers to change either active or passive. Where significant transformational change is an objective it is important to map the key systems effects and research the likelihood, magnitude and location of tipping and leverage points.

A7.7 Irreversibility or virtual irreversibility due to cost and timescale are a feature of many changes. Irreversibility or its virtual equivalent arise where the scale of a change is very large compared to the resources required to reverse it, or where a system passes a tipping point and begins behaving differently which causes self-sustaining feedback effects, making it impractical to reverse. The possibility of irreversible change is a feature of how a system functions, in other words, what happens when the system tips into a new and altered state. See also Annex 5 section on Decision

trees and Real Options Analysis concerning analysis of uncertainty in situations where knowledge is increasing. Where relevant, research should therefore seek to understand how the system is likely to function at and after a tipping point.

A7.8 The less objective data and experimental evidence there is, the higher will be the uncertainty around changes driven by tipping points. In cases where the likelihood of the resulting change or the scale of the change is unknown, uncertainty is different from quantifiable risk. Analysis of such situations must take care not to give a spurious impression of accuracy. To support informed decisions appraisers should clearly identify the unknowns and their potential scale in terms of outcomes. The use of scenario analysis together with real options analysis[48] of alternative scenarios can shed light on the potential value of delaying decisions, particularly where knowledge is increasing over time. It can also indicate the value of making more flexible higher cost interventions. This is an operations research problem and the proportionate use of expert operations research analysts' is recommended. For an example of scenarios used with real options analysis in conditions of uncertainty see the paper "Modelling the risk–benefit impact of H1N1 influenza vaccines"[49]

Transformation, Systems and Dynamic change in the policy process

A7.9 Transformational changes are hardly ever brought about by individual projects or programmes. They require strategic portfolios of programmes grouped into related subjects. These portfolios of programmes are focussed on shared SMART objectives and aim to change a range of related outcomes. Bringing about a fundamental transformational change will require changes across many fronts, for example the attainment of a zero carbon emissions economy, in which increased output does not automatically bring about increased emissions. This will apply across the extractive industries, the manufacture of products, and the delivery of services, as well as changes in which goods and services are produced and consumed, and in what proportions. To make this self-sustaining will require changes across supply and logistical chains and changes in public taste and habits.

A7.10 Significant transformational changes need to be researched, appraised, designed, approved and evaluated in the context of the strategic level of the decision hierarchy outlined in chapter 3. Individual projects and programmes will have their SMART objectives set by requirements of the strategy and its strategic portfolios. It is not sensible to attempt appraisal of the social value of projects and programmes in isolation from their role in implementing a policy or strategic objective they enable. It is also unhelpful and unrealistic to attempt to divide the social value of the whole programme into its constituent enabling components. The solution in such cases where the social value is not amenable to direct valuation in isolation from the wider strategy, is to use social cost effectiveness as the criteria for optimum option selection within the enabling projects.

[48] See Annex 5 from paragraph A5.15 onwards for real options analysis with an example.

[49] By L.D. Phillips Et al.- published by the European Journal of Public Health February 2013.

Glossary

Additionality is a real increase in social value that would not have occurred in the absence of the intervention being appraised.

Adverse Selection may occur where asymmetric information restricts the quality of a traded good. This typically happens because the side with more information can negotiate a more favourable exchange than would otherwise be the case.

Affordability is an assessment of the costs of an intervention to the public sector taking into account current and expected future budgets.

Agglomeration benefits come when firms and/or people locate near one another in geographical clusters.

Appraisal is the process of defining objectives, examining options and weighing up the relevant costs, benefits, risks and uncertainties before a decision is made.

Assessment may refer to either an appraisal or an evaluation.

Benefits Externalities are benefits which are not reflected in the market price.

Business As Usual is the continuation of current arrangements as if the intervention under consideration were not to happen. This serves as a benchmark to compare alternative interventions.

Contingency provision should reflect the sum of measured risk (costs of risks avoided, shared and mitigated on an expected likelihood basis) and optimism bias adjustment estimated in nominal prices.

Contingent valuation is a different description of stated preference valuation, where individuals are asked how much they would be willing to pay to obtain a good or service, or how much they would require to compensate them to give it up.

Cost Externalities are costs which are not reflected in the market price.

Cost of capital is the cost of raising funds and is sometimes expressed as an annual percentage rate.

Deadweight refers to allowing for outcomes that would have taken place without the intervention under consideration. Deadweight will be revealed when the total outcome of an option for intervention is compared with business as usual, the (BAU).

Diminishing marginal utility is the tendency for the satisfaction individuals derive from an additional unit of a good or service to diminish as more units are acquired or consumed.

Diminishing marginal utility of income states that the value of an additional pound of income is higher for a low income recipient and lower for a high income recipient.

Discounting is a technique that converts future values occurring over different periods of time to a present value by taking account of the human preference for value now rather than later. This concept is known as "social time preference", and it is applied to real prices expressed in base year values and has nothing to do with inflation.

Discount rate is the annual percentage rate at which the present value of future monetary values are estimated to decrease over time.

Displacement is the degree to which an increase in economic activity or social welfare that is promoted by an intervention is offset by reductions elsewhere. in the area under consideration or in similar areas close by. This occurs where existing businesses close and reopen in a fresh location or move into the target area from similar areas close by.

Do-minimum option in the Green Book refers to the minimum intervention required to deliver the core business needs required to deliver the SMART objectives identified in the strategic appraisal. This excludes additional features that take advantage of opportunities present during implementation of change.

Effectiveness is a measure of the extent to which a proposed intervention achieves its objectives.

Evaluation is the systematic assessment of an intervention's design, implementation and outcomes.

Expected value is the product of variable such as a risk multiplied by its probability of occurrence.

External Benefits are benefits of production or consumption of a good which are not taken into account by individuals or included in the price of a good in a perfectly competitive market.

External Costs are costs of production or consumption of a good which are not taken into account by individuals or included in the price of a good in a perfectly competitive market.

Externalities occur when consuming or producing a good or service produces benefits or costs for others that are not directly involved in the consumption or production.

GDP deflator is an index of the general price level in the economy as a whole, measured by the ratio of gross domestic product (GDP) in nominal (i.e. cash) terms to GDP at constant prices.

Gold Plating is the inclusion in an option of additional features that add little value but add significantly to cost.

Hedonic pricing is a form of revealed preference valuation that uses data from related surrogate markets and econometric techniques to estimate a value for a good or service.

Information asymmetry is a difference in the information available to the parties involved in a transaction giving an advantage to one side over the other.

Intervention refers to a proposed, policy, programme or project that is being appraised.

Implementation refers to the activities required to deliver an intervention following approval.

Irreversibility describes an option that would create a significant change that practically or affordably cannot be undone.

Leakage is the extent to which effects "leak out" of a target area into others e.g. workers commuting into other areas to take up new employment opportunities.

Longlist refers to the initial, wide set of possible option choices considered in the first stage of appraisal using the options framework filter before selecting the shortlist.

Market failure occurs where, a market is unable to function fairly according to the economic ideas of efficient markets, from a Green Book perspective which looks beyond simply economic efficiency this means the market is unable to provide satisfactory levels of welfare efficiency.

Market value or price is the price at which a commodity can be bought or sold, determined through the interaction of buyers and sellers in a market.

Marginal utility is the change in satisfaction experienced by a consumer from a small change in the consumption of a good or service.

Monte Carlo Analysis is a simulation-based risk modelling technique that produces expected values and confidence intervals as a result of many simulations that model the collective impact of a number of uncertainties.

Moral Hazard occurs when an individual changes their behaviour and takes risks because they are protected from negative consequences and someone else bears the costs.

Multi Criteria Decision Analysis is a technique for dealing with competing complex unmonetisable values. In certain circumstances, it can be used at the longlisting stage to consider the scope and the technical means of delivery of a service. The technique permitted uses swing weighting in controlled conditions led by an experienced facilitator it is different from simple weighting and scoring which is explicitly not recognised as a valid objective methodology.

Net Present Value (NPV) is a generic term for the sum of a stream of any future values that have been discounted to bring them to a present value.

Net Present Social Value (NPSV) or Net Present Public Value (NPPV) mean the same and are the present value of a stream of future costs and benefits to UK society (that are already in real prices) and that have been discounted over the life of a proposal by the appropriate Green Book social time preference rate.

Nominal price refers to prices that include inflation they are the actual prices that are paid, or which it is expected will be paid in the future, this is the same price base as is used for public sector budgets.

Opportunity cost is the value which reflects the best alternative use a good or service could be put to.

Optimism bias is the proven tendency for appraisers to be over-optimistic about key project parameters, including capital costs, operating costs, project duration and benefits delivery.

Options Framework is a process where an initial longlist is reduced to a shortlist by breaking a proposal down into a sequence of strategic choices looking at scope, solution, delivery, implementation and funding.

Outcome refers to the consequences to society of a change in a public service. For example, changes in cardiovascular surgery which lead to improved life expectancy of the population.

Output refers to the change in the level or quality of a public service. For example, more successful cardiovascular operations carried out.

(a) **Policy** is a statement of intent, and is implemented as a procedure or protocol and a deliberate system of principles to guide decisions and achieve rational outcomes, adopted by a governance body within an organization. Policy and its implementation consists of all of the elements below.

(a) **Portfolio** is a collection of programmes and/or projects it may be used to structure and manage investments at an organisational or functional level to optimise strategic benefits and/or operational efficiency.

Portfolio Management is the selection, prioritisation and control of an organisation's programmes and projects, in line with its strategic objectives and capacity to deliver. The goal of PM is to balance the implementation of change initiatives and the maintenance of Business As Usual, while optimising performance in the private sector this is return on investment and in the public sector this is the social/public welfare return on spending.

PPP refers to a Public Private Partnership which can take many organisational forms.

Precautionary principle refers to the concept that where the potential consequences of a perceived risk are significantly adverse, action may be justified even if the probability of its occurrence is low.

Preferred Option is the option preferred after a detailed analysis of the shortlist. Comparison of each shortlist option, and their advantages over Business As Usual allows identification of the best option for the delivery of public value.

Preferred Way Forward, found using the options framework, is the option that appears most likely to deliver SMART objectives at the longlist stage before a detailed appraisal of the shortlist. This option, together with Business As Usual, a viable do-minimum and one or two other alternatives are taken forward as a shortlist for more detailed appraisal.

Price index is a standardised measure of price levels over time. General price indices cover a wide range of prices and include the GDP deflator, the Consumer Price Index (CPI) and the Retail Price Index (RPI). There are also separate price indices that apply to one commodity or type of commodity.

(a) **Programme** is an interrelated series of planned measures (Sub-Programmes, Projects) and related events and coordinated activities in pursuit of an organisation's long-term objectives.

(a) **Project** is a temporary organisation that is needed to produce a specific predefined output or result at a pre-specified time using predetermined resources.

Proposal refers to a policy, programme or project that is being appraised. See also Intervention.

Prosperity is measured by the level of social value as defined in the Green Book, so that an increase in social value is an increase in prosperity and a decrease in social value is a fall in prosperity.

Public Sector Comparator or Comparable Public Option is an option for direct public provision with comparable output assumptions to a Public Private Partnership option, including allowances for differences in risk and tax between the public and private sectors. The purpose of creating this option is to provide comparable comparison with a PPP option based on a level playing field.

Real option theory or analysis is used to estimate the benefit of delaying a decision by retaining flexibility in situations with high levels of uncertainty but where knowledge is increasing significantly over time.

Real price is the nominal price (i.e. current cash price at the time) deflated by a measure of general inflation.

Real terms is a reference to the value of expenditure at a specified general price level (calculated by dividing a nominal cash value by a general price index).

Relative price effect is the movement over time of a specific price index (such as Information Technology) relative to a general price index (such as the GDP deflator).

Relevant costs and benefits are the costs and benefits to UK society overall that affect or can be affected by a proposal or decision.

Resources in the Green Book is used to mean real goods and services excluding other costs. It is widely used in other ways that have different meanings depending on context.

Resource Cost is used in the Green Book in the economic sense to mean the costs of goods and services excluding transfer payments such as for example VAT. In resource accounting, 'resource costs' are accruals expressed in real terms.

Revealed preference is a value revealed or inferred as a result of observing people's actions.

Risks are specific uncertainties that arise in the design, planning, build/creation and operation of a proposal.

Risk costs are the costs of avoiding, transferring or mitigating risks associated with a specific project, programme or policy. The costs of risk mitigation are based on a combination of likelihood of a risk materialising and its cost.

Risk register refers to a tool used to record, the risks specific to a proposal, their likelihood and value and the assignment of risk management responsibility.

SRO the Senior Responsible Owner is the person to whom the project or programme manger reports, they "own" the proposal on behalf of the originating organisation but do not take part in its detailed day to day running. They have overall responsibility for asking questions, keeping it on track, dealing with significant external problems and making strategic decisions on submission for approval or not.

Sensitivity Analysis involves exploring the sensitivity of expected outcomes of an intervention to potential changes in key input variables. It can be used to test the impact of changes in assumptions and should be clearly presented in the results of appraisal.

Shadow price refers to an estimated value of a good where market prices are not available, or do not reflect total costs and benefits.

Shortlist refers to the set of viable options to be taken forward to the more detailed analysis in the second stage of appraisal.

Social Benefits are the benefits to society, the total of which in the Green Book is the sum of benefits accruing to society and any benefits accruing to the public sector.

Social Costs are the costs to society , the total of which in the Green Book is the sum of costs accruing to society and any benefits accruing to the public sector.

Social Cost Benefit Analysis quantifies in monetary terms the effects on UK social welfare. Costs to society are given a negative value and benefits to society a positive value. Costs to the public sector are counted as a social welfare cost. It generates measure of social value. When combined with an appropriate public sector cost measure a BCR is produced which provides a social unit cost measure.

Social Cost-Effectiveness Analysis compares the costs of alternative ways of producing the same or similar outputs, it produces a unit cost measure.

Social Time Preference Rate or STPR is defined as the value society attaches to present, as opposed to future values.

Social Value is a measure of total social welfare. As a net value it is the sum of total benefits and total costs to society of a proposal.

Stated preference is a technique for eliciting values for something that is not-marketed, and is derived from responses to expertly designed surveys. (See **willingness to pay** and **willingness** to accept below).

(a) **Strategic Portfolio** consists of the programmes projects and related activities that are necessary to make the changes required to deliver a strategic objective or objectives.

Strategy is a plan of action designed to achieve an overall aim or objective. Derived from the art of planning and directing overall military operations and movements in a war or battle.

