Homes England

The Housing and Regeneration Agency

AMION CONSULTING

Homes England – Measuring Social Value

Paper 1: Measuring the placemaking impacts of housing-led regeneration

Date: September 2023

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Table of Contents

List of Abbreviations

Abbreviation	Full Term
BCR	Benefit Cost Ratio
CBA	Cost Benefit Analysis
DID	Difference-in-Difference
DLUHC	Department for Levelling-Up, Housing and Communities
ECF	English Cities Fund
EPC	Energy Performance Certificate
ESF	Eigenvector Spatial Filtering
GAMLSS	Generalised Additive Model for Location, Scale and Shape
GIS	Geographical Information Systems
HPM	Hedonic Price Modelling
HPSSA	House Price Statistics for Small Areas
IMD	Index of Multiple Deprivation
LSOA	Lower Super Output Area
MSOA	Middle Super Output Area
NPSV	Net Present Social Value
ONS	Office of National Statistics
PCA	Principal Component Analysis
PP	Price Paid Data
REML	Restricted Maximum Likelihood
RMSE	Root Mean Square Error Values
R2	Coefficient of determination values
VOA	Valuation Office Agency

1. Foreword

Within our new Strategic Plan we have set ourselves the mission of driving regeneration and housing delivery, to create high-quality homes and thriving places. This will support greater social justice, the levelling up of communities across England and the creation of places people are proud to call home. An integral part of achieving this mission will be our ability to understand the impact we are having in places, not just in terms of the outputs we deliver but the wider social value of our activity and that of our partners.

As a government agency, we are committed to investing public funds where they will deliver the greatest social value. Rigorous economic appraisal, alongside evaluation, plays a central role in ensuring that the projects and schemes we support achieve this ambition. However, as was recognised in the HM Treasury Green Book review in November 2020, there are a number of challenges in undertaking economic appraisal in practice. This in turn can lessen its effectiveness in supporting the delivery of policy priorities, including the levelling up agenda.

One of the most notable issues is that the Benefit Cost Ratio (BCR), used in economic appraisal to inform judgements on value for money, can be misaligned to decision makers' objectives. This is commonly the result of the BCR being overly dependent on benefits that are easy to value in monetary terms; whereas those benefits that are difficult to measure, while still potentially being a core part of the strategic rationale for intervening in a place, are not fully counted.

Recognising that the accurate estimation of benefits (and costs) can be a particularly pertinent challenge in the context of regeneration and levelling up, we have implemented a comprehensive programme of research specifically targeted at improving economic appraisal for these types of programmes and projects. This work has been undertaken in close collaboration with colleagues in the Department for Levelling Up, Housing and Communities (DLUHC), and in consultation with HM Treasury, wider Government and a range of industry and academic experts. A core focus of the research has been to strengthen Homes England's ability to **measure and assess the full social value** delivered through our housing and regeneration activities.

This report (which focuses on measuring the placemaking impacts of housing-led regeneration) is the first of a suite of documents and guidance we will be publishing over the coming year, setting out the findings of our research programme. The report demonstrates the significant wider benefits housing-led regeneration can create and, importantly, enables the inclusion of these benefits within project and programme BCRs. Guidance on applying the research has been incorporated within the recently updated version of the DLUHC appraisal guide (March 2023).

I am very much looking forward to sharing our further research as it emerges in the coming months. This will initially include research on the value of redeveloping brownfield land, environmental impacts, reference class forecasting and optimism bias.

I would like to thank AMION Consulting who led the research and all those in Homes England who supported the work, with particular thanks to the Economics team led by Jo Brotherhood. I would also like to thank analysts and economists in DLUHC and HM Treasury who provided invaluable feedback. In addition I would like to thank Professor Peter Tyler, from the University of Cambridge, who undertook a peer review of the research and guidance prior to its publication.

Andy Wallis
Chief Economist, Homes England

2. Executive Summary

Background – driving regeneration and housing delivery

1. Homes England is the government's housing and regeneration agency. We drive regeneration and housing delivery to create high-quality homes and thriving places. This will support greater social justice, the levelling up of communities across England and the creation of places people are proud to call home. We believe that affordable, quality homes in well-designed places are key to improving people's lives. We make this happen by using our powers, expertise, land, capital and influence to both bring investment to communities and get more quality homes built.

2. Our Strategic Plan (May 2023) confirms our refreshed mission and objectives, which have been updated to align with the government's levelling up agenda and our expanded role in placemaking and regeneration.

Homes England Research Programme

3. The assessment of a project's costs and benefits, in the form of economic appraisal, is an integral part of optimising the social value delivered through the use of public sector resources. Where possible, this should involve valuing and monetising all relevant costs and benefits. This goes beyond market effects and includes areas such as environmental and broader social impacts. In practice, it is widely recognised that there are methodological challenges in capturing the full range of costs and benefits that an intervention can generate. This is particularly true of regeneration activity[1], where the strategic rationale for intervening often revolves around the delivery of external impacts. These include the benefits to existing residents and businesses of removing blight, improving safety or providing new community facilities, that by their very nature can be difficult to quantify and monetise[2].

4. Substantial work has been undertaken across government to improve the approach to economic appraisal and the use of tools such as cost benefit analysis (CBA)[3]. The Department for Levelling Up, Housing and Communities (DLUHC) has recently updated its own DLUHC Appraisal Guide (2023),[4] including new guidance on the appraisal of place-based initiatives. This has been in response to the publication of the revised HM Treasury Green Book (2022)[5] and the Levelling Up White Paper (2022)[6] which places much greater focus on reducing geographical disparities.

5. In conjunction with DLUHC's work on updating its appraisal guidance, Homes England has implemented a comprehensive research programme, targeted at improving the way in which economic appraisal is used to accurately and consistency assess the full economic and social impacts of the Agency's activities. **This report sets out the findings of the first research workstream, which has focused on measuring the benefits to existing residents of new housing-led regeneration**.

[1] Regeneration is defined for the purposes of this study as the process of improving the physical/environmental, social and/or economic characteristics of a site or area.

[2] To monetise (or monetisation) refers to the translation of estimates of social benefits or costs into monetary terms.

[3] Cost Benefit Analysis (CBA) 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 a measure of social value. When combined with an appropriate public sector cost measure a BCR is produced, which provides a social unit cost measure (HM Treasury Green Book (2022), p.130).

[4] https://www.gov.uk/government/publications/dluhc-appraisal-guide

[5] https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent/the-green-book-2020

[6] https://www.gov.uk/government/publications/levelling-up-the-united-kingdom

Research aims and approach

6. The DLUHC Appraisal Guide identifies that the primary benefits of new housing can be measured through the assessment of land value uplift[7]. However, as well as the direct private benefit of new homes reflected through changes in land values, housing-led development can enable a broader range of further external impacts (externalities) – for example, new housing or employment space, public realm improvements and facilities that benefit existing communities (as well as new residents). These will not be fully captured through the assessment of land value uplift.

7. Extensive case study evidence demonstrates the positive external impacts of housing-led development. However, while examples such as the Agency's intervention in Salford Central through the English Cities Fund (see case studies p.11) highlight the scale of impact that can be achieved, a credible methodology has not previously been available through which the overarching positive impact on a place can be monetised. Working with analysts in DLUHC, Homes England has sought to address this gap through statistical modelling, drawing on past Agency interventions.

8. AMION Consulting was commissioned to examine the relationship between Homes England interventions with placemaking objectives and post-intervention trends in house prices (over and above localised growth). The study used a hedonic pricing methodology[8] consistent with HM Treasury Green Book guidance. The methodology[9] identified the contribution of property characteristics to price transactions considering a range of location and amenity influences that were also considered likely to contribute to market value. The aim of the approach was to establish the extent to which housing-led regeneration had been able to create benefits for adjacent areas.

9. The projects within the study were all housing-led regeneration projects that had clear placemaking and regeneration objectives such as removing existing blight, remediation of significant brownfield land, general market making effects from enhanced confidence in the area and/or were designed to tackle specific long standing socio-economic issues. The study assessed the extent to which these regeneration schemes had influenced house prices in the vicinity of the development site compared to houses further away.

Findings

10. **Overall, the study found that, on average, housing-led regeneration projects are likely to have a positive wider placemaking impact on the surrounding area, which can be assessed through net house price effects.** Measuring this across the residential capital value within an impact area demonstrates the considerable extent of wider benefits that can be generated through housing-led activity and that, without accounting for this impact, the full scale of social value delivered through the Agency's interventions might otherwise be significantly underestimated.

11. Using additional econometric modelling, the research then examined the net price effects against a range of underlying development and location features, for example Ofsted rating of nearest schools and distance to town centre. This enabled a set of uplift factors to be developed by region, number of units (scheme size) and local rates of development (measured by change in housing stock). The uplift factors refer to the simulated

[7] Land value uplift, when used in appraisals, represents the private benefit (or change in economic efficiency) of one form of development on a particular site compared to its previous use. In a housing context, land value uplift is the value of land when used for housing minus the value of land in its current use. Generally, land value uplift will be higher where housing is of higher benefit to society, for example, in locations where housing supply is constrained relative to demand and/or where a site is near to local amenities or well-developed transport infrastructure. In short, the value of land is determined by a number of factors, but most significantly by its use and location.

[8] 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 (HMT Green Book p.127).

[9] A method of economic evaluation, based on the premise that the price of a good is partly determined by its characteristics or the services it provides. The approach seeks to value the individual characteristics of that good by studying how the price people are willing to pay for it changes when the characteristics change, https://www.oxfordreference.com/.

increase in the housing stock capital value and forms the basis of the impacts to be applied as part of ex-ante scheme appraisal (see Table 4, p.21).

12. **The uplift factors range from 0% to over 3% and represent a one-off uplift to surrounding house prices within a designated impact area.**

Application

13. Working with analysts in DLUHC, Homes England has developed guidance to enable the findings of the research to be applied. The detailed guidance is set out in Annex Gi of the DLUHC Appraisal Guide 2023. The guidance is also summarised within **Annex A** of this report. To support the application of the research, Homes England has developed its own in-house database on the capital stock values of all local areas across the UK, based on national datasets, which accompanies the DLUHC Appraisal Guide.

14. The guidance sets out how to monetise placemaking or 'wider area' impacts based on estimating the existing housing stock and capital value within the surrounding area of a scheme. An appropriate uplift value is then applied to this housing stock capital value. This is determined by the location of the scheme by region, the size of scheme and local rates of development. Depending on the number of housing units being developed, the impact area is taken as a 1.5km or 2.5km radius of the scheme, using the centroid of the site. These impacts, which are then prorated over the appraisal period in line with the scheme's housing delivery, are adjusted for additionality. This takes into account both deadweight and displacement effects.

15. The assessment of wider area impacts through the application of this research should only be used for projects within urban areas which are part of a programme of funding that has clear placemaking and regeneration objectives; and has explicitly established the importance of housing as a mechanism for delivering these objectives.

3. Research aims

Monetising the impacts of housing-led regeneration

16. The HM Treasury's Green Book makes it clear that the appraisal of social value should consider not just economic market efficiency but overall social welfare efficiency, stating that social or public value therefore includes all significant costs and benefits that affect the welfare and wellbeing of the population, not just market effects[10]. This is echoed in DLUHC's appraisal guidance, which highlights the need for economic appraisal to seek to capture all the benefits and costs of an intervention. This includes all externalities in the form of placemaking and regeneration, health, educational, transport, environmental, and culture and amenity impacts.

17. The challenge facing appraisers, and decision makers, is that external impacts can often be difficult to quantify and, even more so, monetise. This can mean that metrics commonly used to assess an intervention's value for money, such as the Benefit Cost Ratio (BCR) and Net Present Social Value (NPSV)[11], do not accurately reflect the net impact on society. In addition to this, there can be a lack of consistency in the approaches used to assess external impacts where accepted guidance does not exist.

18. Recognising these challenges, Homes England has implemented a research programme targeted at improving the way in which economic appraisal is used to accurately and consistency assess the impacts of the Agency's activities. The objectives that have underpinned the design and implementation of the research programme are to:

    - **Improve the understanding of both the nature and scale of impacts associated with housing-led interventions through carrying out rigorous primary research**. The focus has been on identifying key gaps in the evidence base and implementing comprehensive research studies to address these.
    - **Develop methodologies and guidance to quantify and monetise a greater range of impacts**. A core requirement for all of the work has been that it will be of practical use, specifically that the research will lead to methodologies that can be applied in practice.
    - **Support broader improvements in the assessment of value for money, in line with the HM Treasury Green Book review**. The Agency's Strategy, Research, Analysis and Sponsorship Unit has been working with analysts in DLUHC to develop a broader approach to value for money assessment. As well as capturing a wider range of monetisable costs and benefits, this has also involved considering how non-monetisable effects can be incorporated alongside metrics such as the BCR and NPSV.

19. **This report sets out the findings of the first research workstream, focused on measuring the welfare enhancing benefits that can be delivered through housing-led regeneration as a result of its impact in helping to transform communities into successful, vibrant places**.

20. As well as the direct private benefit of new homes, captured as part of standard appraisal guidance through the measurement of land value uplift, housing-led regeneration can lead to a broad range of further external impacts (externalities). For example, internal case studies of Homes England projects have shown that at a local level this can include generating employment opportunities for local people, increased local spend in the economy, and social and environmental benefits through physical transformation and enhanced public realm.

21. Evaluation evidence also exists demonstrating the potential positive external impacts of regeneration[12]. However, while examples such as the Agency's intervention in Salford Central through the English Cities Fund highlight the scale of impact that can be achieved, a credible methodology has not previously been available

[10] HM Treasury Green Book (2022), p.5.

[11] The BCR and NPSV compare the present value of a stream of future costs and benefits to UK society (that are already in real prices), discounted over the life of a proposal by the appropriate Green Book social time preference rate (HM Treasury Green Book (2022), p.130). The BCR reflects the ratio of benefits to costs, while the NPSV is the total sum of benefits minus costs.

[12] Literature review of regeneration scheme evaluations, Centre for Regional Economic and Social Research, Sheffield Hallam University, 2019.

through which the overarching positive impact on place can be monetised. This limits the extent to which the benefits of projects such as Salford Central or the Agency's intervention in Digbeth, Birmingham (see case studies below) can be captured as part of an assessment of value for money. Working with analysts in DLUHC, Homes England has sought to address this gap through statistical modelling, drawing on past Agency interventions.

22. The specific aim of this research has been to assess whether housing-led regeneration projects have been able to create positive 'spillover'[13] or placemaking effects on adjacent areas. The research has then sought to establish the potential scale of these impacts, so that estimates can be applied to the appraisal of future interventions and incorporated as part of an assessment of value for money. It is important to note, that when applying the research findings, care will need to be taken to avoid the potential for double counting, particularly where separate estimates have been made of amenity benefits.

Case Study: Salford Central, The English Cities Fund

(Valette Square, Salford)
Image credit: Homes England

The English Cities Fund (ECF) works in partnership with councils, landowners, and key community stakeholders to deliver long-term and complex mixed-use schemes in some of the most deprived towns and cities of England. The fund has transformed challenging brownfield sites into thriving local communities and gateway destinations, while unlocking significant private capital. ECF has secured a number of schemes, including Salford Central, Salford Crescent, Canning Town and projects in St Helens and Plymouth with an anticipated total housing output of 10,600 homes and over 1.6 million square feet of office, retail, innovation zones and leisure space.

To date, ECF has started 2,700 homes, of which almost 2,200 have been completed. It has also delivered more than one million square feet of commercial, retail and leisure space and has improved the public spaces and transport links in the regions it has invested in. ECF's investment has also acted as a catalyst for further investment into these regions, as evidenced by the 18,000 homes that have been (or are in the process of being) built in Salford and the surrounding region.

In March 2022, Homes England, Muse Developments and Legal and General reaffirmed their commitment to this long-standing partnership until December 2036.