Substitution is where one type of labour of factor of production such as capital equipment is substituted for another but there is no increase in employment or output.

Switching value refers to the value a key input variable would need to take for a proposed intervention to switch from a recommended option to being pointless.

Systematic risk is the variation in outputs that is correlated with movements in the wider economy and which cannot be reduced by risk management.

Transfer payments pass purchasing power from one economic agent to another and do not affect output or consumption of resources. They include the transfer of resources between people such as gifts, taxes such as VAT or social security payments and are not included as an element of social values.

Value for Money – (VfM) is a balanced judgment based on the Benefit Cost Ratio which brings together social costs and benefits including public sector costs over the entire life of a proposal, together with decisively significant unquantified deliverables, and unmonetised risks and uncertainties, to deliver a proposals SMART objectives. The judgement is made in the context of the proposals role, in supporting government policies and strategies of which it is a part, and its fit with wider public policies.

Willingness to Accept is a technique for the inference of value of a non-marketed good or service from the amount that respondents to an expertly designed survey are willing to accept. to give up the good or service.

Willingness to Pay is a technique for the inference of value of a non-marketed good or service from the amount that respondents to an expertly designed survey are willing to pay to acquire a good or service.

Bibliography

Abel, A., Dixit, J., Eberly, J., Pindyck, R. (1995). Options, The Value of Capital and Investment. NBER Working Paper 5227.

Arrow, K., Cropper, M., Gollier, C., Groom, B., Heal, G., Newell, R., Nordhaus, W., Pindyck, R,. Pizer, W., Portney, R., Sterner, T., Tol, R., and Weitzman M., (2014). How Should Benefits and Costs be Discounted in an Intergenerational Context? *Review of Environmental Economics and Policy,* 8(2) pp. 145-163.

Arrow, K., Cropper, M., Gollier, C., Groom, B., Heal, G., Newell, R., Nordhaus, W., Pindyck, R,. Pizer, W., Portney, R., Sterner, T., Tol, R., and Weitzman M., (2013). Determining Benefits and Costs for Future Generations. *Science*, 341(6144), pp. 349-350.

Arrow, K., Cropper, M., Gollier, C., Groom, B., Heal, G., Newell, R., Nordhaus, W., Pindyck, R., Pizer, W., Portney, P., Sterner, T., Tol, R. S. J. and Weitzman, M. (2013b). How Should Benefits and Costs Be Discounted in an Intergenerational Context? The Views of an Expert Panel: The Views of an Expert Panel. *Resources for the Future Discussion Paper*, pp. 12-53.

Atkins G., Davies N., and Kidney Bishop T., (2017). How to value infrastructure: Improving cost benefit analysis, Institute for Government. Available at:

https://www.instituteforgovernment.org.uk/publications/value-infrastructure-september-2017

Atkinson, G., Dietz, S., Helgeson, J., Hepburn, C., and Sælen, H., (2009). Siblings, Not Triplets: Social Preferences for Risk, Inequality and Time in Discounting Climate Change. *Economics Discussion Papers*, No 2009-14, Kiel Institute for the World Economy.

Bateman, I., Harwood, A., Mace, G., Watson, R., Abson, D., Andrews, B., Binner, A., Crowe, A., Day, B, Dugdale, S., Fezzi, C., Foden, J., Haines-Young, R., Hulme, M., Kontoleon, A., Lovett, A., Munday, P., Pascual, U., Paterson, J., Perino, G., Sen, A., Siriwardena, G., van Soest D., and Termansen, M. (2013) Bringing ecosystem services into economic decision making: Land use in the UK. *Science*, Vol 341, No. 6141, pp. 45-50, 5th July 2013. DOI: 10.1126/science.1234379.

Barber, M. (2017). Delivering better outcomes for citizens: practical steps for unlocking public value. Published on the Gov.uk webpages

Barro, R. (2006). Rare Disasters and Asset Markets in the Twentieth century. *The Quarterly Journal of Economics*, 121(3), pp. 823-866.

Barro, R. (2009). Rare Disasters, Asset Prices, and Welfare Costs American. *Economic Review,* vol. 99(1), March 2009: 243-64.

Baumstark, L., and Gollier, C., (2013). *The relevance and the limits of the Arrow-Lind Theorem*. Mimeo, Toulouse University.

Blundell, R., Browning, M., and Meghir C., (1984). Consumer Demand and the Life-Cycle Allocation of Expenditures. *Review of Economic Studies*, 61, 1994, pp. 57-80.

Blundell, R. (1988). Consumer Behaviour: Theory and Empirical Evidence – A Survey. *The Economic Journal*, 98, pp. 16-65.

Boardman, A., Greenberg, D., Vining, A., and Weimer, D., (1996). *Cost-Benefit Analysis: Concepts and Practice*. Upper Saddle River, N.J. Prentice Hall.

Cowell, F., and Gardiner, K., (1999). Welfare Weights. STICERD, London School of Economics, Economics Research Paper 20, Aug 1999

Crafts, N. (2002). Britain's Relative Economic Performance 1870 -1999. *Institute of Economic Affairs Research* Monograph No. 55, IEA London.

Cropper, M., Freeman, M., Groom, B and Pizer, W. (2014). Declining Discount Rates. *American Economic Review: Papers and Proceedings*, 104(5), pp. 538-43

Dasgupta, P. (2008). Discounting climate change. *Journal of Risk and Uncertainty,* 37, 141-169.

Demsetz, H. (1969). Information and Efficiency: Another Viewpoint. *Journal of Law and Economics*, Vol 12, pp 1-22.

Dietz, S., Hepburn, C., and Stern, N. (2007). *Economics, Ethics and Climate Change.* In: Basu, Kaushik and Kanbur, Ravi, (eds.) Arguments for a Better World: Essays in Honour of Amartya Sen. Oxford university Press, Oxford, U.K., pp. 19-20. ISBN 13: 978-0-19-923999-3.

Dixit, A. (2000). Incentives and Organisations in the Public Sector: An Interpretative Review, Princeton University.

Drury, C. (1988). *Management and Cost Accounting*. VNR International, London.

Drupp, M., Freeman, M., Groom, B., and Nesje, F., (2015). Discounting Disentangled: An Expert Survey on the Components of the Long Term Social Discount Rate. Grantham Research Institute on Climate Change and the Environment Working Paper No. 172. Under review.

Emmerling, J., Groom, B., and Wettingfeld, T. (2016). Discounting and Intra-generational equity: Who should we be discounting? Mimeo, London School of Economics, March.

Evans, A. (2000). The Economic Appraisal of Road Traffic Safety Measures in Great Britain, European Conference of Ministers of Transport. Round Table, Paris.

Evans, D., and Sezer H. (2002). A Time Preference Measure of the Social Discount Rate for the UK. *Applied Economics,* 34, pp. 1925-1934.

Flanagan, J, with C Smith. (Jan 2001) Making Sense of Public sector Investments: The Five Case Model.

Flanagan, J, for HM Treasury and Welsh Government (2018 and earlier editions) Business Case Guidance for Programmes.

Flanagan, J, for HM Treasury and Welsh Government (2018 and earlier editions) Business Case Guidance for Projects.

Feldstein, M. (1970). Choice of Technique in the Public Sector, A Simplification. *The Economic Journal,* 80(323), pp: 985 – 990.

Feldstein, M. (1973). The Inadequacy of Weighted Discount Rates. For a then forthcoming volume of essays in honour of Richard A. Musgrave, reproduced in Layard (1972)

Frontier Economics for Defra (2014) Flood and Coastal Erosion Risk Management (FCERM) and the Wider Economy.

Flyvbjerg, B. (2002). Underestimating Costs in Public Works Projects. *Journal of the American Planning Association*, 68(3), pp: 279-295.

Fox, Kennedy and Sugden (1993), Decision Making – A Management Accounting Perspective, Butterworth Heinemann in association with CIMA.

Franklin, D. (2000). *The Morality of Groups*, PhD Thesis, University College London.

Freeman, M. (2016). *Long-term corporate and social discount rates for infrastructure and environmental project valuation*. Mimeo, Loughborough University.

Freeman, M., and Groom, B. (2015). Positively Gamma Discounting: Combining the Opinions of Experts on the Social Discount Rate. *The Economic Journal*, 125(585), pp: 1015-1024, Media summary from Royal Economic Society.

Freeman, M., Groom, B., Panipoulou, K. and Pantelides, T. (2015). Declining Discount Rates and the Fisher Effect: Inflated Past, Discounted Future. *Journal of Environmental Economics and Management* 73, pp.32-49.

Freeman, M., and Groom, B. (2013). How certain are we about the certainty equivalent long-run social discount rate? *Journal of Environmental Economics and Management*. (published online).

Freeman, M., Groom, B., and Spackman, M., (2018) "Social Discount Rates for Cost-Benefit Analysis: A Report for HM Treasury" published on the Green Book web pages.

Freeman, M (2009). Yes, We Should Discount the Far-Distant Future at Its Lowest Possible Rate: A Resolution of the Weitzman–Gollier Puzzle. *Economics Discussion Papers*, No 2009-42, Kiel Institute for the World Economy.

Freeman M., and Groom B. (2012). *Positively Gamma Discounting*. Mimeo, Loughborough University.

Fujiwara (2010). The Department for Work and Pensions Social Cost-Benefit Analysis framework – Methodologies for estimating and incorporating the wider social and economic impacts of work in Cost-Benefit Analysis of employment programmes – A report of research carried out by the Department for Work and Pensions.

Fujiwara D., and Campbell R, (2011). Valuation Techniques for Social Cost-Benefit Analysis: Stated Preference, Revealed Preference and Subjective Well-Being Approaches A Discussion of the Current Issues Available at:

https://www.gov.uk/government/publications/valuation-techniques-for-social-cost-benefit-analysis

Gibbons, S., Mourato, S., Resende, G. (2014). The amenity value of English nature: a hedonic price approach. *Environmental Resource Economics*, 57, pp. 175-196.

Gollier, C. (2002). *Time Horizon and the Discount Rate*, IDEI, University of Toulouse, mimeo.

Gollier, C. (2002a). Discounting an uncertain future. *Journal of Public Economics*, 85, pp. 149-166.

Gollier, C. (2002b). Time horizon and the discount rate. *Journal of Economic Theory*, 107, 463-473.

Gollier, C. (2008). Discounting with fat-tailed economic growth. *Journal of Risk and Uncertainty*, 37 (2 – 3), pp.171–186.

Gollier, C., (2011). Le calcul du risque dans les investissements publics, Centre d'Analyse Stratégique, Rapports & Documents n°36, La Documentation Française.

Gollier C (2012). *Pricing the Planet's Future: The economics of discounting in an uncertain world*. Princeton Press.

Gollier C (2012b). Term Structures of Discount Rates for Risky Projects. Toulouse School of Economics (LERNA, University of Toulouse). Found here:

https://pdfs.semanticscholar.org/4083/ee75d24f965d108e6c0bffb855503f61f4a9.pdf

Gollier, C. (2013) Term structures of discount rates for risky investments.

Gollier C., and Hammitt J. (2014). The long run discounting controversy. *Annual Review of Resource Economics*, 6, pp: 273-295.

Groom B. and Maddison D. (2013). 'Non-identical Quadruplets: Four New Estimates of the Elasticity of Marginal Utility for the UK'. Centre for Climate Change Economics and Policy Working Paper No. 141. Found here:

http://www.lse.ac.uk/GranthamInstitute/publication/non-identical-quadruplets-four-new-estimates-of-the-elasticity-of-marginal-utility-for-the-uk-working-paper-121/

Groom B., Koundouri P., Panipoulou K., and Pantelides T. (2007). Declining Discount Rates: How much does model selection affect the certainty equivalent discount rate? *Journal of Applied Econometrics*, 22(3), pp 641-656.

Ham, Y., Maddison, D. and Elliot, R. (2013). The valuation of landfill disamenities in Birmingham. *Ecological Economics*, 85, pp. 116-129.

Hart, O., Shleifer, A. and Vishny, R., (1997). The Proper Scope of Government: Theory and an Application to Prisons. *The Quarterly Journal of Economics*, 112 (4), pp. 1127-1161.

Heal, G. and Millner, A. (2014). Agreeing to disagree on climate policy. *PNAS*, 111(10) pp: 3695-3698.

Heal, G., and Millner, A. (2013a). Discounting under disagreement. NBER Working Paper No. 18999, (DOI): 10.3386/w18999.

Heal, G., and Millner, A. (2013b). Uncertainty and decision in climate change economics. Working paper, NBER Working Paper No. 18929, DOI: 10.3386/w18929.

Henderson, N., and Bateman, I. (1995), Empirical and public choice evidence for hyperbolic social discount rates and the implications for intergenerational discounting. *Environmental and Resource Economics,* 5(4), pp: 413-423.

Hepburn C., and Groom B., (2007). Gamma Discounting and Expected Net Future Value. *Journal of Environmental Economics and Management*, 53(1), pp. 99-109.

Hepburn, C., Koundouri, P., Panopoulou, E. and Pantelidis, T. (2009). Social discounting under uncertainty: A cross-country comparison. *Journal of Environmental Economics and Management,* 57(2), pp: 140 – 150.

House of Commons Public Accounts Committee, Improving the Delivery of Government IT Projects (HC65).

IAWG (2010). Appendix 15a: *Social Cost of Carbon for Regulatory Impact Analysis under Executive Order* 12866. US Interagency Working Group on the Social Cost of Carbon of the United States of America.

Jones-Lee, M. (1992). Paternalistic Altruism and the Value of a Statistical Life. *The Economic Journal*, 102(410), pp. 80-90.

Kula, E. (1987). Social Interest Rate for Public Sector Appraisal in the United Kingdom, United States and Canada, *Project Appraisal*, 2 (3) pp. 169-74.

Layard, R., Mayarez, G., Nickell, S., (2008). The marginal utility of income. *Journal of Public Economics*, 92, pp. 1846-1857.

Lebegue, D. (2005). Revision du taux d.actualisation des investissem- net publics. Rapport du groupe de experts, Commisariat Generale de Plan.

Little, I., and Mirrlees, J., (1994). *The Costs and Benefits of Analysis: Project Appraisal and Planning Twenty Years On*, in R Layard and S Glaister eds Cost Benefit Analysis 2nd ed, Cambridge University Press.

Lowe, J. For HM Treasury (July 2008). Intergenerational wealth transfers and social discounting: Supplementary Green Book guidance.

Lowe, J. For HM Treasury (July 2008). Value for money and the valuation of public sector assets.

Lowe, J. et al. For HM Treasury (2018 and 2020). Editor of the Green Book 2006 to present.

Maddison, A. (2001). *The World Economy: A Millennial Perspective*. Paris, OECD.

Maddison, D., and Day, B., (2015). Improving Cost Benefit Analysis – A report to the Natural Capital Committee. Available at:

https://www.gov.uk/government/publications/natural-capital-committee-research-improving-cost-benefit-analysis-guidance

Giglio, S., Maggiori, M. and Stroebel, J. (2015) Very Long-Run Discount Rates. *Quarterly Journal of Economic,* 130(1), pp. 1-53.

Millner, A., and Heal, G. (2014). Resolving Intertemporal Conflicts: Economics vs Politics. NBER Working Paper No. 20705.

Official Norwegian Reports (2012). Cost Benefit Analysis. Official Norwegian Reports NOU 2012: 16. Ministry of Finance, Norway.

Newbery, D. (1992). Long term Discount Rates for the Forest Enterprise, Department of Applied Economics, Cambridge University, for the UK Forestry Commission, Edinburgh.

Newell, R. and Pizer, W. (2003). Discounting the distant future: How much do uncertain rates increase valuations? *Journal of Environmental Economics and Management*, 46(1), pp. 52-71.

OECD (2015). Methodologies for Assessment of Policies for Long-Term Transition to Sustainable Transport. OECD International Transport Forum.

ONS (2013). Middle Income Households, 1977-2011/12.

OXERA (2002). A Social Time Preference Rate for Use in Long-Term Discounting, a report for ODPM, DfT and Defra. Available at:

https://www.oxera.com/Latest-Thinking/Publications/Reports/2002/A-social-time-preference-for-use-in-long-term-disc.aspx

Pearce D., and Ulph D., (1995). A Social Discount Rate For The United Kingdom, CSERGE Working Paper No 95-01, School of Environmental Studies University of East Anglia Norwich.

Pearce, D., and Ulph. D., (1999). *A Social Discount Rate for the United Kingdom*. In D. Pearce, D., ed., Environmental Economics: Essays in Ecological Economics and Sustainable Development. Cheltenham: Edward Elgar Publishing.

Phillips L. (2011) *The Royal Navy's Type 45 Story: A Case Study.* In: Salo A., Keisler J., Morton A. (eds) Portfolio Decision Analysis. International Series in Operations Research & Management Science, vol 162. Springer, New York.

Phillips L. Egan, M. Airoldi, M. MCDA Decision Conference CoRWM (applied to the storage of nuclear waste) (March 2006)

Phillips L. et al. The European Journal of Public Health (February 2013) Modelling the risk–benefit impact of H1N1 influenza Vaccines

Quinet E. (2013). *L'évaluation socioéconomique des investissements publics*. Tome 1 Rapport final. Commissariat Generale a la strategie et a la Prospective.

Ramsey F.P. (1928), A Mathematical Theory of Saving. *Economic Journal*, 38(152), pp. 543 559.

Sandmo A. (1998). Redistribution and The Marginal Cost of Public Funds. *Journal of Public Economics*. 70, pp: 365-382.

Scott, M. and Dowley, M. (1977). The Test Rate of Discount and Changes in Base Level Income in the United Kingdom. *The Economic Journal*, 87(346) pp: 219-241.

Scott, M.F.G. (1989), A New View of Economic Growth, Clarendon Paperbacks

Smith, C., and Flanagan, J., (2001). Making Sense of Public Sector Investments: the 'Five Case Model' in Decision Making. Radcliffe Medical Press, Oxford.

Spackman, M. (2016). Appropriate time discounting in the public sector. GRI Working Paper No. 182. Grantham Research Institute on Climate Change and Environment. London School of Economics.

Stern, N. (1977). *Welfare Weights and the Elasticity of the Marginal Valuation of Income.* Studies in Modern Economic Analysis. M. Artis and A.R. Nobay. Oxford, Basil Blackwell

Stern, N. (2007). *The Economics of Climate Change: The Stern Review*. Cambridge University Press.

Stern, N. (2008). The economics of climate change. *American Economic Review: Papers & Proceedings* 98(2), pp. 1.37.

Sterner, T. and Persson, U. (2008). An even Sterner Review: Introducing relative prices into the discounting debate. *Review of Environmental Economics and Policy*, 2, 61-76

Stouthard, M. and Essink-Bot, M-L. (1997). Disability weights for diseases in the Netherlands. Amsterdam: Inst. Sociale Geneeskunde.

Thaler, R. H., and Sunstein, C. R. (2008). Nudge: Improving Decisions about Health, Wealth, and Happiness. Yale University Press.

Tol, R. (2010). International inequality aversion and the social cost of carbon. *Climate Change Economics*, 1(1), pp. 21-32.

Traeger, C. (2012). What's the Rate? Disentangling the Weitzman and the Gollier Effect. CUDARE Working Paper 1121, University of California, Berkeley.

USEPA (2010). Guidelines for Preparing Economic Analyses. United States Environmental Protection Agency, Washington DC. EPA 240-R-10-00.

Vissing-Jørgensen, A. and Attanasio, O. (2003). Stock-Market Participation, Intertemporal Substitution, and Risk-Aversion. *The American Economic Review*, 93 (2), pp. 383-391.

Vose, D. (1996). *Qualitative Risk Analysis: A Guide to Monte Carlo Simulation Modelling*. John Wiley & Sons, Chichester.

Weitzman, M. (1998) Why the far-distant future should be discounted at its lowest possible rate. *Journal of Environmental Economics and Management* 36(3), pp. 201-208.

Weitzman, M. (March 2001). Gamma Discounting. *American Economic Review*, Vol 91(1), pp: 260-271.

Weitzman, M. (2009) On Modelling and Interpreting the Economics of Catastrophic Climate Change. *Review of Economics and Statistics*, 91(1), pp. 1-19.

Weitzman, M.L., (2010). Risk Adjusted Gamma Discounting. *Journal of Environmental Economics and Management*, 60(1), pp. 1-13.

Crime statistics for quarter of a mile radius of central point of proposed City Gateway site, retrieved from https://www.ukcrimestats.com/ in September 2022

	ASB	Burglary	Robbery	Vehicle	Violent	Shoplifting	CD&A	Other Theft	Drugs	Bike Theft	Theft from the person	Weapons	Public order	Other	Total
Sep-21	34	14	3	1	98	71	14	18	11	1	12	1	33	1	312
Sep-20	32	7	4	2	59	34	5	7	7	4	5	4	21	3	194
Sep-19	13	17	1	8	60	29	10	21	17	2	15	4	41	8	246
Sep-18	49	3	1	5	58	51	10	23	12	7	1	6	43	2	271
Sep-17	70	5	1	1	36	53	9	13	1	6	8	5	14	1	223
Sep-16	51	13	1	2	33	63	4	18	0	1	5	1	3	0	195
Sep-15	58	4	0	0	35	79	9	18	0	6	10	1	8	0	228

Annex A: project confirmation table

Please complete the table below for each project and send to the Towns Fund central inbox, towns.fund@communities.gov.uk,within two months of agreeing Heads of Terms.

Project confirmation table					
Project name: Doncaster Station Gateway – New Multi-Use Building and Associated Public Realm					
Date:					
Towns Fund ask (£ million)					
£20.09m					
Match funding total and breakdown					
N/a					
Expected outputs and outcomes					
• Increase in the amount (and diversity) of high quality, affordable commercial floor space - 4 or 5 storey building • Delivery of new public spaces • An increase in the amount of shared workspace or innovation facilities • Increased number of enterprises utilising high quality, affordable and sustainable commercial spaces • Better perceptions of the place by residents/businesses/ visitors					
Plan for addressing key conditions					
N/a					
Fast-tracked project (Yes or No)					
No					
Capital/revenue split					
Capital £20.09m Revenue £0					
Nominal Financial profile (£ million)					
2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
0.0	1.008	0.480	1.595	12.075	4.932
Signature of Town Deal Board Chair and accountable body's Chief Executive Officer or S151 Officer					
 Tariq Shah					

Chair – Doncaster Town Deal Board

Faye Tyas
Section 151 Officer
Doncaster Council

Annex A: project confirmation table

Please complete the table below for each project and send to the Towns Fund central inbox, towns.fund@communities.gov.uk,within two months of agreeing Heads of Terms.

Project confirmation table					
Project name: Doncaster Station Gateway - Railway Square Extension					
Date:					
Towns Fund ask (£ million)					
£4.149m					
Match funding total and breakdown					
N/a					
Expected outputs and outcomes					
• New or upgraded cycle or walking paths- 400 metres • Cycle park- additional 30 cycle parking spaces • Delivery of new public spaces • Wider Cycling infrastructure • Improved commuter flows • Better perception of the place by residents					
Plan for addressing key conditions					
N/a					
Fast-tracked project (Yes or No)					
No					
Capital/revenue split					
Capital £4.149m Revenue £0					
Nominal Financial profile (£ million)					
2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
0.0	0.214	2.093	0.175	0.604	1.063
Signature of Town Deal Board Chair and accountable body's Chief Executive Officer or S151 Officer					
 Tariq Shah					

Chair – Doncaster Town Deal Board

Faye Tyas
Section 151 Officer
Doncaster Council

SUPPLEMENTARY GREEN BOOK GUIDANCE

OPTIMISM BIAS

1 INTRODUCTION AND RATIONALE

1.1 There is a demonstrated, systematic, tendency for project appraisers to be overly optimistic. To redress this tendency appraisers should make explicit, empirically based adjustments to the estimates of a project's costs, benefits, and duration.

1.2 As discussed in the Green Book, it is recommended that these adjustments be based on data from past projects or similar projects elsewhere, and adjusted for the unique characteristics of the project in hand. In the absence of a more specific evidence base, departments are encouraged to collect data to inform future estimates of optimism, and in the meantime use the best available data.

2 OBJECTIVES

2.1 The main aims of applying this guidance are to:

- Make adjustments to their estimates of capital and operating costs, benefits values and time profiles; and
- Provide a better estimate of the likely capital costs and works' duration.

2.2 The guidance is not designed to provide comprehensive information on the range of tools that exist to prevent optimism bias, including project management and risk management techniques. Reference should be made to the Green Book and related sources of guidance, including the Office of Government Commerce.

3 MAKING ADJUSTMENTS

Introduction

3.1 Table 1 provides adjustment percentages for generic project categories that should be used in the absence of more robust evidence. It has been prepared from the results of a study by Mott MacDonald into the size and causes of cost and time overruns in past projects.[1]

3.2 Project appraisers should apply the steps set out below to derive the appropriate adjustment factor to use for their projects.

[1] The guidance was prepared from advice provided by Mott MacDonald (2002), *Review of Large Public Procurement in the UK*, Mott MacDonald (2002), available at www.hm-treasury.gov.uk/greenbook.

Table 1: Recommended Adjustment Ranges

Project Type	Optimism Bias (%)[2]			
	Works Duration		Capital Expenditure	
	Upper	Lower	Upper	Lower
Standard Buildings	4	1	24	2
Non-standard Buildings	39	2	51	4
Standard Civil Engineering	20	1	44	3
Non-standard Civil Engineering	25	3	66	6
Equipment/Development	54	10	200	10
Outsourcing	N/A	N/A	41*	0*

* The optimism bias for outsourcing projects is measured for operating expenditure.

3.3 Project appraisers should note that the upper bound percentages in table 1 relate to the average historic optimism bias found at the outline business case stage for traditionally procured projects. Higher optimism bias adjustments may therefore be required at an earlier stage in the appraisal process, but Table 1 provides a first starting point and reasonable benchmark.

3.4 The following approach should be adopted, and the results reviewed for reasonableness. It helps inform appraisers of their likely optimism bias unless steps are taken to address the contributory factors set out in Tables 2-4, and described in Annex 2. It is designed to complement rather than replace the good practice work which is often currently undertaken to identify project specific risks.[3]

Step One – Decide which project type(s) to use

3.5 Careful consideration needs to be given to the characteristics of a project when determining its project type. For example, a project might satisfy the standard project criteria (e.g. new build on a greenfield site) and also the non-standard criteria (e.g. demolition and build on brownfield site, and refurbishment). It may be best to consider such a project as two different projects under the same programme.

3.6 For ease of determining a project type for building and civil engineering projects, a project is considered "non-standard" if it satisfies any of the following conditions: (a) it is innovative (b) it has mostly unique characteristics; or (c) construction involves a high degree of complexity and/or difficulty.

[2] Note that these values are indicative starting values for calculating optimism bias levels in current projects. The upper bound (U) does not represent the highest possible values for optimism bias that can result and the lower bound (L) does not represent the lowest possible values that can be achieved for optimism bias.

[3] To prevent confusion between work undertaken to mitigate project specific risks, the term 'contributory factors' is used to describe those risks that Mott MacDonald found have led to optimism bias, as shown in Annex 2.

3.7 A PFI / PPP project that includes several project types (e.g. an element of standard building, non-standard building, standard civil engineering, outsourcing and equipment / development) should be considered as a programme with five projects.

3.8 The project type should be determined by its dominant characteristics. However, if a building or civil engineering project has a significant amount of standard or non-standard elements (more than 35%) that are not physically separate then this type of project can be considered a combined project.

3.9 Outsourcing and equipment / development elements of a larger project should be considered as separate projects within the same project programme.

3.10 The definitions of the project types are as follows:

- **Standard building projects** are those which involve the construction of buildings not requiring special design considerations i.e. most accommodation projects e.g. offices, living accommodation, general hospitals, prisons, and airport terminal buildings.
- **Non-standard building projects** are those which involve the construction of buildings requiring special design considerations due to space constraints, complicated site characteristics, specialist innovative buildings or unusual output specifications i.e. specialist/innovative buildings e.g. specialist hospitals, innovative prisons, high technology facilities and other unique buildings or refurbishment projects.
- **Standard civil engineering projects** are those that involve the construction of facilities, in addition to buildings, not requiring special design considerations e.g. most new roads and some utility projects.
- **Non-standard civil engineering projects** are those that involve the construction of facilities, in addition to buildings, requiring special design considerations due to space constraints or unusual output specifications e.g. innovative rail, road, utility projects, or upgrade and extension projects.
- **Equipment & development projects**: Projects that are concerned with the provision of equipment and/or development of software and systems (i.e. manufactured equipment, Information and Communication Technology (ICT) development projects) or leading edge projects.
- **Outsourcing projects** are those that are concerned with the provision of hard and soft facilities management services e.g. ICT services, facilities management or maintenance projects.