[13] Spillover effects relate to the wider external impacts (externalities) of an intervention beyond the initial area of impact.

Case Study: Warwick Bar, Digbeth

(Banana Warehouse, Digbeth, Birmingham)
Before image credit: Homes England. After image credit: Digbeth Loc. Limited

Homes England, in partnership with Digbeth Loc Limited, Stanhope PLC, Steven Knight and K4 Architects, are working together with Birmingham City Council and the West Midlands Combined Authority to bring MasterChef, a hotel, workspaces and other creative industry uses to the heart of Digbeth in Birmingham.

Birmingham City Council and the West Midlands Combined Authority have an ambitious vision for Digbeth, and are working to establish a thriving creative centre by reclaiming large areas of brownfield land and buildings adjacent to Birmingham City Centre and the new Curzon Street HS2 Station. Homes England's assembly and development of Warwick Bar – a collection of brownfield sites of strategic importance – is working to catalyse the wider regeneration of Digbeth. On Homes England's land, there is the potential to deliver around 900 new homes, 25,000 square metres of commercial floor space, new open spaces, public access to the canal network and space for the thriving creative industries based around Digbeth and beyond.

The project is a testament to the importance of partnership working in placemaking. Homes England's collaboration with a range of public and private sector partners ensures the combination of expertise and capital to develop a mixed-used scheme that will have a transformational impact on central Birmingham and the wider economy.

4. Approach

23. AMION Consulting was appointed by Homes England to assess whether housing-led regeneration projects had positive wider area impacts in the form of 'spillover' or placemaking effects. The nature/scale of such effects was assessed using post-development house price trends in areas adjacent to interventions, where net increases can be taken to reflect enhanced amenity through:

    - local environmental improvements and the removal of blight; and/or
    - more general market effects arising from, for example, enhanced confidence in the area and 'demonstration effects'[14].

24. The research builds upon a study undertaken for DLUHC[15] to support the evidence base on the displacement of supply-side housing interventions. The earlier study identified a range of potential placemaking impacts that were treated as wider benefits, rather than as part of the additionality assessment.

25. The analysis used a spatial discontinuity[16], quasi-experimental[17], pooled-cross-section hedonic framework[18] to examine the relationship between past Homes England interventions with placemaking objectives and post-intervention trends in house prices. These trends were assessed in distance-based rings proximate to the intervention and relative to a 'control' ring beyond which any price effect impact was not anticipated to occur. In most cases, the outer (control) ring was 2.5 km from the intervention site. The analysis controlled for housing type, area characteristics and spatial dependence.

26. The overall approach extended the use of conventional Hedonic Price Modelling (HPM), which is widely used in housing and real estate analysis and was also used in the DLUHC study that sought to assess displacement effects.

27. The HM Treasury Green Book, notes (p.59), *"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."*

28. The underlying premise of the HPM is that properties represent a 'bundle' of attributes which contribute to the market values observed through price transactions. HPMs attempt to assign the contribution of property characteristics to price transactions taking into account a range of location and amenity influences that are also likely to contribute to market value.

29. The approach built upon a framework of analysis outlined by Ahlfeldt and Kavetsos (2014) who examined the impact of new sports stadia on London property prices[19]. The authors point out that the key challenge in identifying the effect of a new stadium on surrounding property prices lies in the difficulty of separating the effect the facility exhibits on nearby properties from that of other locational characteristics.

30. They reference the similarities of the issue with broader experimental research, where individuals are observed before and after a treatment[20] and outcomes are contrasted with the level of treatment received. Focusing on change over time means that unobserved individual differences affecting an outcome, irrespective of

[14] Effects on the behaviour of individuals or businesses caused by the observation of the actions of others and their consequences.

[15] https://www.gov.uk/government/publications/the-additionality-of-housing-supply-interventions.

[16] Analysis either side of a spatial boundary/line/ring.

[17] An approach seeking to get as close to experimental random control conditions as is possible.

[18] Mixed cross section (area indicators) and times-series (house prices) model.

[19] Ahlfeldt, Gabriel M. and Kavetsos, Georgios (2014) Form or function?: the effect of new sports stadia on property prices in London. Journal of the Royal Statistical Society: Series A (Statistics in Society), 177 (1). pp. 169-190.

[20] Treatment in this context means the new intervention e.g. sports stadium / development.

treatment, can be controlled for (on average). This process allows for more appropriate isolation of treatment effects and is effectively a quasi-experimental methodology corresponding to difference-in-differences (DiD) analysis[21].

31. The study compared changes in property prices in areas likely have been affected by the stadium (treatment) with changes in prices of properties located further away which were unlikely to have been affected (control), pre and post development. A number of alternative metrics are examined as the basis of a distance measure from the stadium development among which is a series of consecutive, mutually exclusive, distance rings extending out to a 'control' ring. It is argued that the ring approach allows for a non-linear effect of development on surrounding properties, with ring price differentials effectively representing a series of DiD outcomes relative to the control ring. The close proximity of the rings to each other also provides a credible mechanism to address unobservable, local area heterogeneity[22] [23].

Project selection

32. The analysis extended this quasi-experimental methodology to the assessment of spillover effects across a sample of Homes England schemes, funded with the ambition to both regenerate areas and increase the supply of housing. Using data from Homes England, the study aimed to provide evidence as to the magnitude and extent of any spillovers across a sample of development schemes in which Homes England participated.

33. Homes England selected case study projects that were completed by 2018 in order to provide sufficient data post completion, which met all or some of the following criteria:

- Housing-led with a regeneration focus – housing projects or mixed-use schemes that comprised a high proportion of housing located within an area of deprivation and/or blight that were designed to help achieve the wider regeneration of an area.
- Market making focus – projects designed to introduce new housing products into a housing market, to diversify the nature of the stock in an area.
- Quality of design – projects that had incorporated high design standards, in order to attract demand and promote the wider enhanced image of the area.
- Poor existing site condition.

34. In total, 65 individual projects were identified in urban areas, although a number of these were grouped together because they were located within the same area. The latter were modelled together in order to assess the impact of more comprehensive area-based interventions. In total 35 case study areas were assessed, with 32 taken through for detailed modelling (Annex B). These had completion dates between 2009 and 2018. The case studies were located in 30 local authority districts. In total, the modelled projects supported the delivery of 8,901 new homes, with an average of 137 per project.

Technical summary of statistical modelling

35. Following HPM convention, the core of the model involved regressing the log price of property (i) transacted at time (t) (P_{it}) on a vector of property and location (amenity) characteristics (Y_m) but with the addition of ring location variables (X_{in}) and a post-completion indicator ($POST_t$) which took a unit value after scheme completion or otherwise zero.

$$\log (P_{it}) = \beta_1 (X_{in}) + \beta_2 (X_{in} \times POST_t) + \sum_m \gamma_m Y_{itm} + \sum_t \varphi_t y_t + \sum_q \psi_q c_q + (\varepsilon_{it})$$

[21] DiD contrasts differences in the profiles of treatment (the intervention e.g. stadium) and control groups before and after an intervention to identify treatment effects.

[22] This process seeks to satisfy conditional independence (CIA) and single unit treatment value (SUTVA) assumptions whereby, absent of intervention, the pattern of average outcomes/performance for treated and untreated 'units' is the same and intervention does not affect outcomes for the control group.

[23] The proximity of rings also helps to counter potential endogeneity (e.g. wider regeneration of an area may determine transactions/prices rather than the development under review) since we can assume that any such wider policies impact rings to broadly the same degree.

36. Year/time-of-year variables (yt) were included to control for broader macroeconomic and seasonal trends common to the local area. Location fixed effects (cq) were incorporated to account for time-invariant location characteristics and standard errors were clustered on postcodes to account for potential serial correlation in the error term[24].

37. The baseline model was extended by attempting to control for competing/overlapping development in two ways. In the first instance, Homes England identified sites likely to have been built-out within the ringspace used for modelling impacts within relevant timelines. Secondly, new postcodes added to the postcode register were identified both prior to and post completion of schemes within each ringspace as a proxy for competing residential property development.