Step Two – Always start with the upper bound

3.11 Use the appropriate upper bound value for optimism bias from Table 1 above as the starting value for calculating the optimism bias level.

Step Three – Consider whether the optimism bias factor can be reduced

3.12 Reduce this upper bound optimism bias according to the extent to which the contributory factors have been managed.

3.13 The extent to which these contributory factors are mitigated can be reflected in a mitigation factor. The mitigation factor has a value between 0.0 and 1.0. Where 0.0

means that contributory factors are not mitigated at all, 1.0 means all contributory factors in a particular area are fully mitigated and values between 0.0 and 1.0 represent partial mitigation.

3.14 Optimism bias should be reduced in proportion to the amount that each factor has been mitigated.

3.15 Ideally the optimism bias for a project should be reduced to its lower bound optimism bias before contract award. This assumes that the cost of mitigation is less than the cost of managing any residual risks.

Step Four - Apply the optimism bias factor

3.16 The present value of the capital costs should be multiplied by the optimism bias factor. The result can then be added to the total net present cost (or net present value) of the whole project cost to provide the Base Case.[4]

Step Five - Review the optimism bias adjustment

3.17 Clear and tangible evidence of the mitigation of contributory factors must be observed, and should be independently verified, before reductions in optimism bias are made. Procedures for this include the Gateway Review process.

Using and presenting the results

3.18 Following these steps will provide an optimism bias adjustment that can be used to provide a better estimate of the Base Case. Sensitivity testing should be used to consider uncertainties around the adjustment for optimism bias. Switching values, the values at which decisions are likely to change, should be shown where appropriate. If the adjustment for optimism is shown as a separate piece of analysis, sensitivity analysis should be used to show the range of potential outcomes, not just the single optimism bias adjustment.

3.19 Generally, if the optimism bias at the appraisal stage is appropriately low, then the project should be allowed to proceed. If the optimism bias remains high, then approval should be withheld, or given on a qualified basis, e.g. requiring further research, costing and risk management. For instance, high optimism bias may be acceptable for a strategic outline business case but would not normally be acceptable at the full business case stage.

Reducing optimism bias

3.20 Project appraisers should review all the contributory factors that lead to cost and time overruns, as identified by the research. Tables 2-4 show the percentage contributions to the upper bound of various factors for each type of project, and for two types of optimism bias – capital costs and works duration.

3.21 The main strategies for reducing optimism bias are:

- Full identification of stakeholder requirements (including consultation);

[4] The Base Case, as defined in the Green Book, is the best estimate of how much a proposal will cost in economic terms, including an allowance for risk and optimism.

- Accurate costing; and
- Project and risk management.

3.22 All these should form part have the business case, and all the contributory factors in the Appendix should be covered. For more information on how to develop these strategies, refer to the Green Book and the Office of Government Commerce.

3.23 The lower bound values represent the optimism bias level to aim for in projects with effective risk management by the time of contract award. Ideally by this time, the project' scope should be clearly identified, its costs robustly estimated, its risks identified and valued, and effective project and risk management strategies developed.

Works duration

3.24 The same principles apply for estimating the length of time it will take to complete the capital works. Once an initial estimate is made, the upper bound optimism bias percentage should normally be applied. If the project has advanced, and the contributory factors leading to works duration optimism bias have been addressed, then the percentage optimism bias may be reduced, along the lines set out for capital works optimism bias.

4 OPERATING COSTS AND BENEFITS

4.1 Due to a lack of available data, Mott MacDonald was unable to recommend sound upper and lower bound optimism bias levels for operating expenditure (except for outsourcing projects) or benefits shortfall. Optimism bias should still be considered for these parameters. If there is no other evidence to support adjustments to operating costs or benefits, appraisers should use sensitivity analysis to check switching values. This should help to answer key questions such as:

- By how much can we allow benefits to fall short of expectations, if the proposal is to remain worthwhile? How likely is this?
- How much can operating costs increase, if the proposal is to remain worthwhile? How likely is this to happen?
- What will be the impact on benefits if operating costs are constrained?

Example 1 (Part 1) – Capital Expenditure

Suppose we examine the capital expenditure and works duration optimism bias levels for a non-standard building (e.g. a specialist hospital). For simplicity, suppose the initial estimated NPC of capital expenditure (i.e. the project estimate for capital expenditure) is £100 m. The upper bound capital expenditure optimism bias value for a non-standard building project is 51 % (see Table 1)

If contributory factors are not effectively managed, the estimated Final NPC capital expenditure, taking into account optimism bias, is calculated as follows:

£100 m + (51 % x £100m) = £151 m

For this example the mitigation factors have been identified for each of the contributory factors listed in the table below and effective risk management strategies are in place to manage them. Note that the '% contribution to Optimism Bias' values in the table below have been taken from Table 2 and the 'Mitigation factor' represents the degree to which contributory factors are managed.

Contributory Factor	***% Contribution to Optimism Bias***	***Mitigation Factor***	***Cost of Risk Management***
Poor Contractor Capabilities	*5*	*1.0*	*£0*
Design Complexity	*3*	*1.0*	*£140,000*
Inadequacy of the Business Case	*23*	*0.4*	*£700,000*
Poor Project Intelligence	*6*	*1.0*	*£10,000*
Site Characteristics	*1*	*1.0*	*£40,000*

The following are simple examples of successful strategies for effectively managing each of the five contributory factors identified in the table above:

- *Only contractors that have successfully delivered this type of project before are to be considered (cost of managing this risk £0).*
- *The design has recently proven successful on a project of a similar size and nature and key design team members are appointed that have successfully produced and supervised the implementation of this design (cost of managing this risk is £140,000 say).*
- *Treasury/OGC best practice is being used to prepare and develop the business case and all areas of the strategic outline case have been competently addressed (only 40% mitigated in the example, as more detail is required – the cost of managing this risk reduction in OB is £700,000 say). Sufficient time is to be allowed to adequately define the project scope (this may result in major changes to a project and its costs that require a review of project estimates), identify contributory factors and develop appropriate risk management strategies.*
- *Detailed research has already been performed to confirm current and future demand and project sensitivities, although a review of the research should be performed to confirm the results/recommendations are sound (cost of managing this risk is £10,000 say).*
- *The Trust has owned the proposed site for at least 20 years during which comprehensive site investigations were performed within the last five years. Therefore only a site inspection, desk study of existing records and a limited site investigation are required to confirm the site ground characteristics (cost of managing this risk is £40,000 say).*

The resultant capital expenditure optimism bias (i.e. the upper bound optimism bias minus the managed optimism bias contribution) is calculated as follows:

*Managed optimism bias contribution = Reduction in optimism bias = 5 + 3 + (23 * 0.4) + 6 + 1 ≈ 24 %*

*Resultant capital expenditure optimism bias = (100 % – 24 %) * 51 ≈ 39 %*

Therefore the forecast NPC capital expenditure for this example (excluding the cost of risk management), taking into account optimism bias, is £139 m, which is calculated as follows:

£100 m + (39 % x £100m) = £139 m

Whereas the estimated final NPC capital expenditure for this example taking into account optimism bias and the cost of risk management, is approximately £140 m, which is calculated as follows:

£139 m + £(0.0 + 0.14 + 0.70 + 0.01 + 0.04) = £139 m + £0.89 m = £139.89

This figure for the final NPC capital expenditure after implementing risk management strategies is lower than the £151 m calculated for final NPC capital expenditure if contributory factors are not effectively managed.

1.1 Example 1 (Part 2) - Capital Expenditure

Ideally at contract award, the lower bound optimism bias for capital expenditure should be achieved through sufficient risk mitigation (if the cost of risk mitigation is less than the cost of the residual risk).

If we now consider the above example at contract award ideally the resultant capital expenditure optimism bias after effective management of contributory factors should be equal to the lower bound optimism bias, 4 %, for non-standard buildings. In this case the estimated final NPC capital expenditure, taking into account optimism bias and cost of risk management, is £104 m plus the cost of risk management, which is calculated as follows:

(£100 m x ((100 % + 4 %) / 100 %)) + cost of risk mitigation = £104 m + cost of risk mitigation

Therefore if say for example the total cost of managing project risk is £7million, then the final NPC capital expenditure would be £111 m (i.e. £104 m + £7 m).

1.2 Example 2 (Part 1) – Works Duration

A similar process as in the example of section 1.1 can be performed to calculate works duration optimism bias levels at outline business case for our non-standard building, where the upper bound works duration optimism bias value for a non-standard building project is 39 %. Suppose the estimated works duration is 28 months.

If contributory factors are not effectively managed, the estimated works duration taking into account optimism bias, is calculated as follows:

28 months + (39 % x 28 months) ≈ 38.9 months (a delay of approximately 11 months)

If we now apply the same risk management strategies as in Example 1 (Part 1) for each of the contributory factors listed in the table below. Note that, the '% Contribution to Optimism Bias' values in the table below have been taken from Table 2 and the mitigation factor represents the degree to which the contributory factors are managed.

Contributory Factor	***% Contribution to Optimism Bias***	***Mitigation Factor***
Poor Contractor Capabilities	*5*	*1.0*
Design Complexity	*2*	*1.0*
Inadequacy of the Business Case	*22*	*0.4*
Poor Project Intelligence	*5*	*1.0*
Site Characteristics	*3*	*1.0*

The resultant works duration optimism bias (i.e. the upper bound optimism bias minus the managed optimism bias contribution) is approximately 30%, calculated as follows:

*Managed optimism bias contribution = Reduction in optimism bias = 5 + 2 + (22 * 0.4) + 5 + 3 = 23.8 %*

*Resultant works duration optimism bias = (100 % - 23.8 %) * 39 ≈ 29.7 %*

Therefore, the estimated works duration, for this example taking into account optimism bias, is approximately 36.3 months, calculated as follows:

28 months + (29.7 % x 28 months) ≈ 36.3 months

This figure for the works duration after implementing risk management strategies is lower than the 39-month duration calculated if contributory factors are not effectively managed.

This method of assessment can be applied throughout the project life cycle for a project (e.g. strategic outline case, outline business case and full business case).

1.3 Example 2 (Part 2) – Works Duration

Ideally at contract award, the lower bound optimism bias for works duration should be achieved through sufficient risk mitigation (if the cost of risk mitigation is less than the cost of managing the residual risk).

Assume that the above applies to this example and the resultant works duration optimism bias is equal to the lower bound optimism bias, 2 %, for non-standard buildings.

In this case the estimated works duration, is approximately 28.6 months, which is calculated as follows:

28 months x (100 % + 2 %) ≈ 28.6 months

1.4 Calculating Upper Bound Values for Combined Projects

Where a building or civil engineering project has significant standard and non-standard elements that cannot be physically separated it is considered a combined project (where one of the elements is not significant the project should be identified according to its dominant project type characteristics). To calculate the appropriate upper bound values for combined projects the following approach is recommended:

(a) Determine the percentage split for standard and non-standard parts of the capital value of the building or civil engineering project (use best judgement).

(b) Identify the upper bound values for the standard and non-standard parts.

(c) Multiply each percentage of CAPEX by the appropriate upper bound optimism bias.

(d) Add the OB contributions together to determine the resultant optimism bias percentage.

The following table shows a worked example of the calculated resultant upper bound optimism bias level for capital expenditure for a combined building project:

Project Type	***Percentage of CAPEX (%)***	***Upper bound OB (%)***	***OB Contribution (%)***	***Resultant OB (%)***
Non-standard building	*30*	*51*	*15.3*	*-*
Standard building	*70*	*24*	*16.8*	*-*
Combined building	*100*	*-*	*-*	*32.1*

The works duration optimism bias can be determine in the same way. The following table shows a worked example of the calculated resultant upper bound optimism bias level for works duration for a combined building project:

Project Type	***Percentage of Works Duration (%)***	***Upper bound OB (%)***	***OB Contribution (%)***	***Resultant OB (%)***
Non-standard building	*30*	*39*	*11.7*	*-*
Standard building	*70*	*4*	*2.8*	*-*
Combined building	*100*	*-*	*-*	*14.5*

Experienced appraisers can use their best judgment.

Table 2 Optimism Bias Upper Bound Guidance for Buildings Projects

		Non-standard Buildings		Standard Buildings	
Upper Bound Optimism Bias (%)[5]		**39**	**51**	**4**	**24**
		Works Duration	**Capital Expenditure**	**Works Duration**	**Capital Expenditure**
Contributory factors to Upper Bound Optimism Bias (%)[6]		**Non-standard Buildings**		**Standard Buildings**	
Procurement	Complexity of Contract Structure	3	1	1	
	Late Contractor Involvement in Design	6	2	3	2
	Poor Contractor Capabilities	5	5	4	9
	Government Guidelines				
	Dispute and Claims Occurred	5	11	4	29
	Information management				
	Other (specify)				
Project Specific	Design Complexity	2	3	3	1
	Degree of Innovation	8	9	1	4
	Environmental Impact				
	Other (specify)	5	5		
Client Specific	Inadequacy of the Business Case	22	23	31	34
	Large Number of Stakeholders			6	
	Funding Availability	3		8	
	Project Management Team	5	2		1
	Poor Project Intelligence	5	6	6	2
	Other (specify)	1	2		< 1
Environment	Public Relations			8	2
	Site Characteristics	3	1	5	2
	Permits / Consents / Approvals	3	< 1	9	
	Other (specify)	1	3		
External Influences	Political	13			
	Economic		13		11
	Legislation / Regulations	6	7	9	3
	Technology	4	5		
	Other (specify)		2		

[5] Note that these are only indicative starting values for calculating optimism bias contributions, because a project's optimism bias profile will change during its project life cycle.

[6] Contributions from each area are expressed as a % of the recorded optimism bias. Note: The sum of individual percentages contributions in each column may not add up to 100% due to rounding errors.

Table 3 Optimism Bias Upper Bound Guidance for Civil Engineering Projects

		Non-Standard Civil Engineering		Standard Civil Engineering	
Upper Bound Optimism Bias (%)[7]		**25**	**66**	**20**	**44**
		Works Duration	**Capital Expenditure**	**Works Duration**	**Capital Expenditure**
Contributory factors to Upper Bound Optimism Bias (%)[8]		**Non-Standard Civil Engineering**		**Standard Civil Engineering**	
Procurement	Complexity of Contract Structure	4			
	Late Contractor Involvement in Design	< 1			3
	Poor Contractor Capabilities	2		16	
	Government Guidelines				
	Dispute and Claims Occurred	16			21
	Information management				
	Other (specify)	1	2		
Project Specific	Design Complexity	5	8		
	Degree of Innovation	13	9		
	Environmental Impact		5	46	22
	Other (specify)	3			18
Client Specific	Inadequacy of the Business Case	3	35	8	10
	Large Number of Stakeholders				
	Funding Availability		5	6	
	Project Management Team		2		
	Poor Project Intelligence	3	9	14	7
	Other (specify)				
Environment	Public Relations				9
	Site Characteristics		5	10	3
	Permits / Consents / Approvals				
	Other (specify)				
External Influences	Political	19			
	Economic	24	3		7
	Legislation / Regulations		8		
	Technology	6	8		
	Other (specify)	< 1	1		

[7] Note that these are only indicative starting values for calculating optimism bias contributions, because a project's optimism bias profile will change during its project life cycle.

[8] Contributions from each area are expressed as a % of the recorded optimism bias. Note: The sum of individual percentages contributions in each column may not add up to 100% due to rounding errors.

Table 4 Optimism Bias Upper Bound Guidance for Equipment/ Development and Outsourcing Projects

		Equipment / Development		Outsourcing		
Upper Bound Optimism Bias (%)[9]		**54**	**200**	**-**	**-**	**41**
		Works Duration	**Capital Expenditure**	**Works Duration**	**Capital Expenditure**	**Operating Expenditure**
Contributory factors to Upper Bound Optimism Bias (%)[10]		**Equipment / Development**		**Outsourcing**		
Procurement	Complexity of Contract Structure	13	7	-	-	
	Late Contractor Involvement in Design		7	-	-	
	Poor Contractor Capabilities	11	4	-	-	
	Government Guidelines			-	-	
	Dispute and Claims Occurred			-	-	
	Information management		5	-	-	
	Other (specify)			-	-	
Project Specific	Design Complexity		10	-	-	
	Degree of Innovation	20	17	-	-	
	Environmental Impact	9		-	-	
	Other (specify)			-	-	3
Client Specific	Inadequacy of the Business Case	20	18	-	-	52
	Large Number of Stakeholders			-	-	
	Funding Availability			-	-	
	Project Management Team		5	-	-	
	Poor Project Intelligence	4	4	-	-	32
	Other (specify)			-	-	
Environment	Public Relations			-	-	
	Site Characteristics			-	-	
	Permits / Consents / Approvals			-	-	
	Other (specify)			-	-	
External Influences	Political			-	-	
	Economic			-	-	
	Legislation / Regulations	4	5	-	-	
	Technology	19	18	-	-	9
	Other (specify)			-	-	

[9] Note that these are only indicative starting values for calculating optimism bias contributions, because a project's optimism bias profile will change during its project life cycle.

[10] Contributions from each area are expressed as a % of the recorded optimism bias. Note: The sum of individual percentages contributions in each column may not add up to 100% due to rounding errors.

APPENDIX

CONTRIBUTORY FACTORS

Procurement

1. **Complexity of Contract Structure**
   - Details of risk transfer had to be clarified
   - Payment mechanism had to be defined
   - Unforeseen amount of negotiation required on terms of contract
2. **Late Contractor Involvement in Design**
   - Value management was necessary but contractor was not involved early enough to allow for it
   - The design could not be built due to construction problems (e.g. access)
   - Contractor provided design / construction feedback at a late stage resulting in a redesign
3. **Poor Contractor Capabilities**
   - Contractor was inexperienced
   - Site health and safety standards were not met
   - Construction was not carried out to the necessary standards
   - The contractor had insufficient resources
4. **Government Guidelines**
   - No precedent or guideline had been developed to procure a leading edge project
5. **Dispute and Claims**
   - Dispute over interim payments
   - Claims for changes in scope
   - Claims for late release of information by other stakeholders
6. **Information Management Systems**
   - The interfaces between the stakeholders were not managed efficiently resulting in information not being transferred effectively.

Project Specific

7. Design Complexity

- The construction was to take place over an existing mine, thus requiring complicated foundations.
- The design had to be built in difficult conditions e.g. a hydropower station

8. Degree of Innovation

- New generation design
- Unusual site conditions requiring innovative solutions e.g. large wind forces, chemical nature of soil and soil contamination

9. Environmental Impact

- Contamination e.g. nuclear power station, Incinerator
- Noise pollution e.g. airports
- Impact on wildlife e.g. new road through protected area

Client Specific

10. Inadequacy of the Business Case

- Number of services were not anticipated
- Output specifications were not defined clearly
- Oversight in facilities required
- All stakeholders were not involved and so their needs were not defined and included in business case

11. Large Number of Stakeholders

- Different public sector parties having differing interests in the project
- Process of obtaining approval took longer than expected due to number of parties involved

12. Funding availability

- Difficulties in obtaining financial backing for project
- Additional funding was made unexpectedly available later on in the project thus changing project scope

13. Project Management Team

- The project management team was inexperienced in delivering a project of this nature.
- Inadequate review of drawings by the project manager before construction

14. Poor Project Intelligence

- Insufficient ground investigation
- The detailed design was based on insufficient site information
- Insufficient surveying of existing conditions e.g. for refurbishment of buildings

Environment

15. Public relations

- Opposition from the local community (with regards to traffic and construction noise and environmental impact)
- Environmental protests

16. Site Characteristics

- The presence of badger setts within construction site
- Underground stream requiring protection during construction
- Archaeological findings

17. Permits / Consents / Approval

- Parliamentary Bill required for project initiation
- Difficulties in obtaining planning permission, possibly resulting in an appeal to the Secretary of State

External Influences

18. Political

- Opposition by a major political party
- Impact on sensitive constituencies
- Lacks support from key political stakeholders

19. Economic

- Change in market demand resulting in a change in funding priorities
- Crash in stock markets

20. Legislation / Regulations

- Change in required standards

21. Technology

- Unanticipated technological advancements
- Computer virus
- Limits in technology

Summary of scheme costs

Scheme element	Towns Fund	Council	Total
City Gateway building	£20,090,000	£1,000,000	£21,090,000
Railway Square	£4,149,000	£1,800,000	£5,949,000
Total	**£24,239,000**	**£2,800,000**	**£27,039,000**

Scheme element	Towns Fund	Council	Total
City Gateway building	£23,103,500	£1,150,000	£24,253,500
Railway Square	£4,771,350	£2,070,000	£6,841,350
Total	**£27,874,850**	**£3,220,000**	**£31,094,850**

City Gateway - including optimism bias			
Funding source	**2024**	**2025**	**Total**
Town Deal	£5,740,585	£17,362,915	£23,103,500
The Council	£285,743	£864,257	£1,150,000
Total	**£6,026,328**	**£18,227,172**	**£24,253,500**

Railway square including optimism bias			
Funding source	**2024**	**2025**	**Total**
Town Deal	£1,185,549	£3,585,801	£4,771,350
The Council	£514,338	£1,555,662	£2,070,000
Total	**£1,699,887**	**£5,141,463**	**£6,841,350**

The Scheme - including optimism bias			
Funding source	**2024**	**2025**	**Total**
Town Deal	£6,926,134	£20,948,716	£27,874,850
The Council	£800,081	£2,419,919	£3,220,000
Total	£7,726,215	£23,368,635	£31,094,850

Funding source	2022	2023	2024	2025	Present Value cost (2022 prices)
Town Deal	£0	£0	£6,926,134	£20,948,716	£25,360,162
The Council	£0	£0	£800,081	£2,419,919	£2,929,512
Total	**£0**	**£0**	**£7,726,215**	**£23,368,635**	**£28,289,674**

Department for Transport

Value for Money Framework

Moving Britain Ahead

The Department for Transport has actively considered the needs of blind and partially sighted people in accessing this document. The text will be made available in full on the Department's website. The text may be freely downloaded and translated by individuals or organisations for conversion into other accessible formats. If you have other needs in this regard please contact the Department.

Department for Transport
Great Minster House
33 Horseferry Road
London SW1P 4DR
Telephone 0300 330 3000
General enquiries https://forms.dft.gov.uk
Website www.gov.uk/dft

Contents

Foreword

The Department for Transport (DfT) is committed to ensuring public resources are invested to enhance the UK's transport network and provide the greatest benefits to society, in the most efficient way. It is important that investment decisions are based on clear and robust value for money advice.

In DfT we take pride in the quality of our economic appraisal. Our transport appraisal guidance (WebTAG) draws on best practice in Government, academia, and industry; and we aim to ensure that it reflects the latest and best available evidence and appraisal methodologies. This provides transport analysts with a comprehensive, consistent, and robust approach for assessing the costs and impacts of transport interventions.

This new value for money framework sits alongside WebTAG and explains how to use the appraisal results to provide value for money advice for our decision makers.

This document draws on best practice within DfT and across Government, and reflects further work we have undertaken in this area. It aims to provide comprehensive guidance for assessing value for money and clearly communicating value for money considerations to decision makers – no matter how complex or unconventional the proposal may be. Key to this is ensuring that this framework sets out a clear approach for looking beyond the monetised benefit cost ratios when making value for money judgements, to take the full range of impacts of a proposal into consideration.

I believe that the decision-makers, policy colleagues, and analysts in DfT and local government who use this framework will find it a valuable addition to our suite of guidance. I hope that, ultimately, the application of this framework leads to better management of public resources.

Amanda Rowlatt, Chief Analyst and Strategy Director

July 2017

1. Introduction to the Value for Money Framework

What is the purpose of this Framework?

1.1 'Value for money' is one of the key considerations of any decision involving the use of public funds across government. It is considered in the Economic Case of the 'Five Case' model of decision-making recommended by Her Majesty's Treasury (HMT) and adopted by the Department for Transport (the Department) in the "Transport Business Case"[1].

1.2 As Accounting Officer, the Permanent Secretary has a duty to Parliament to ensure value for money (VfM) in all areas of the Department's expenditure. This includes the Department's procurement, projects and processes[2].

1.3 This document aims to ensure that decision-makers receive straightforward, clear and consistent messages on value for money which guide them through the evidence to arrive at a judgement. This promotes sound decision-making and helps provide the Permanent Secretary with assurance that this duty is met.

When should it be used and by whom?

1.4 Value for money should be considered as part of the decision-making process for any proposal which involves the use of public resources.

1.5 This document provides high-level guidance on the Department's approach to considering value for money in decision-making about **new proposals.**

1.6 Value for money should also be assessed after an intervention has been delivered, by using benefits management and evaluation to identify its actual impacts. Although these ex-post assessments lie outside the scope of this framework, it is important to consider how their evidence can inform value for money assessments of new interventions.

1.7 This document outlines the Department's approach to value for money assessments and provides guidance on how the outputs of these assessments should be communicated to decision-makers as part of a Value for Money Statement.

[1] Impact Assessments and Regulatory Triage Assessments are not within the scope of this document. Guidance on these documents and value for money assessment of regulatory changes should be sought from the Better Regulation Unit.
[2] As described in Managing Public Money.

1.8 This guidance is primarily intended for use by analysts, policy officials, and decision-makers within the Department. It may also be a useful resource for external stakeholders.

1.9 Analysts, policy officials, and decision-makers within Local Government should also follow this Framework (including the supplementary guidance), which replaces the existing guidance found within the December 2013 document, "Value for Money Assessment: Advice Note for Local Transport Decision Makers".

1.10 This document should be read alongside and is aligned to WebTAG (Transport Analysis Guidance) – the Department's detailed advice on how to conduct modelling and appraisal of transport proposals. Accordingly, relevant sections of WebTAG are referenced throughout this document. However the separation of this document and WebTAG reflects the following distinction:

- WebTAG recommends how costs and impacts should be assessed in an appraisal and is primarily intended for use by the appraisal practitioner;
- this guidance is intended for analysts and policy officials alike, and provides the framework for forming value for money advice and using the results of an appraisal to inform value for money conclusions.

1.11 This document should also be read alongside other key departmental and cross-governmental resources including:

- The Transport Business Case: Guidance on how the Department assesses the overall business case for major investments;
- The Green Book: HMT guidance for central government organisations on the economic appraisal and evaluation of proposals; and
- Managing Public Money: HMT guidance on how to consider value for money before committing funds to a policy, programme or project.

1.12 These resources should be consulted to ensure methods used are consistent with best practice and proportionate to the size, scope and value of the proposal.

1.13 Further resources which may be useful, in addition to a glossary which defines some of the key technical terms used within the following chapters, are included at the end of this document, in Annexes A and B.

2. What Do We Mean by Value for Money?

2.1 Achieving value for money can be described as **using public resources in a way that creates and maximises public value**.

2.2 The use of public resources is defined as public sector capital and resource expenditure, stewardship of assets, and raising revenue.

2.3 Public value is defined as the total well-being of the UK public as a whole[3]. In a transport context, this covers all the **economic** (e.g. travel time, vehicle costs, tax revenues); **social** (e.g. health, safety, accessibility); and **environmental** (e.g. noise, air quality, landscape) impacts of a proposal.

2.4 This means that value for money is considered at a national level, not just in terms of how it will affect the local vicinity in which a proposal operates. This ensures that the assessment focuses on the impacts of a proposal that are 'additional' (lead to a net increase in overall public value). This allows us to distinguish between such occasions, and those where a proposal will lead to displacement (a shift in value from one location to another); leakage (value 'leaking out' from the targeted area to surrounding areas of the intervention); and/or deadweight (continuation of the status quo).

2.5 Considering the process through which an intervention has an impact on public value is a good place to start thinking about how value for money can be achieved. Box 2.1 shows an outline 'logic map' for a proposal, which provides a framework for understanding this process.

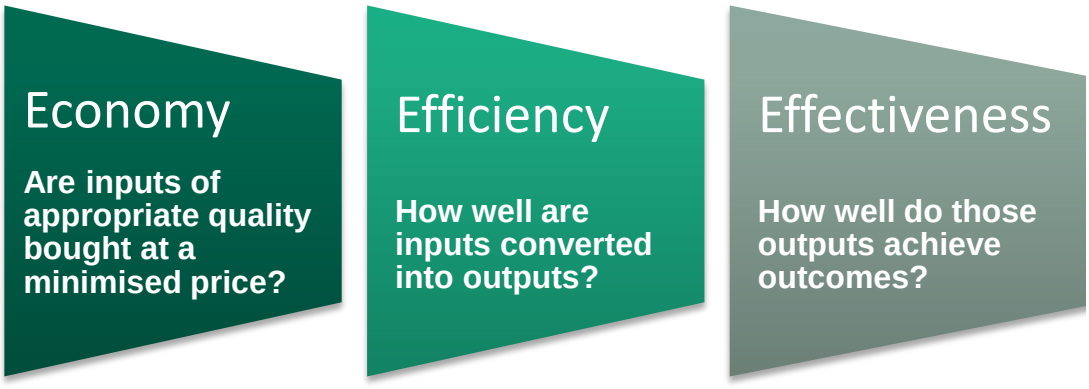
[3] For some schemes, it may also be appropriate to consider the impact on non-UK residents. WebTAG unit A5.2 Section 3.2.5 contains some additional information on this.