38. Despite the inclusion of multiple years of transactions, the model was essentially cross-sectional in nature as detailed georeferenced data on most amenity variables are not available across the years covered within the exercise. While the fixed-effects procedures adopted address issues of heterogeneity, along with the spatial dependence adjustments (see below), there remains (as in all hedonic studies of this nature) the potential for unobserved, time-varying heterogeneity within the models.

Ring size

39. There was no particular evidence as to the size or radius of the rings and no indication of the 'ring position' of the control ring that should be adopted for this modelling approach. Ahlfeldt and Kavetsos (2014) take a pragmatic perspective and define rings on the basis of securing an adequate population of transactions across rings, extending rings outwards to a distance of some 5km.

40. Following the DLUHC research on displacement effects[25], the approach taken assumed a broad relationship between ring size and scheme size. The schemes reviewed varied in size and covered varying footprints. It was possible to find relatively low numbers of units in a development that had a larger footprint than, say, a high volume development/conversion of a single apartment block.

41. This made the selection of ring size somewhat complex, and the study adopted a protocol of using the following to be consistent with the DLUHC study[26]:

    - 0.25km radius ring for schemes with less than 150 units or large unit numbers on a relatively small footprint;
    - 0.5km radius ring for schemes with 150 to 500 units or large unit numbers on a moderate footprint; and
    - 0.75km radius ring for schemes with 500 to 1,500 units or large unit numbers on a typically large footprint.

42. With an overall sample of 32 schemes, this process defined 17 schemes for the 0.25km ring model, 11 for the 0.5km model and 4 for the 0.75km model. Following the approach of Ahlfeldt and Kavetsos (2014), the control ring was set at 10 rings from the development in all instances which implies a 'control' of just over 2km for the 0.25km rings, 4km for the 0.5km rings and 6km for the 0.75km rings.

43. The rings were also structured in a slightly different manner from Ahlfeldt and Kavetsos (2014). The study defined ring 1 to be the footprint of the scheme itself. Ring 2 was defined as including all transactions within a (0.25/0.5/0.75 km) radius of the centroid of the development but not included within the footprint of the

[24] Ahlfeldt and Kavetsos (2014) outline the basis of the specification.

[25] https://www.gov.uk/government/publications/the-additionality-of-housing-supply-interventions.

[26] Developments have different 'core' size/scale and are likely to have different spillover ranges. It would not make sense to have narrow rings with large development as spillovers: may conceivably extend beyond the full set of narrow rings; may not capture any spillovers; and may extend into the control ring, invalidating the approach.

development. Rings beyond ring 2 were defined according to the radius model employed. In analysing spillovers, the study focused on rings 2 to 9.

44. This approach to ring definition brings with it a risk of low transaction numbers in semi-urban or rural environments or in cases where the development footprint dominates small-radius inner rings. There may also be occasions when low numbers occur within rings at a more extended range from developments, reflecting the nature of local topographies. In practice, only one potential scheme was set aside for such reasons as part of this study.

45. Another complicating feature of the analysis is the possibility that schemes under review are part of broader phased developments, in which case units from the earlier phase are contained in surrounding rings. Homes England provided annual breakdowns of site development for each scheme in the study, so that phasing could be identified. In some instances, a single scheme was also defined to reflect the broader footprint associated with close/proximate phased development in the same locality. In these cases, the impact was assessed upon completion of the final phase with ring radius defined on the basis of combined units.

46. While the study transferred the methodology from Ahlfeldt and Kavetsos (2014) to the housing development environment, the approach was extended by including a broader set of amenity variables and introducing spatial filters to address potential spatial dependence.

Amenity variables

47. Amenity variables play an important role in HPMs, controlling for a wide range of locational influences on property prices. As the focus of the research was on relative price trends rather than making inferences about specific amenity variables, the study followed previous practice in the DLUHC displacement research[27] and used dimensionality reduction[28] to reflect underlying patterns in the amenity dataset.

48. Principle Component Analysis (PCA)[29] was used to construct principal components for the amenity dataset and effectively undertake a PCA for specific ring models within each scheme modelled. While it is common practice to focus on only the primary components, the misconception that components with small variance are of no value in regression frameworks is avoided and includes more than just those with eigenvalues higher than 1. The maximum number of components for any model is limited to 20[30] and the study did not rotate components.

Spatial dependence

49. It is common for observations to be correlated in terms of time, subgroup clusters or spatial distribution. To address potential spatial dependence, the research constructed a series of spatial filters for each individual scheme. The research also considered the fact that the property transactions dataset geocodes properties to postcodes. As such, multiple transactions are coded to the same coordinates. This issue was addressed by adjusting filters to allow for spatial grouping of observations using the routines developed by Murakami in the spmoran R package[31].

[27] https://www.gov.uk/government/publications/the-additionality-of-housing-supply-interventions.

[28] Dimensionality reduction represents variation contained in a dataset with a new, but smaller, set of variables which are uncorrelated. Principal Components Analysis (PCA) is one method of achieving this and is employed for each ring model. The maximum number of components for any model is limited to 20.

[29] Transforming a dataset (of given dimensionality) into a new reduced dimension dataset that is orthogonal and retains as much of the initial data geometry as is feasible, is a common undertaking in many disciplines. In practice, both linear and non-linear approaches are available within broader convex and non-convex frameworks. Principal Component Analysis (PCA) is the most common of the more prevalent convex frameworks that typically require eigen-decomposition of full or sparse (spectral) matrices. Reduction is achieved by embedding datasets into a linear subspace of lower dimensionality with the projection maintaining as much data variance as possible. The leading eigenvectors outline a series of uncorrelated linear combinations of the variables and typically contain most of the variance in the dataset.

[30] Jolliffe, I T. (1982) A Note on the Use of Principal Components in Regression, Journal of the Royal Statistical Society, Series C, Vol 31, 3, 300-303.

[31] https://arxiv.org/abs/1703.04467.

Data

50. The transactions data used in the research was sourced from the UK Land Registry Price Paid dataset[32]. The dataset contains all domestic transactions since 1995 and includes information relating to type of property (including whether it is a new build), nature of tenure, date of sale and postcode.

51. Land Registry data does not provide any indication of other property attributes that are available in bank/building society databases (for example, number of rooms/bathrooms) but it has coverage across all geographies whereas the coverage of the latter, at small area level, will reflect the market position of the mortgage provider[33].

52. The research partially compensated for the absence of more detailed property characteristics by merging Land Registry transactions with DLUHC Energy Performance Certificate (EPC) data. The EPC dataset contains a range of intelligence, the most important of which for the purposes of the research was the floorspace of properties. Matching the Land Registry Price Paid and EPC datasets on the basis of address data, a match rate of some 80% on average was achieved, broadly comparable with other studies that have performed the same task.

53. Property size is a reasonable proxy for number of characteristics not included in the Land Registry Price Paid data but is only effectively available from 2008/09. Since the sample of schemes had completion dates around this point, the study ran versions of the models with floorspace included and excluded.

54. This does bring to the fore the issue of potential bias through omitted variables, though there are very few hedonic approaches that can legitimately claim to be free of such risk. Adjustment for spatial dependence, to the extent there are pronounced spatial patterns in the size/scale of properties, may partially compensate as may fixed effects procedures.

55. In common with other studies, a dataset of amenity variables was assembled and used to reflect potential location specific (observable) influences on transaction prices. As noted above, despite the inclusion of multiple years of transactions, the model was essentially cross-sectional[34] in nature as detailed georeferenced data on most amenity variables are not available across the years covered within the exercise. Variables assembled included:

- Index of Multiple Deprivation (IMD) ranking position (Lower Super Output Area (LSOA)).
- Household income (Middle Super Output Area (MSOA)).
- Journey times:
  - Walking to nearest primary/secondary schools, town centre (LSOA).
  - Driving to nearest primary/secondary schools, food source, GP, town centre, station, location with up to 5000 jobs, location with 5000+ jobs (LSOA).
  - Distance to nearest bus stop, underground or DLR (Postcode).
- Ofsted rating of nearest primary/secondary schools.
- PM2.5 pollution (Postcode).
- Crime density (Postcode).
- Property density by property type (LSOA).
- Proportion of properties in Council Tax bands A/B and F to H (LSOA).
- Age profile of properties (LSOA).