Box 2.1: Logic map of a proposal with example

Stage of Logic Map	Example
Context refers to the problems the proposal aims to address.	Congestion on the A1 (single lane).
Inputs refers to the resources required to deliver the proposal. It typically includes thing such as staff, engineers, consultants, materials, land.	The land, labour and machinery, and enterprise for construction of an additional lane.
Outputs refers to the tangible deliverables of the proposal. It typically includes things such as roads, railways, stations built or maintained.	New lane constructed so that the A1 is now dual- rather than single-laned.
Outcomes refers to the short- and medium-term results of the proposal which may affect public value.	Shorter journey times, lower vehicle operating costs, increased reliability.
Impacts refers to the longer term effects of the proposal on the well-being of the UK public. It is the wider public value attributable to the proposal.	Increased productivity due to reduced commute times for travellers; agglomeration if the A1 connects / creates clusters.

2.6 From this logic map, it follows that value for money is primarily driven by how **economical** the purchase of inputs is; how **efficiently** those inputs are converted into outputs; and how **effectively** those outputs achieve outcomes[4]. Box 2.2 provides a description of these 'three Es'.

Box 2.2: Drivers of value for money



[4] These three Es are used in a similar form by the NAO. Website accessed on 02/02/16 https://www.nao.org.uk/successful-commissioning/general-principles/value-for-money/assessing-value-for-money/

2.7 To then measure the extent to which a proposal represents value for money, an understanding of the effect of particular outcomes on the wellbeing of the public is also required. For example, in measuring the value for money of the proposal to build an additional lane on the A1 we need to know how much value the public place on increased reliability.

2.8 This relationship is not affected directly by policy decisions, but economics provides the tools with which to measure it.

3. Principles of Value for Money Assessment

What is a value for money assessment?

3.1 Although the underlying relationship between the use of public resources and public value is complex, a useful assessment of value for money can be made through a comparison of the cost of public resources expected to be used for a proposal and its expected impact on public value (as defined in Chapter 2).

3.2 The aim of the assessment is to help decision-makers judge whether the expected costs of a proposal are justified by its expected benefits to the UK public as a whole, including both positive and negative impacts of the proposal on the economy, society, environment, and public accounts.

3.3 Consideration of these impacts is combined with an understanding of how these impacts are expected to vary across social groups.

3.4 The assessment also considers whether there may be alternative proposals to achieve an objective or solve a particular problem which deliver better value for money.

3.5 In combining these elements, the value for money assessment determines whether resources from the Broad Transport Budget (the public budget available for transport) are being used in a way that maximises public value.

3.6 To reflect this, the key output of a value for money assessment is a value for money category. A category provides a succinct summary of the extent to which value for money is achieved by a proposal. Further detail on the Department's value for money categories is found in Chapter 5 of this document and in the "Value for Money: Supplementary Guidance on Categories" document.

How is value for money assessed?

3.7 The Department has developed a process for assessing the value for money of major transport proposals over many years. The approach is based on the fundamentals of economic and transport appraisal, which are outlined in this chapter. Further detail can be found in HMT's Green Book and the Department's Transport Analysis Guidance (WebTAG).

3.8 WebTAG guidance focuses on the analysis of transport infrastructure investments, but the fundamental principles are largely applicable when assessing the value for money of any departmental investment or policy.

3.9 The assessment should incorporate any relevant evidence from the benefits management processes and evaluations of past interventions of a similar type.

3.10 A value for money assessment happens when it has been determined that a problem may be solved through expenditure. It comprises three key elements:

- development of appropriate options;
- measurement of proposal costs and impacts; and
- consideration of risks and uncertainties to provide confidence in the assessment.

3.11 These elements are discussed in detail below. A full assessment using these three elements culminates in the assignment of a value for money category and provides a framework for ensuring that the Department uses public resources in a way that maximises public value.

Element 1: Option development

3.12 A wide range of possible alternatives to address an identified problem or meet a particular objective should be considered before recommending a specific proposal. These should reflect a variety of approaches and scales of intervention and should not be limited to infrastructure or single mode solutions where alternatives might be feasible.

3.13 Option development is especially important during the early stages of decision-making, but alternatives should be retained in a value for money assessment until we are sufficiently confident that the preferred option offers the best value for money and achieves its wider objectives. This process ensures we can be sure that we have properly considered whether there may be better value for money alternatives to a preferred proposal.

3.14 HMT's Green Book and WebTAG guidance on the Transport Appraisal Process provide detailed guidance on how options should be developed.

What would happen without any new proposal?

3.15 One of the options developed must correspond to a case without an intervention. In WebTAG, this is known as the 'without-scheme' case. All other options should be compared against this, with the difference between the two allowing for measurement of the impacts of the given option.

3.16 For example, a cost impact of £10m does not necessarily mean that the total cost of the proposal is exactly that, but that the cost is £10m more than the cost of not going ahead with the proposal.

3.17 The without-scheme case should include all committed proposals. For most interventions, this should correspond to maintaining existing facilities and services, and include any other proposals for which implementation is planned and/or resource has already been allocated.

3.18 Key demand uncertainties within this case should be accounted for through appropriate scenario testing (as covered in Sections 4.2 and 5.2 of TAG unit M4) and described in the Value for Money Statement.

3.19 For transport infrastructure proposals, there should be no difference in elements of the transport network or land use between the with- and without-scheme cases other than the proposal itself. WebTAG Unit A1.1 on Cost-Benefit Analysis provides outline guidance on the limited exceptions to this; and where it is clear that additional changes to the network would be required in the without-scheme case to accommodate future demand, further guidance may be found in WebTAG unit M4 (Section 7.4).

Element 2: Measuring costs and impacts

3.20 A value for money assessment should provide easily interpretable and comparable conclusions. Appraisal guidance has been developed for exactly this purpose – to encourage a consistent approach to measuring scheme costs and benefits. This enables decision-makers to draw conclusions easily about whether an individual proposal offers value for money and to compare the extent to which value for money is achieved across a range of options or proposals.

3.21 Where possible, it is preferable for impacts to be measured in monetary values (monetisation). This provides a powerful tool for comparing impacts and arriving at interpretable conclusions. Chapter 7 of this document provides guidance for when it is not possible to monetise certain impacts.

3.22 When monetary values are used, to ensure valuations are comparable across impacts and across time, they should be:

- **deflated:** adjusted for the timing of their incidence by accounting for inflation;
- **discounted:** adjusted to account for the tendency to prefer the receipt of goods and services now rather than later; and
- **expressed in market prices**: include an adjustment for the fact that individual consumers perceive prices differently to businesses and government because they pay indirect taxes (such as VAT) that these organisations do not.

3.23 This is in line with WebTAG Unit A1.1 and HMT's Green Book guidance on how to arrive at ‘present values’.

Costs

3.24 For the purposes of a Department for Transport value for money assessment, ‘costs’ refers to both the costs and revenues of a proposal which directly affect the public budget available for transport (Broad Transport Budget).

3.25 Costs and revenues to non-transport sector public sector bodies and private sector providers are considered as part of the ‘impacts’ of a proposal and as such are not counted as public resources.

3.26 This allows the Department to prioritise spending decisions related to the budget for which it is responsible, while appropriately considering the impact of those decisions on other public sector bodies, the private sector, and the UK public as a whole.

3.27 The costs of a proposal should in all cases be expressed appropriately (see paragraphs 3.21 to 3.22) in monetary terms (i.e. monetised) to arrive at the Present Value of Costs (PVC).

3.28 Where identified as appropriate in WebTAG Unit A1.2 and HMT's Green Book, risks to proposal costs should be considered through a Quantified Risk Assessment (QRA). This takes account of different possible outcomes and their likely probability. The key output of the QRA is a 'risk-adjusted' cost estimate.

3.29 To account for the tendency to be overly optimistic about expected costs, an appropriate level of optimism bias (OB) should be applied to the risk-adjusted cost estimate.

3.30 It is this final value which should be used as the Present Value of Costs (PVC), as the best approximation to the expected value of the proposal's costs.

3.31 WebTAG Unit A1.2 contains definitive guidance on conducting QRAs and the application of appropriate levels of optimism bias in different transport contexts.

3.32 As a result of the PVC being deflated, discounted, expressed in market prices, and inclusive of an optimism bias uplift, it will differ from the costs typically quoted in financial documents.

Impacts

3.33 For the purposes of a Department for Transport value for money assessment, impacts refers to the positive and negative impacts of a proposal on the UK public. Impacts include effects on the economy, environment, society and public accounts.

Monetisation

3.34 WebTAG contains detailed guidance on appropriate methods for monetising many impacts of transport proposals.

3.35 Where impacts are monetised appropriately, together they are referred to as the Present Value of Benefits (PVB).

3.36 Some methods for identifying outcomes, impacts, and estimating their monetary values are more widely-accepted than others, because they are well-researched, tried-and-tested, and more robust.

3.37 As a result, the Department distinguishes between three 'types' of monetised impacts: established, evolving, and indicative monetised impacts. These are treated differently in the value for money assessment and presented separately in Value for Money Statements. This is discussed further in Chapter 4 of this Framework.

Non-monetised impacts

3.38 To provide a broad and accurate view of the total impact of a proposal, impacts which cannot be easily or satisfactorily monetised should also be considered and used to form value for money conclusions.

3.39 In such cases, the Department recommends the use of a non-monetised assessment of those particular impacts. This avoids the use of monetary values which may be highly inaccurate estimates of the impact on public value.

3.40 In these cases, the degree of confidence the Department has in the non-monetised valuation will vary depending on the quality of the approach taken and the data sources used.

3.41 WebTAG provides guidance on non-monetised methods. And in many cases the Department has greater confidence in these methods, than in alternative, non-WebTAG methods which attempt monetisation of the same impacts.

3.42 An assessment of non-monetised impacts should consider how the proposal will affect each impact individually. WebTAG uses a seven-point scale to denote the magnitude and nature of the impact, ranging from large adverse to large beneficial.

3.43 In special circumstances, it may not be feasible or proportionate to undertake a monetised assessment. In such cases it may be appropriate to draw value for money conclusions from an appraisal comprising only non-monetised impacts. Further guidance on when and how to adopt this approach can be found in Chapter 7.

Distributional Impacts

3.44 Value for money assessments for transport interventions should consider and highlight the distributional impacts (DIs) of the proposal.

3.45 A DI assessment considers how the impacts of the transport intervention vary across different social groups. WebTAG Unit A4.2 gives guidance on how these should be appraised across eight key areas[5].

3.46 The approach is proportionate, with a screening process to establish whether further appraisal in any of the eight areas is required. The appraisal provides a seven-point scale from 'large beneficial' to 'large adverse', similar to that used for WebTAG non-monetised appraisals.

3.47 It is especially important to highlight whether, as a result of the proposal:

- particular social groups are expected to disproportionately benefit or be disadvantaged across the range of areas assessed; or
- significant positive or negative outcomes in any of the eight key areas are likely to occur for particular groups.

3.48 The outcomes of the assessment should be presented to decision-makers to provide a more holistic picture of the effects of a proposal by highlighting how impacts vary across social groups.

3.49 Appropriate use of a DI assessment may also aid the design and consideration of mitigations against the negative effects of a proposal.

3.50 There is uncertainty in estimating the nature of the relationship between distributional impacts and public value, which means the DI assessment is not directly comparable to the assessment of impacts on total public value.

3.51 In light of this, the conclusions of a DI assessment are considered alongside the value for money category, rather than as part of it. This also promotes a

[5] The eight key areas are: user benefits, severance, personal security, accidents and safety, accessibility, affordability, noise and air quality.

transparent understanding of distributional impacts which might otherwise be lost within the overall impact on public value.

Element 3: Consideration of risks and uncertainties

3.52 Before a value for money assessment can arrive at conclusions, the risk and uncertainty within the assessment must be considered.

3.53 All analysis is based in part on assumptions about how the world is or how it is expected to be in the future. Decisions should be purposefully made about which data and assumptions to include in analysis and how they will be used in the appraisal. The resulting implications should also be considered, to ensure the limitations of the analysis are clearly understood and articulated.

3.54 Uncertainty in both the expected costs and impacts of the proposal should be clearly communicated in advice to decision-makers when reporting value for money. For example, when reporting the expected costs the level of optimism bias used to produce the estimate should be specified.

3.55 This is discussed in more detail in Chapters 4 and 6 of this Framework.

Increasing confidence in monetised impacts

3.56 Sensitivity analysis can be used to test the impact of the key risks and uncertainties on the Present Value of Benefits (PVB) of a proposal. Such analysis can provide greater confidence in the value for money conclusions drawn.

3.57 In sensitivity analysis, the assumptions and parameters used in the original appraisal ('core scenario') are varied to determine the effects this has on the value for money of the proposal.

3.58 When a WebTAG-based assessment is undertaken, sensitivity tests on the high and low scenarios of national demand and values of time are required, as set out in WebTAG Unit A1.3.

3.59 Further sensitivity tests should be determined on a case-by-case basis in a proportionate manner. For transport proposals, guidance on this is set out in WebTAG Unit M4. This includes:

- identifying the uncertainties underpinning the appraisal and modelling of the proposal;
- assessing the likelihood of these risks being realised.

3.60 Much of the uncertainty in the assessment may arise from assumptions which are not economic or transport-modelling based. As a result, it is important that the value for money assessment is carried out with input from experts in other fields, such as operational researchers and engineers. This may lead to useful sensitivity testing on assumptions such as operating speeds, capacity and timetabling, for example.

3.61 In some cases, there may be potential biases in the analysis which are not tested formally through sensitivity analysis. This might be the case where data is known to be out of date, or where more detailed modelling has not yet been carried out. These biases and their implications for value for money conclusions

should also be considered and reported. Further guidance on dealing with potential biases can be found within the Supplementary Guidance on Categories.

4. Value for Money Assessment

4.1 As discussed above, the culmination of a value for money assessment is the value for money category. This is a succinct summary of the overall assessment, considering monetised and non-monetised impacts as well as uncertainty and risks in the analysis.

4.2 Where a standard economic appraisal has been undertaken, so that the majority of expected impacts are monetised, this category is primarily informed by two metrics: the Benefit Cost Ratio (BCR) and Net Present Public Value (NPPV).

4.3 As discussed in Chapter 3, the level of confidence the Department has in the expected impacts of a proposal varies. As a result we distinguish between different 'types' of impact – established monetised, evolving monetised, indicative monetised, and non-monetised. These are treated differently in the value for money assessment, and inform the value for money category at different stages. Further detail on this is provided in this chapter.

4.4 Though the BCR and NPPV are the only metrics that directly inform the value for money category, additional metrics such as Cost per Additional Passenger Generated may be used to build a richer understanding of the impact of a scheme and support the value for money case. In particular, these metrics can be a useful way to compare proposals in meeting particular stated objectives – such as cost effectiveness – whereas the value for money assessment considers the impact on public value as a whole.

Value for Money Metrics

4.5 In standard appraisal, where the majority of impacts are measured in monetary values, the value for money category is primarily informed by one of two metrics: the Benefit Cost Ratio (BCR) and the Net Present Public Value (NPPV).

4.6 These metrics provide a primary indication of the extent to which a proposal is expected to represent value for money. Other impacts, risks and uncertainties are then considered to arrive at a final value for money category and wider conclusions.

4.7 Both metrics are used to express the relationship between the Present Value of Costs (PVC) and the Present Value of Benefits (PVB), which are defined in Chapter 3. The metrics are described in Boxes 4.1 and 4.2 below.

Benefit Cost Ratio

4.8 When the Present Value of Costs is positive, as in most transport interventions, the Benefit Cost Ratio (BCR) should be reported in the Economic Case and Value for Money Statement.

4.9 For these cases, the BCR is the most useful and interpretable value for money metric. It provides a representation of the relative relationship between benefits and costs, and allows easy comparison of different options and between schemes. This is especially important, given that the Department works within a constrained budget.

Box 4.1: Benefit Cost Ratio

The BCR is defined as:

$$\text{BCR} = \frac{\text{Present Value of Benefits}}{\text{Present Value of Costs}}$$

4.10 It indicates how much benefit is expected for each unit of cost. A BCR of greater than one indicates that the benefits outweigh the costs. For example, a BCR of 2.0 suggests that for each pound of Broad Transport Budget expenditure, two pounds of benefit to public value are expected to be generated.

Net Present Public Value

4.11 In cases where the Present Value of Costs is negative or there are no costs or revenues to the Broad Transport Budget associated with the proposal, it is more appropriate to calculate and report the Net Present Public Value (NPPV).

4.12 In these cases the BCR is difficult to interpret and should not be reported. However in most cases it is still calculated in order to identify the value for money category. Further guidance on this is found in Chapter 5 of this document and in the Value for Money: Supplementary Guidance on Categories.

Box 4.2: Net Present Public Value

The Net Present Public Value (NPPV) is defined as:

$$\text{NPPV} = \text{Present Value of Benefits} - \text{Present Value of Costs}$$

4.13 Unlike the BCR, the NPPV does not measure the likely benefits relative to the likely costs. Instead, it measures the total impact on public value of a proposal. It is simply the sum of all benefits net of costs.

4.14 A positive NPPV indicates that there is expected to be an overall gain in public value as a result of the proposal.

Assessing Value for Money

4.15 As discussed in Chapter 3, to provide a holistic, transparent and useful view of a proposal's impact on public value, a value for money assessment includes consideration of three types of monetised impacts ('established', 'evolving' and 'indicative'), non-monetised impacts, and uncertainty.

Types of impact

4.16 Some methods for identifying outcomes, impacts and estimating their monetary values are more widely-accepted than others, as they are well-researched, tried-and-tested, and robust.

4.17 To reflect this in a way which is useful for decision-making, the Department distinguishes between three types of monetised impact, and the way each of these types of impact is used in the assessment varies. This is discussed further below.

4.18 Box 4.3 provides a brief description of each 'type' of impact and how they are used. Box 4.4 provides a (non-exhaustive) list of impacts that typically fall within each category when the methodologies for monetisation set out in relevant WebTAG units are used.

Box 4.3 Types of impact and their use in the VfM assessment

Type	Description	Use in Assessment
Established Monetised Impacts	The method used for estimating the impact and its monetary value is accepted, well-researched, and tried-and-tested. Values can be derived from current and predicted future market prices (e.g. fuel prices) or monetary values derived from research (e.g. values of travel time saved).	Used to generate an initial value for money metric which is reported in the Value for Money Statement.
Evolving Monetised Impacts	Some evidence exists to support the estimation of a monetary value but this is less widely-accepted, well-researched or tried-and-tested.	Included after initial value for money metric has been calculated. Generates an adjusted metric which is reported in the Value for Money Statement.
Indicative Monetised Impacts	Monetary valuation methods are not considered sufficiently widely-accepted, well-researched or tried-and-tested to be definitive. The methodologies are generally developing and a high degree of uncertainty in the magnitude of the impact exists.	Considered together at the last stage of the assessment. Do not feed into the initial or adjusted value for money metrics.
Non-monetised Impacts	Estimated magnitude of the impact is assessed on a seven-point scale. Approach to assessment can vary; can be informed by a variety of evidence sources and analytical judgement.	

Box 4.4: Typical impacts of a transport proposal

Established Monetised Impacts	Evolving Monetised Impacts	Indicative Monetised Impacts	Non-monetised Impacts
Included in initial and adjusted metrics	*Included in adjusted metric*	*Considered after metric using switching values approach*	
Journey time savings Vehicle operating costs Accidents Physical activity Journey quality Noise Air quality Greenhouse gases Indirect tax	Reliability Static clustering Output in imperfectly competitive markets Labour supply	Moves to more/less productive jobs Dynamic clustering Induced investment Supplementary Economy Modelling*	Security Severance Accessibility Townscape Historic environment Landscape** Biodiversity Water environment Affordability Access to services Option and non-use values

**These are a class of models rather than a specific economic impact*

*** A widely-used methodology for monetisation exists, but this is not included in WebTAG guidance because of concerns about its robustness. Detailed guidance is found in the Supplementary Guidance on Landscape.*

4.19 When selecting which impacts to consider in the assessment, due attention should be given to the quality and robustness of underlying data and to the size, scale and scope of the proposal.

4.20 For example, many larger transport proposals may be expected to have material impacts on the wider economy, and so it is often useful to assess such impacts, even where the methodology is still developing. Sensitivity testing should be used to provide an understanding of the impact of the uncertainty.

Including different types of impact in the assessment

4.21 Each 'type' of impact is included in the value for money assessment sequentially. This enables the generation of an initial assessment of value for money, in which we have the most confidence. This can then be adjusted to account for other impacts which are more uncertain.

4.22 Only the most established impacts are included in the Present Value of Benefits at first. This stage of the assessment generates an **initial** value for money metric upon which other metrics, which are less certain, are based.

4.23 The evolving monetised impacts are subsequently added to the original assessment to generate an **adjusted** value for money metric.

4.24 Both the initial and adjusted value for money metrics should be reported in the Economic Case and Value for Money Statement. The adjusted metric is also used to derive a provisional value for money category (see Chapter 5 of this document and the *"Value for Money: Supplementary Guidance on Categories"* for further details).

4.25 The final stage of the value for money assessment requires consideration of **indicative monetised** impacts and **non-monetised** impacts. This involves determining whether these impacts, either individually or collectively, are likely to materially alter the overall value for money of the proposal. Further guidance on this approach, known as 'switching values', is found in the *"Value for Money: Supplementary Guidance on Categories".*

4.26 For indicative monetised impacts, the degree of uncertainty in estimating the monetary value should be reflected through the presentation of an appropriately wide range of scenarios and sensitivities.

4.27 Recall that for non-monetised impacts, WebTAG recommends using a seven-point scale to denote the magnitude and nature of the impacts, ranging from large adverse to large beneficial. Indicative monetised evidence provides a similar tool for understanding the expected magnitude of the remaining impacts.

Assessing uncertainty

4.28 Given the uncertainty in the estimation of all impacts, it is important to undertake appropriate and proportionate sensitivity analysis at all stages of the assessment. The results from these tests should be reported (often as ranges around value for money metrics) and explained so they can be considered when drawing final conclusions about value for money.

4.29 The value for money assessment thus reflects a consideration of all material economic, social and environmental impacts, including those which cannot be sufficiently easily monetised for inclusion in benefit-cost ratios.

5. Value for Money Categories

5.1 Value for money categories provide a succinct, overarching summary of the outcome of an often complex economic appraisal. They are based on an assessment of a proposal's benefits relative to its costs.

5.2 They help decision-makers understand the expected impact of a proposal on public value and the extent to which it represents value for money once all potential impacts (monetised and non-monetised) have been considered.

5.3 Using a consistent approach to express value for money conclusions also allows for easy comparison across proposals.

5.4 This chapter introduces the various categories used by the Department and explains how they correspond to the value for money metrics introduced in the previous chapter.

5.5 A 'high-level' overview of how to arrive at and report these categories following a value for money assessment is provided below. **More detailed, technical guidance can be found in the Value for Money Supplementary Guidance on Categories.**

Category Definitions

Proposals with significant transport budget impacts

5.6 In **standard cases**, where Broad Transport Budget cost outlays exceed revenues or cost savings, the Department uses six value for money categories. The relevant categories are detailed in Box 5.1.

Box 5.1 Standard Categories

(Transport cost outlays exceed revenues or cost savings)

VfM Category	Implied by…*
Very High	BCR greater than or equal to 4
High	BCR between 2 and 4
Medium	BCR between 1.5 and 2
Low	BCR between 1 and 1.5
Poor	BCR between 0 and 1
Very Poor	BCR less than or equal to 0

**Relevant indicative monetised and/or non-monetised impacts must also be considered and may result in a final value for money category different to that which is implied solely by the BCR. This chapter provides guidance on how to select the final value for money category.*

5.7 Four additional categories have also been introduced to reflect special cases where the proposal will result in **cost savings** (see Box 5.2).

5.8 Proposals that could result in cost savings include reductions in service, projects being de-scoped, fare rises and tolling schemes.

5.9 In all such cases, revenues or cost-savings to the Broad Transport Budget exceed any cost outlays when compared to the case without the proposal.

Box 5.2 Cost Saving Categories

(Transport revenues or cost savings exceed outlays)

Very High (and Financially Positive)	Proposal generates benefits to wider society and 'pays for itself' in the long-run since outlays are less than revenues and cost-savings combined.
Economically Efficient Cost Savings	Cost savings outweigh benefit losses and thus overall public value is increased, implying value for money.
Potentially Efficient Cost Savings	Benefit losses outweigh cost savings, but only to a limited extent. As a result, if the money returned to the budget were spent on proposals representing at least Medium value for money, public value would increase overall. The ultimate outcome is therefore likely to represent value for money.
Poor (but Financially Positive)	Proposal results in benefit losses that outweigh cost savings to a greater extent. In these cases, even if the money returned was spent on a Medium value for money proposal, it would not lead to an overall increase in public value. Whilst there may be strong strategic, financial, management or commercial reasons for proceeding with these proposals, they are not considered to have a strong economic case.

Proposals with small transport budget impacts

5.10 For proposals where there are no gross costs or cost savings[6] to the Broad Transport Budget, or these are close to negligible relative to other appraisal impacts (because the proposal has no costs or revenues, or these are almost entirely borne by non-transport budgets), there are two Categories.

5.11 A proposal is judged to be *Economically Positive* if it is expected to have a positive NPPV and *Economically Negative* if it is expected to have a negative NPPV.

5.12 This should include consideration of all impacts, including those which are not monetised within the reported metrics. The other impacts should be considered and reported using the 'switching values' approach set out below.

[6] Gross costs or cost-savings are all of the impacts which affect the PVC (affect the Broad Transport Budget) as defined in WebTAG as the costs and revenues which directly affect the public budget available for transport.

Arriving at a value for money category

General approach

5.13 As alluded to above, value for money is determined by considering the relationship between the costs and benefits of a proposal. Where a monetised assessment has been undertaken, the Department's approach to assigning a category starts by considering the appropriate metric (Benefit Cost Ratio or Net Present Public Value).

5.14 In line with HMT's Green Book guidance, the final metric used to assess value for money must account for all relevant risks, uncertainties and impacts. This ensures decision-makers have an understanding of both the impact of the proposal and how much confidence they can place in the underlying metric of that impact.

5.15 To begin with, the category should be derived from the **adjusted value for money metric** as it includes a reasonably broad range of impacts in which the Department has sufficient confidence. However the initial value for money metric may be used in cases where no evolving monetised impacts (as defined in Chapter 4) are expected.

5.16 Consideration then turns to other economic impacts and risks (both monetised and non-monetised) that have not yet been accounted for. The key question to ask at this stage is how likely is it that the value for money category will change if these impacts are included in the assessment.

Selecting the final category

5.17 In some cases, the outcome of the value for money assessment will clearly point to a single category, suggested by the adjusted value for money metric. This is usual when:

- the adjusted metric sufficiently captures all the impacts of a proposal / very few impacts (either monetised or non-monetised) are excluded from the adjusted metric;
- sensitivity analysis, and an assessment of risk and uncertainty, suggests a narrow range of value for money metrics.

5.18 Therefore, the adjusted metric provides a sufficiently accurate assessment of what the expected value of the metric would be when all risks, uncertainties and impacts are considered.

5.19 In other cases, assigning a value for money category is more complex. It requires coming to a judgement about whether there is sufficient evidence to suggest the value for money category should differ from that derived from the adjusted metric.

5.20 Questions under consideration include:

- How **confident** are we in the adjusted metric? What happens if we change our assumptions or the parameters used in the original analysis (e.g. changing the estimated level of demand)?

- What happens to the value for money metric if **indicative monetised impacts** are included in Present Value of Benefits? How confident are we that this will occur?
- Is the expected magnitude of any of the **non-monetised impacts** sufficient to enhance or diminish the value for money category of the proposal? How confident are we in our estimation of these impacts?

5.21 To reach a judgement about what the final value for money category should be, an approach making use of 'switching values' is employed. It examines the extent to which the Present Value Benefits or Present Value of Costs of the proposal would need to increase or decrease to result in a change to the assigned value for money category. Analysis is then used to inform a judgement as to how likely this increase or decrease is to be realised.

5.22 In many cases the outcome of this process will point to a single value for money category. However it may be more appropriate to report a hybrid category (e.g. 'Medium-High') in cases where it is likely and reasonable to believe, that a proposal may fall into another category, based on analysis using 'switching values'.