[32] Land Registry Price Paid Database.

[33] More recently, the ONS has partnered with Zoopla to gather information on property attributes in modelling the impact of proximity to greenspace, https://www.ons.gov.uk/economy/environmentalaccounts/articles/urbangreenspacesraisenearbyhousepricesbyanaverageof2500/2019-10-14.

[34] All the amenity variables are considered at a single point in time as opposed to a longitudinal analysis where the variables would have been observed over a given period of time.

56. All models include controls for property attributes, year and month of sale, floor area (where available), principal component amenity variables, location fixed effects and spatial filters. The sample contained 32 schemes with completion dates covering the period 2009 to 2018. Table 1 highlights scheme level characteristics and shows that around 11 of the 32 were sized under 100 units, 8 between 100 and 200 units, 9 between 200 and 500 units with 4 over 500 units. Some 28% were located in the South East, 19% in the North West, 16% in the South West followed by 13% in London with other schemes spread across the remaining regions in England. The East and East Midlands had the smallest number of schemes. Table 1 also illustrates the ring models used in the analysis, showing that the narrow ring model dominated with 17 of the 32 (53%) schemes using the 0.25km ring structure, 11 (34%) using the 0.5km structure and just 4 (13%) using the 0.75km structure.

Table 1: Sample Scheme Characteristics	
Completion	**Total**
Schemes	32
Size (No. of gross units)	
<100	11
100-200	8
200-500	9
500+	4
Region	
East	1
East Midlands	1
London	4
North East	1
North West	6
South East	9
South West	5
West Midlands	2
Yorkshire and the Humber	3
Ring Model	
0.25km	17
0.5km	11
0.75km	4
1km	-

5. Findings

Statistical modelling results

57. Table 2 details the distribution of observations across models by size-band, coefficient of determination values (R^2) and root mean square error values (RMSE). The smallest samples occurred in the smallest schemes, indicative of narrow ring models, with sample sizes expanding across larger schemes. R^2 values were typically in the 0.7 to 0.9 range with RMSE values ranging between 0.15 to 0.3, broadly similar to outcomes in the DLUHC research on displacement effects.

Table 2: Model Performance Profiles				
Size Band	**<100**	**100-200**	**200-500**	**500+**
Schemes	11	8	9	4
		Observations		
Min	3284	3918	5483	38681
Max	17931	39130	51865	99652
		R^2		
Min	0.698	0.757	0.734	0.750
Max	0.839	0.879	0.877	0.818
		RMSE		
Min	0.155	0.154	0.158	0.232
Max	0.285	0.286	0.301	0.257

58. Figure 1 and Table 3 summarise the pattern of significant post development ring coefficients across all models and for the conventional three levels of significance. It shows that there existed 80 significant post development coefficients at the p<0.1 threshold, some 28% of the 288 coefficients modelled, a figure that declined to 33 (11%) at the p<0.01 threshold. Significant coefficients tended to be clustered towards the inner rings of the models, as one might expect if there exist spillover effects – some 61% of significant coefficients were located in rings 2 to 5 at the p<0.01 level, rising marginally to 64% at the p<0.1 level.

59. Likewise, 40% of such coefficients lay in rings 2 and 3 for the p<0.1 threshold with 46% at the p<0.01 threshold, which contrasted with around 24% and 18%, respectively, in the bottom three rings. Around 65% and 70% of significant coefficients in inner rings 2 to 5 were in rings 2 and 3 respectively, with the bulk of significant ring 6 to 9 coefficients in rings 6 and 7.

Figure 1: Distribution of Significant Ring Coefficients

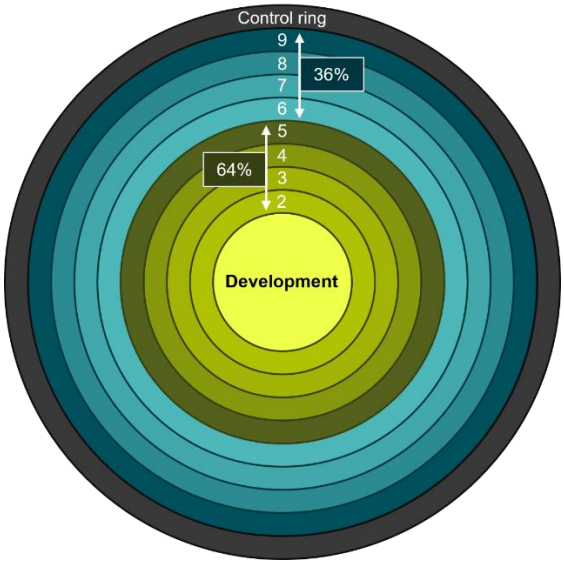

Table 3: Model Performance profiles - Significant Ring Coefficient Summary									
Rings	**R2**	**R3**	**R4**	**R5**	**R6**	**R7**	**R8**	**R9**	**Total**
Significant Ring Coefficients									
1% Level	10	5	2	4	6	4	1	1	33
5% Level	18	6	6	5	8	5	4	1	53
10% Level	21	11	9	8	12	9	7	3	80
Significant Ring Coefficients (% of Total)									
1% Level	30.3	15.2	6.1	12.1	18.2	12.1	3.0	3.0	100
5% Level	34.0	11.3	11.3	9.4	15.1	9.4	7.5	1.9	100
10% Level	26.3	13.8	11.3	10.0	15.0	11.3	8.8	3.8	100
Significant Ring Coefficients (% of R2/R5)									
1% Level	47.6	23.8	9.5	19.0	-	-	-	-	100
5% Level	51.4	17.1	171	14.3	-	-	-	-	100
10% Level	42.9	22.4	18.4	16.3	-	-	-	-	100
Significant Ring Coefficients (% of R6/R9)									
1% Level	-	-	-	-	50.0	33.3	8.3	8.3	100
5% Level	-	-	-	-	44.4	27.8.	22.2	5.6	100
10% Level	-	-	-	-	38.7	29.0	22.6	9.7	100

Impact simulations

60. The final element of the analysis looked further into the pattern of net change across projects as described above. The study investigated the extent to which: there was evidence of any broad relationship between the HPM ring performance profiles and other dimensions of interest; and whether the analysis could underpin future guidance criteria. This analysis combined the developments from both the DLUHC research into displacement effects and the Homes England sample to provide sufficient observations. Overall, this modelling was based on 104 case studies.

61. Price performance was assessed against the size, type, density and location of schemes through scheme-level information. Additional controls included year of completion and the version of the ringmodel used in HPM modelling.

62. Local development was proxied by generating a specific ring footprint measure. This was achieved by taking the area of postcodes included in the ring footprint as at completion date and measuring the proportion of that area that lay in postcodes introduced over the previous eight years. Affordability was represented via the ratio of average property prices to earnings for year of scheme completion.

63. Analysis was undertaken within a semi parametric Generalised Additive Model for Location, Scale and Shape (GAMLSS) framework. Traditional statistical models make assumptions about the nature of relationships between response variables and model drivers. GAMLSS models are more flexible and permit a wider range of potential relationships to be tested. In this case we adopt an approach using cubic splines to model non-linear price variation against a number of project and scheme characteristics (including type of scheme, year of development, number of units, local development trends and region) and subsequently use model parameters to generate simulations of price relationships in the context of different combinations of characteristics.

64. The number of units delivered, rate of housing development in adjacent areas and scheme size were all identified as significant factors in explaining net price patterns. In terms of spatial profiling, and controlling for the above features, the modelling indicated that project performance across the North[35], Midlands[36] and South East was more positive than across London, South West and East regions. While outcomes for the South West

[35] North East, North West, and Yorkshire and the Humber.

[36] West Midlands and East Midlands.

and East reflected more limited project performance than elsewhere, it is not clear why these regions should perform substantially worse than other areas. To offset any sample selection issues, the mid-point impact based of the range between London and the South East (the lowest and highest impact areas) was used to approximate impact in the East and South West.

Table 4: Impacts table - % uplift to residential capital value

Region	No. of gross units	Low Development (LD)	Medium Development (MD)	High Development (HD)
North (North East, North West, Yorkshire and the Humber)	<100	0.80%	0.55%	0.12%
	100-250	1.50%	1.24%	0.82%
	250-500	2.76%	2.50%	2.08%
	500+	2.05%	1.67%	1.39%
Midlands (East Midlands, West Midlands)	<100	0.96%	0.71%	0.28%
	100-250	1.66%	1.40%	0.98%
	250-500	2.92%	2.66%	2.24%
	500+	2.21%	1.78%	1.49%
East & South West (East of England, South West)	<100	0.66%	0.53%	0.32%
	100-250	1.01%	0.88%	0.67%
	250-500	1.94%	1.68%	1.30%
	500+	1.49%	1.15%	1.01%
South East	<100	1.31%	1.06%	0.63%
	100-250	2.01%	1.75%	1.33%
	250-500	3.27%	3.01%	2.59%
	500+	2.56%	2.01%	1.87%
London	<100	0.00%	0.00%	0.00%
	100-250	0.00%	0.00%	0.00%
	250-500	0.61%	0.35%	0.00%
	500+	0.41%	0.29%	0.15%

Note: rate of development refers to total % change in the stock of houses in the impact area over the last four years, low (<4%), medium (4%-12%), high (>12%). See further guidance below.
Note: The impacts for the East and South West are based on the mid-point impact between London and the South East[37]

65. **Table 4 shows the simulated increase in housing stock capital value by grouped regions for urban areas with varying numbers of units supported, and local rates of recent development.** The latter is based on an analysis of the percentage change in the stock of houses in the impact area over the period 2015 to 2019, with low development defined by less than 4% growth, medium development by 4% to 12% and high development by over 12%. The analysis approximates an average or typical scheme reflecting the specific sample of project.

66. Although values differ across regions, there is consistency in the simulation patterns across size and recent development profiles. Values initially rise with numbers of units before peaking and declining as scale of development becomes large/very large. Values are also higher in areas in which there has been relatively low recent housing development and decline in relation to the scale of recent development. As such, very large-scale schemes in areas of high recent development are attributed the lowest placemaking gain.

[37] The modelled results for the East and South West region were as follows:

No. of gross units	Low Development (LD)	Medium Development (MD)	High Development (HD)
<100	0.00%	0.00%	0.00%
100-250	0.00%	0.00%	0.00%
250-500	0.94%	0.68%	0.26%
500+	0.63%	0.46%	0.26%

67. The simulations are 'predictions' given a set of baseline characteristics/values and the parameters reported by the semi-parametric modelling. In terms of the latter, modelling suggests that:

    a. Simulations for projects sized <250 units are likely to be very robust, 250 to 500 units moderately robust, >500 units least robust.
    b. Simulations for projects in areas where here has been low recent development are likely to be very robust, medium recent development moderately robust, and high recent developments least robust.[38]

[38] The rate of development refers to the total percentage change in the stock of houses in the impact area over the last four years, where low recent development is <4%, medium recent development is 4%-12% and high recent development is >12%.

6. Conclusion

68. Housing-led regeneration has the potential to generate a wide range of benefits, not just for those who occupy the new homes created but also for those living and working within the surrounding community. While there have been case studies of previous interventions that have demonstrated the possible scale of these effects, it has been difficult to quantify and monetise the placemaking impact of housing-led regeneration as part of an ex-ante appraisal. This has limited the ability of metrics such as the BCR to fully reflect the true social value that can be created through interventions of this type, presenting challenges for decision makers.

69. Homes England has addressed this evidence gap through commissioned research, specifically targeted at determining the potential nature and size of placemaking effects from housing-led activity. **The research has identified that residential investments, as part of projects with clear placemaking and regeneration objectives, can create significant positive wider area impacts. This has been evidenced using a hedonic pricing methodology applied to a sample of previous Homes England projects.** Statistical modelling has been used to generate a set of uplift factors, ranging from 0% to over 3%, that can be applied to the housing capital stock value in a given impact area in order to estimate the potential scale of placemaking effects.

70. Working with analysts in DLUHC, Homes England has developed guidance to enable the findings of the research to be applied in practice. The detailed guidance is set out within Annex Gi of the DLUHC Appraisal Guide and is also summarised within **Annex A** of this report. It should be noted that the application of this research should only be used for projects within urban areas which are part of a programme of funding that has clear placemaking and regeneration objectives. Care should also be taken to avoid double counting, particularly where separate estimates have been made of amenity benefits.

7. Annex A: Guidance on assessing wider area impacts

Introduction

1. This annex describes how the wider area impacts of supply-side housing interventions with explicit placemaking and regeneration objectives can be assessed and monetised as part of the assessment of value for money. This guidance can also be found in the DLUHC Appraisal Guide (2023). **For wider area impacts to be relevant, the intervention must be part of a programme of funding that has clear placemaking and regeneration objectives and has explicitly established the importance of housing as a mechanism for supporting regeneration plans**. The criteria for inclusion are set out in the next section. All of these must be demonstrated to have been met, using robust evidence, otherwise wider area impacts cannot be considered in the value for money assessment.

Criteria for inclusion

2. The wider area impacts of housing interventions should only be assessed for projects that fulfil the following criteria:

    - Are supply-side housing interventions and address housing needs.
    - Are located in a place where housing has been identified as a driver for regeneration.
    - Are located within an urban area, that is a town or city setting, and typically would be brownfield sites.
    - Are of a significant scale relative to the local housing market, and not anticipated to be below 50 units.
    - Have clear placemaking and regeneration objectives that are likely to result in new uses and activities that make the surrounding area become more desirable.

3. The justification for including wider area impacts must be clearly linked to the programme funding objectives, the underlying rationale for the intervention, the socio-economic context and the objectives of the project as set out in the strategic dimension of the business case. The market failures should also be clearly set out and are likely to relate to providing positive externalities or extensive public good provision.

4. Based on the underlying research and previous housing interventions with wider area impacts, it is anticipated that such impacts are only likely to be relevant where schemes exhibit one or more of the following attributes:

    - A prominent site that will address significant negative externalities caused on site that impact the surrounding area, such as removing existing blight or remediating brownfield land.
    - A housing scheme that, as well as addressing housing needs, delivers a range of other significant amenity benefits such as open space, active transport (cycleways, pathways), other recreational uses and employment opportunities that will serve and benefit existing residents in the wider area.
    - A scheme that is part of a wider placemaking strategy and aims to transform a particular place to help restore and enhance the perception and viability of that location. This could be in the form of providing a critical mass of housing, education, leisure, employment uses and/or delivering a broader range of community infrastructure.

5. Importantly, in all cases it must be clearly evidenced how the intervention addresses the needs of the surrounding area. This should be set out in the Theory of Change for the project which clearly demonstrates how the intervention will give rise to positive wider placemaking impacts. This will include setting out the following:

    - **Strategic context, underlying rationale, and project objectives:** to understand how the intervention is addressing key challenges in the local area and beyond the site itself.
    - **Inputs:** to the project, such as the level of investment, complementary activity and private sector investment leveraged.