5.23 Where evidence suggests that the value for money category is likely to change under particular circumstances (e.g. lower-than-projected population growth, higher-than-expected construction cost inflation) and a fair degree of uncertainty exists about whether those circumstances will be realised, it may appropriate to report both the most likely category and the category that would likely be achieved if those circumstances occur. For example, "the proposal offers Medium value for money, but this could potentially drop to Low value for money under a low growth scenario".

5.24 If sensitivity analysis or an assessment of impacts (monetised or non-monetised) beyond the adjusted BCR have been carried out and show that the value for money category is unlikely to change, this should also be made clear to decision-makers.

5.25 The following chapter contains further guidance on how to report a value for money assessment.

6. Reporting Value for Money

6.1 Any submission requesting a decision with value for money implications is accompanied by a '**Value for Money Statement**'. This includes the Economic Case for any transport investment proposal, in which inclusion of a Value for Money Statement is mandatory.

6.2 The Value for Money Statement provides decision-makers with a concise summary of the conclusions from the value for money assessment. It highlights the impacts, risks, assumptions and uncertainties present in the analysis and their implications for the proposal.

6.3 Its primary purpose is to aid the decision-making process. The statements typically range from a few paragraphs to a full page, depending on the complexity of the assessment and the audience to which they are presented. They should be clear to both economists and non-economists.

6.4 This chapter focuses on how value for money conclusions should be presented in a Value for Money Statement.

Reporting the value for money assessment

6.5 The questions below provide a practical framework for ensuring the relevant information in the value for money assessment is presented in the Value for Money Statement. Guidance on how to answer them is found throughout this document.

To what extent does the proposal represent value for money?

- What is the value for money category of the proposal? (Chapter 5)
- What does that category mean in terms of value for money? (Section 5.6 to 5.10)
- Have a sufficiently wide range of options to solve the identified problem been considered? (Chapter 3)
- Could other options to solve the identified problem represent better value for money?

What are the key impacts of the proposal on the public?

- What is the cost to the Broad Transport Budget? (Section 3.24 to 3.32)
- What are the most significant monetised impacts (both negative and positive) of the proposal? e.g. journey time savings, reliability benefits
- Are there any significant non-monetised impacts? (Section 3.38 to 3.43)

- How do these impacts vary across different social groups (distributional impacts)? (Section 3.44 to 3.51)

Why do these impacts place the proposal in the reported category?

- The initial and adjusted value for money metric (Chapter 4 of this document provides guidance on which should be reported).
- Which uncertainties and impacts beyond the BCRs were considered when assigning a category? (Section 3.52 to 3.61)
- A description of how these uncertainties and further impacts were used to come to the most likely category.

How confident can we be in the value for money reported category?

(See also the Supplementary Guidance on Categories)

- How likely is the category to be realised? How likely is it to be different?
- What ranges of the value for money metric did sensitivity tests suggest?
- How have the key uncertainties and further impacts been considered in the process of determining the value for money category?
- How robust are the data sources and methodologies used to assess the impact?
- Are there any uncertain assumptions or important dependencies that particularly influence the category?
- Has any uncertainty from these been mitigated against?

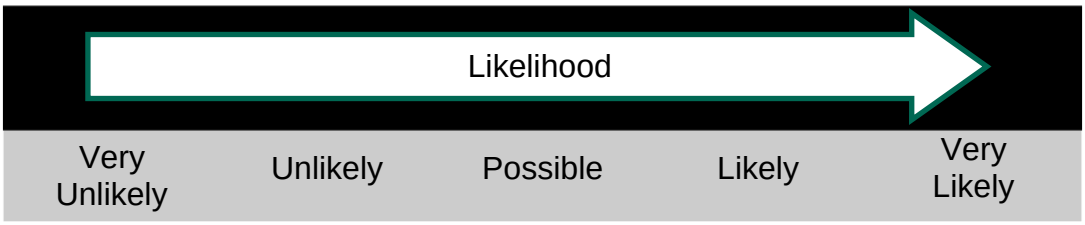
Communicating uncertainty

6.6 In cases where there is a large amount of uncertainty, particularly around key assumptions, and/or where a project is of key importance (in terms of scale of investment or exposure to risk), sensitivity analysis should be undertaken. This is a crucial step in mitigating uncertainty in the value for money assessment and increasing the level of confidence that decision-makers can place in the value for money conclusions drawn.

6.7 A ‘switching values’ analysis may subsequently be used to determine whether or not the results of this sensitivity analysis imply a value for money category different from that suggested by the adjusted BCR. Further guidance on how the results of sensitivity analysis may be used to inform the value for money category is set out in the Supplementary Guidance on Categories.

6.8 If the sensitivity analysis does imply a different value for money category, an assessment of likelihood must be undertaken in order to judge whether or not the value for money category should change. In this case, it may be useful to use the likelihood scale in Box 6.1 to express the degree of confidence in a value for money category.

Box 6.1: Likelihood scale for VfM Categories



6.9 Box 6.2 provides an example of how this might be presented as a table in a value for money statement. For consistency, the likelihood of categories should be rated according to the scale in Box 6.1 and a clear rationale should be provided for the final value for money category selected.

Box 6.2: Example of a table summarising confidence in the VfM category of a proposal

Category	***Low***	***Medium***	***High***	***Very High***
Likelihood	*Very Unlikely*	*Unlikely*	*Likely*	*Possible*

Reporting Distributional Impacts

6.10 The distributional impact assessment provides decision-makers with an understanding of how a proposal will affect different groups within society.

6.11 It is an important part of the value for money assessment and outputs should be clearly communicated alongside other value for money considerations. Reporting of distributional impacts should:

- highlight the impacts with the most disproportionate impacts on some groups; and
- identify where any vulnerable group receives disproportionate effects across a range of indicators (as opposed to considering only the impacts in isolation);
- consider distributional impacts in light of the objectives of the proposal. For example, if a proposal focuses on improving access to an employment centre, which groups benefit (or otherwise) from any improved access should be highlighted.

6.12 The methods used to assess distributional impacts are not directly comparable to those used for other impacts on total public value. As a result, the conclusions should be presented alongside the value for money category rather than within it.

7. Non-monetised Assessment

7.1 In certain cases, it is not possible or proportionate to carry out a full monetised value for money assessment. Instead, a similar, but largely non-monetised assessment may be used to understand the value for money implications.

7.2 In such cases, the value for money assessment is primarily used to establish whether or not a proposal represents value for money. This involves assessing whether it is expected to increase public value overall, and whether there may be better ways to achieve the same objectives.

When is a non-monetised assessment appropriate?

7.3 Before undertaking such an assessment, it should be considered whether largely non-monetised analysis is sufficient to inform the decision being taken.

7.4 Conducting a non-monetised assessment may have consequences for the degree of confidence officials can have in its conclusions. However, in some cases it may be more useful, informative and credible than conducting a monetised appraisal.

7.5 Non-monetised assessments may be appropriate for proposals:

- at very early stages of approval to develop the option further;
- involving very small expenditure; or
- where impacts lack a sufficient evidence base to be monetised.

7.6 A judgement is required from the analyst on whether the approach is sufficient. The approach used may be tested by comparing with similar case studies. The judgement should be explained in the Value for Money Statement and discussed in the Analytical Assurance Statement.

How to undertake a non-monetised assessment

7.7 The assessment should consider:

- how the intervention will deliver the claimed benefits;
- to what extent the intervention will deliver the claimed benefits;
- how benefits compare with the costs (perhaps discussing the monetary value we would have to attribute to the benefits for them to outweigh the costs and how reasonable this is);

- alternative proposals to achieve the objective that may represent better value for money; and
- any assumptions, uncertainty, risks and sensitivities of the evidence.

7.8 These considerations lead to a discussion of how economy, efficiency and effectiveness (the ‘three Es’) are achieved, whether the benefits of a proposal exceed its cost (value for money) or whether better alternatives exist.

7.9 A logic map may be useful to provide an understanding of how it is believed the intervention will deliver the claimed benefits. This should be framed using the expected inputs, outputs, outcomes and impacts of a proposal together with the 'three Es'. The structure of an appropriate logic map is given in Chapter 2 of this document.

7.10 Logic maps should be conceptually clear, have no missing links, and make explicit any assumptions about the context, causal links and implementation.

7.11 The appraisal process may be informed by reference to case studies, national statistics, evaluation evidence, previous monetised appraisals, and relevant academic literature.

7.12 The evidence used may include quantitative data sources (e.g. statistical data). The distinction between non-monetised assessments and the standard approach to appraisal is that monetisation of the key impacts has not been undertaken.

Reporting outcomes of a non-monetised assessment

7.13 As non-monetised assessments are primarily used to establish whether or not a proposal is expected to result in an overall increase public value overall, in most cases the value for money category assigned should be either *Economically Positive* or *Economically Negative*. These categories correspond to cases where the benefits were expected to outweigh the costs and vice versa respectively.

7.14 These value for money categories should be presented alongside clear statements as to whether alternatives could deliver better value for money.

7.15 The use of the more specific categories often requires a large degree of monetisation and understanding of uncertainty and is not generally possible in a non-monetised assessment.

7.16 However, in a small number of cases sufficient evidence may be available to suggest that the proposal should be reported as representing a more specific category.

7.17 For example, consider a proposal to run an identical service in a more efficient manner. Where there is confidence that the proposal will only produce cost-savings, and that it will not have detrimental impacts to public welfare more broadly, with sufficient evidence it could be reported as “Very High (and Financially Positive) value for money”.

8. Analytical Assurance Statements and Value for Money

8.1 Any analysis used to inform decision-making within the Department needs to be accompanied by an Analytical Assurance Statement. This ensures decision-makers are aware of the strengths and limitations of the analysis underpinning recommendations.

8.2 The Department's Analytical Assurance Framework, Strength in Numbers, provides details about what information should be included in an Analytical Assurance Statement.

8.3 Whereas the Value for Money statement focuses on *what* analysis was and was not undertaken, the Analytical Assurance statement is more concerned with broader questions about *how* the analysis was conducted and the associated implications. For example, it considers whether sufficient time and resource was allocated for the analysis, the robustness and appropriateness of the chosen methods and whether under different circumstances different results could be or have been achieved. Above all, it considers whether the analysis and its use are fit-for-purpose for the decision at hand.

8.4 The two statements are complementary. Value for money assessments should therefore be undertaken in a way which is fully consistent with Strength in Numbers and the Department's guidance on the Quality Assurance of Analytical Modelling.

8.5 As discussed in previous chapters, any risks, sensitivities, and assumptions which affect the expected value of a proposal's benefits or costs should be reported within the Value for Money Statement.

8.6 Where these affect the overall quality and reliability of the analysis, they should also be drawn out in the Analytical Assurance Statement and inform the assurance rating.

8.7 It is important to note that the Analytical Assurance Statement should cover all analysis used to inform the decision – not just that contained in the Economic Case. It is therefore necessary to consider other analysis included in the Business Case.

Annex A: Glossary

A.1 The **use of public resources** includes capital and resource expenditure, stewardship of assets and raising revenue.

A.2 **Cost-Benefit Analysis (CBA)** is analysis which assesses the value of as many of the costs and benefits of a proposal as feasible, including items for which the market does not provide a satisfactory measure of economic value.

A.3 **Appraisal** refers to the assessment made before decisions are taken of the economic, social, environmental, public account and distributional impacts that an intervention may have.

A.4 **The Present Value of Costs (PVC)** is the sum of discounted costs and revenues to the budget available for transport (broad transport budget) over the appraisal period, and gives the value of these impacts in the prices of a given base year.

A.5 **The Present Value of Benefits (PVB)** is the sum of all discounted benefits and dis-benefits not included in the definition of the PVC over the appraisal period, and gives the value of these impacts in the prices of a given base year.

A.6 **The Benefit-Cost Ratio (BCR)** is given by PVB / PVC and indicates how much benefit is obtained for each unit of cost, with a BCR greater than 1 indicating that the benefits outweigh the costs.

A.7 **The Net Present Public Value (NPPV)** is a measure of the total economic impact of a proposal. It is simply the sum of all benefits and costs.

A.8 **Distributional Impacts (DIs)** consider the variance of transport intervention impacts across different social groups.

A.9 **Optimism Bias (OB)** is the demonstrated systematic tendency for appraisers to be over-optimistic about key project parameters, including capital costs, operating costs, works duration and benefits delivery.

A.10 **A Quantified Risk Assessment (QRA)** allows an expected value (defined as the average of all possible outcomes, taking account of the different probabilities of those outcomes occurring) of the cost of the proposal to be calculated. This expected value should form the ‘risk-adjusted' cost estimate.

A.11 The **Broad Transport Budget** is the public budget available for transport. It includes the budgets of the Department and its Arm’s Length Bodies and the transport budgets of Local Authorities.

A.12 **Benefits management** is a project management discipline that involves the identification, quantification, analysis, planning, tracking, realisation and optimisation of the benefits that a project seeks to deliver. This seeks to ensure that organisations realise the planned benefits from their investments.

A.13 **Evaluation** is a systematic analytical process which examines the effectiveness of a project based on actual results. This can include what difference it made (impact evaluation), whether its benefits justified its costs (economic evaluation) and how it was delivered (process evaluation).

Annex B: Useful Resources

B.1 **WebTAG**, the Department's Transport Appraisal Guidance: https://www.gov.uk/guidance/transport-analysis-guidance-webtag

B.2 **The Green Book**, HMT's guidance on economic appraisal and evaluation: https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent

B.3 **Managing Public Money**, HMT's guidance on how to handle public funds with probity and in the public interest: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/454191/Managing_Public_Money_AA_v2_-jan15.pdf

B.4 **The Magenta Book**, HMT guidance on evaluation: https://www.gov.uk/government/publications/the-magenta-book

B.5 **Department for Transport Appraisal Tables** (AST, AMCB, TEE etc.): https://www.gov.uk/government/publications/webtag-appraisal-tables

B.6 **Strength in Numbers**, the Department's Analytical Assurance Framework: https://www.gov.uk/government/publications/dft-analytical-assurance-framework-strength-in-numbers

B.7 **Quality Assurance of Analytical Modelling**, the Department's guidance for quality assuring analytical models: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/350904/qa-modelling-guidance_pdf.pdf

B.8 **Logic Mapping**, the Department's Hints and Tips Guide: https://www.gov.uk/government/publications/logic-mapping-hints-and-tips-guide

B.9 **The Aqua Book**, HMT's guidance on producing quality analysis for Government: https://www.gov.uk/government/publications/the-aqua-book-guidance-on-producing-quality-analysis-for-government