- **Activities:** that will be covered by the project. Wider area impacts are only likely to be relevant if the following types of activities are included, which improve wider placemaking:
    - Removal of blight, for instance, through demolition and remediation works or relocation of bad neighbour uses.
    - Provision of high-quality development (residential, commercial, or mixed use) of sufficient scale to enhance the overall image and perceptions of the wider area.
    - Provision of housing supply that addresses barriers to growth, in particular labour market constraints.
    - Provision of employment floorspace that facilitates the attraction of new, high value economic activity.
    - Infrastructure provision, in sufficient scale to clearly benefit the surrounding local area. This is likely to comprise one or more of the following:
        - Provision of green or blue space.
        - Public realm improvements.
        - Connectivity improvements such as walkways, cycleways, canals, and bridges.
        - Significant community infrastructure, that is expected to benefit the wider area.
- **Outputs**: of the project, which should link to the underlying rationale for intervention, such as redevelopment of brownfield land, and new economic, environmental, and social opportunities.
- **Outcomes**: of the project, which should clearly include long-term economic and regeneration goals that the intervention is seeking to achieve. For larger projects this could include the transformation of the entire area as a place to live, work and visit. It could also support wider city growth and create markets for new, high-quality housing. For smaller projects this is likely to relate to enhanced townscape, enhancement of community assets and improved amenity of the local area.
- **Impacts**: of the project, as measured by improved wellbeing across the wider area. For wider area impacts this can be measured through higher house prices in the surrounding area, which act as a proxy for this welfare gain.

6. In cases where the project is part of a wider set of interventions which collectively address underlying socio-economic challenges, the justification for including wider area impacts must be clearly explained in relation to the role of the project in isolation and combined with other interventions. The dependencies and costs associated with the wider public sector intervention and other funding programmes should be clearly identified, and impacts attributed accordingly.

Step by step guide

7. Once it has been confirmed that wider area impacts are relevant for the project, the following steps should be undertaken to monetise the impacts as part of the Benefit Cost Ratio (BCR calculation). Table 7 details the accompanying data sources which have been based on publicly available data. In some cases, the user may be able to justify using different data (e.g. local bespoke data, to estimate residential capital stock and value, which is acceptable if fully sourced).

1) Identify the impact area

8. The impact area should be initially identified as a 1.5km or 2.5km radius of the scheme, using the centroid[39] of the site, and based on the constituent Lower Layer Super Output Areas (LSOAs).

9. A variety of postcode/LSOA lookup tables are available online or from the Office of National Statistics (ONS) but where possible it is recommended that the impact area should be clearly mapped using Geographical Information Systems (GIS), to understand the area included.

[39] Using the centre of the development site as the basis of distance calculations.

10. As a starting point, schemes below 1,000 units should use a 1.5km impact area whilst schemes over 1,000 units can use a 2.5km impact area but must include the 1.5km impact area as a sensitivity test. The 2.5km area should only be used if fully justified by local analysis of the impact area.

11. A best fit LSOA approach should be used based on a population centroid approach, so that LSOAs where the majority of the population is located within the impact area are included. This should then be supplemented carefully by further analysis of the geography and local knowledge and consider excluding/including certain LSOAs where relevant, for instance:

    - Where the project is clearly unlikely to influence certain areas within the impact area. For example, a city centre scheme which incorporates a large element of the city centre that may be already regenerated, and the scheme is unlikely to have a significant impact.
    - Where there is a clear demarcation between an area and the site, for example a large park, river, or road, and the two areas are not closely linked.
    - Where the opposite may be true and the impact area appears too narrow given the importance of the scheme. For example, a scheme that is transformational and will have a significant impact on a town's image.
    - The impact area should be clearly explained and justified, with careful analysis of the impact of including/excluding certain areas where necessary. This is particularly important for larger schemes when justifying the selection of the 2.5km impact area.

2) Calculate the quantity of the existing residential housing stock

12. The existing housing stock within the impact area should be calculated by using Valuation Office Agency (VOA) Council Tax: Stock of Properties data provided by LSOA[40], to identify the number of properties (by property type) in the footprint. Property types should include flats, terraced, semi-detached/bungalow and detached.

13. The latest data should be selected to calculate existing stock as well as a comparison to 4 years ago to understand how stock has changed. For example, in 2022, the latest full year's data on the housing stock will be FY 2021/22 and the comparison should be to FY 2017/18 housing stock. This should not include any non-residential property.

3) Calculate the rate of development

14. The absolute growth in total units in the impact area over the last 4 years should then be calculated to identify the rate of development:

    - Low development – less than 4% growth.
    - Medium development – 4% to 12% growth.
    - High development – over 12% growth.

4) Calculate the current stock value

15. The current stock value should then be estimated by LSOA by property type. The Land Registry Price database[41] provides the most granular detail by location and property type. It can be used to match sales values by type by postcode to LSOAs.

16. In some instances (especially for detached properties) there are missing entries in the Price Paid data and the user will need to proxy the median price by type based on other values. These could be the Middle Layer Super Output Area (MSOA), the surrounding LSOAs, or if these do not exist, the average LSOA or MSOA property price.

[40] Valuation Office Agency: Council Tax statistics - GOV.UK (www.gov.uk).

[41] Land Registry Price Paid Database.

17. Once the geographies are matched and sales values identified, the current stock value should then be estimated by multiplying the housing stock by type by median sales value and by LSOA, and then summing the totals.

5) Select an uplift factor

18. Based on the rate of development (Step 3), the size of the scheme and location, select the relevant uplift factor as detailed in Table 5: Impacts table - % uplift to residential capital value within the impact area.

Table 5: Impacts table - % uplift to residential capital value

Region	No. of gross units	Low Development (LD)	Medium Development (MD)	High Development (HD)
North (North East, North West, Yorkshire and the Humber)	<100	0.80%	0.55%	0.12%
	100-250	1.50%	1.24%	0.82%
	250-500	2.76%	2.50%	2.08%
	500+	2.05%	1.67%	1.39%
Midlands (East Midlands, West Midlands)	<100	0.96%	0.71%	0.28%
	100-250	1.66%	1.40%	0.98%
	250-500	2.92%	2.66%	2.24%
	500+	2.21%	1.78%	1.49%
East & South West (East of England, South West)	<100	0.66%	0.53%	0.32%
	100-250	1.01%	0.88%	0.67%
	250-500	1.94%	1.68%	1.30%
	500+	1.49%	1.15%	1.01%
South East	<100	1.31%	1.06%	0.63%
	100-250	2.01%	1.75%	1.33%
	250-500	3.27%	3.01%	2.59%
	500+	2.56%	2.01%	1.87%
London	<100	0.00%	0.00%	0.00%
	100-250	0.00%	0.00%	0.00%
	250-500	0.61%	0.35%	0.00%
	500+	0.41%	0.29%	0.15%

Note: rate of development refers to total % change in the stock of houses in the impact area over the last four years, low (<4%), medium (4%-12%), high (>12%). See further guidance below.
Note: The impacts for the East and South West are based on the mid-point impact between London and the South East[42]

6) Apply the uplift factor and calculate the gross impacts

19. Multiply the current stock value by the uplift factor to calculate the gross economic gain.

7) Incorporate impacts into the Cost-Benefit Analysis and adjust for additionality

20. The gross wider area impacts should then be incorporated within the wider benefits of the economic appraisal, inputted in the correct price base, adjusted for growth in real terms GDP and discounted over time. Unless there is supporting evidence to suggest otherwise, the gross impacts should be inputted on a pro-rata basis against the profile of units delivered.

[42] The modelled results for the East and South West region were as follows:

No. of gross units	Low Development (LD)	Medium Development (MD)	High Development (HD)
<100	0.00%	0.00%	0.00%
100-250	0.00%	0.00%	0.00%
250-500	0.94%	0.68%	0.26%
500+	0.63%	0.46%	0.26%

21. The gross wider area impacts should then be adjusted for additionality to derive the net impacts. This should consider both:

- Deadweight in terms of the wider area impacts that would have occurred without the intervention. The default is for this to be based on the same assumptions as for the overall housing delivery, e.g. if 10% of the housing is delivered under the counterfactual, 10% of the wider area impacts should be counted as deadweight. In some cases, there may be strong justification to vary this. However, this would need to be clearly set out.
- Displacement in terms of the wider area impacts that would have occurred elsewhere from displaced housing activity. Prudently the default is to assume that displaced activity would have the same level of wider area impacts. Therefore, as a rule of thumb, it should be assumed that the displacement rate applied to the number of housing units delivered should also be applied to the wider area impacts.

8) Sensitivity analysis

22. Sensitivity testing should be undertaken, including to reflect project specific circumstances where local evidence is available. Alongside scheme specific sensitivity testing, particularly around the size of the impact area, it is recommended the following impact value ranges based on the rate of development category and unit numbers of the scheme should be applied. This is applied as shown in Table 6. These are based on the research findings regarding underlying development and location features. The sensitivity testing should apply the positive and negative percentage adjustment to discounted wider area impacts to understand how the BCR would change.

Table 6: Sensitivity analysis – impact value ranges

Number of units	Low Development (LD)	Medium Development (MD)	High Development (HD)
<250	+/- 5%	+/- 10%	+/- 15%
250–500	+/- 10%	+/- 15%	+/- 20%
500+	+/- 15%	+/- 20%	+/- 25%

Further adjustments and clarifications

Adjustments to reflect local circumstances

23. The modelling upon which the guidance is based reflects the underlying profile of development schemes included in the original research. It is inevitable that circumstances will arise in which proposed developments are atypical and may exhibit significant characteristics that, based on detailed local analysis, could arguably provide wider area impacts above those recorded in the original research. In this situation, the above analysis should be undertaken to provide a baseline for discussion, with an opportunity to introduce additional evidence as to local impacts. For example, the existing site may have very substantial negative externalities associated with e.g., adverse visual and odour effects. The removal of these may well have a more significant placemaking impact than those identified through the impact factors in Table 5: Impacts table - % uplift to capital value.

24. In these atypical cases, a higher or lower impact rate should be applied based on local evidence. However, the impact using the standard uplift rates shown in Table 5 should also be included in the appraisal as part of sensitivity testing. Strong evidence must be provided to apply a higher uplift than in Table 5.

25. As outlined under Step 1, it may also be relevant to adapt the impact area to reflect the local market and scheme characteristics. This should be clearly set out and justified, alongside presenting the values for the default radius impact area.

Option appraisal

26. Due to the available sample data, the effects and therefore impact uplifts have been assessed for a broad range of unit outputs and thus it may be difficult to differentiate between options where, for example, all schemes will deliver over 1,000 homes. In these cases, it is proposed that the placemaking impact is assessed for the largest option and that the appraiser then uses project specific evidence to adjust the scale of impact accordingly for each alternative option. As a rule of thumb, it is recommended that this is based on a pro-rata basis, using the number of housing units.

Applying the impact model to a programme or multiple projects in the same local area

27. There may be circumstances where a programme is proposed or there are multiple connected projects. Care will need to be taken not to 'double count' the wider placemaking impact. The appraiser will need to use local evidence to determine the most appropriate way to ensure that this does not happen. For example, it may be appropriate to model the impact area around a number of postcode/LSOA areas to reflect the broad spread of projects/programmes and then allocate the impacts on a pro-rata basis between individual projects.

Potential for double counting

28. There will be potential for double counting with other external impacts that result in the wider area becoming more desirable. The following approach should be applied when considering other types of external impacts:

    - Amenity benefits – DLUHC's Appraisal Guide provides an overview of how to estimate the external amenity benefits to the surrounding area of redeveloping brownfield sites. These benefits are likely to represent double counting if wider area impacts are included and unless there is significant justification otherwise, they should be excluded.
    - Transport benefits – if a scheme includes significant transport provision the appraiser should carefully consider the scope for double counting if including both transport and wider area impacts. This will depend on the nature and scale of the transport provision and who the ultimate beneficiaries are, with the scope for double counting likely to be highest where the transport scheme directly benefits the residents of the surrounding area. The appraiser would need to clearly identify and categorise the type of benefits arising from a scheme with housing and transport impacts and the best approach to monetising these, including any potential duplication[43].

Worked example

29. A residential development will deliver 1,500 units on a brownfield site, on the edge of a city centre. The site has been stalled for decades and is causing significant blight issues, given its prominent gateway position. The remediation of the site will significantly improve the quality of the local environment. The housing to be developed is also critical for the sustainable growth of the city centre and will help transform the wider area in which it is located. The site will clearly have wider area impacts on the surrounding area, which have been estimated as follows:

    - Impact area: the default impact area is identified as a 2.5km radius given the size of the scheme and all constituent LSOAs (using the population centroid method) are identified. Based on local knowledge of the area a final list of LSOAs at the 2.5km radius is identified.
    - Existing housing stock is calculated based on the final list of LSOAs by house type.
    - The rate of housing development based on growth over the last four years is identified as medium (between 4% and 12%).
    - The current stock value is calculated based on the median price by property type, and is approximately £7,000m.

[43] This should be undertaken with reference to the levels of transport analysis as set out in Transport Appraisal Guidance (TAG) on wider economic impacts: TAG Unit A2.1: Wider Economic Impacts Appraisal, Department for Transport (DfT), May 2019.

- An uplift value of 1.67% is selected based on location (North), rate of development (medium) and size (500+ units).
- The gross placemaking benefit is approximately £116.9m.
- Additionality is assessed as 60%, reducing the net impact to £70.1m.

30. The discounted placemaking benefit for the preferred option, once profiled in line with the housing and adjusted for additionality, is £44.4m. This is included in the [adjusted] BCR which moves from 1.0 to 2.1.

31. Based on Table 6: Sensitivity analysis, further analysis is performed with the gross Wider Area Impacts (WAIs) ranging from £93.5m to £140.3m. The analysis above should then also be re-run at the smaller impact area of 1.5km as part of the sensitivity testing.

Data sources

32. The accompanying data sheet to the DLUHC Appraisal Guide provides estimates of the residential capital stock values by LSOA across England based on the HM Land Registry Price Paid database and the VOA stock of properties data by property type. Where HM Land Registry Price Paid data by LSOA by type is missing (e.g. where no terrace homes have sold in a certain LSOA over the time period covered), the default is either the median MSOA or LA price by type (which can be sourced from House Price Statistics for Small Areas (HPSSA) data). Alternative data can be used but would need to be fully sourced and justified.

33. The data sources are fully detailed below in Table 7.

Table 7: Data Sources

Category	Data Source
Housing stock	Valuation Office Agency (VOA), Council Tax: Stock of Properties data (currently 1 April to 31 March 2022) (Table CTSOP 3.1), provided by LSOA. Total are used for Terraced, Flats and Detached Properties, whilst Bungalows and Semi-detached are combined.
House prices	Price Paid Data (PP)https://www.gov.uk/government/statistical-data-sets/price-paid-data-downloads, HM Land Registry, using the latest available financial year (currently 1 April 2021 to 31 March 2022, to bring stock value data in line with the VOA stock of properties data), provided by postcode. Alternative data sets, including to measure missing values: • HPSSA, ONS, 2021. Note this only includes median price for all properties by LSOA (not by type) and MOSA.
Population Centroids	Lower Layer Super Output Areas Population Weighted Centroids, ONS, 2011. This data is used to identify the centroid of the constituent LSOAs within the impact area.

8. Annex B – Case studies

Local Authority/ Year	Project
Stockport/2015	Covent Garden
Plymouth/2012	KHD
Newcastle/2016	Ouseburn East Bank
Wakefield/2011	Wakefield ECF
Southampton/2013	Hinkler Parade
Bournemouth/2015	Leyton Mount
Epsom/2009	Epsom Cluster Retail Centre
St Helens/2016	Waterside Village
Liverpool/2016	New Brunswick Village
Derby 09/2013	Derby Baseball Ground
Swale/2013	Sheppey Hospital
Shropshire/2013	Royal Shrewsbury Hospital
Cambridge/2015	Kaleidoscope
Bristol/2016	Hanham Hall
Adur/2014	Southlands Hospital
Salford/2017	Vimto/Timekeepers Sq
Epsom/2015	St Ebbas
Gravesham/2013	Christian Fields
Epsom/2015	West Park Hospital
Southampton/2017	Southampton Estate Renewal
Plymouth/2015	D3/G Cargo
Doncaster/2017	Carr lodge Farm
Plymouth/2017	Stores Enclave
Lambeth/2018	Newington Butts
Telford/2016	Lightmoor Village
Manchester/2017	New Islington
Newham/2017	Canning Town
Manchester/2016	Ancoats