

Review of Post-Occupancy Evaluation for Housing



Introduction

This report is a summary of desk-based research on Post-Occupancy Evaluation, commissioned by the Department for Levelling Up, Housing and Communities (DLUHC).

The original research brief provided by DLUHC acknowledged that Post-Occupancy Evaluation (POE) is not widely used, but that they wished to understand more precisely why this is the case. DLUHC aimed to further explore the extent that POE can be beneficial and used to ensure continual improvement – both in the design of homes but also recording resident responses on a wider scale for new neighbourhoods.

Current POEs are commonly conducted to evaluate the design quality of a building and/or neighbourhood, which can be achieved by measuring how it is performing in line with design intent; measuring if it is fit for purpose; and determining user/resident satisfaction.

The aims of this report are therefore to review and answer the following research questions:

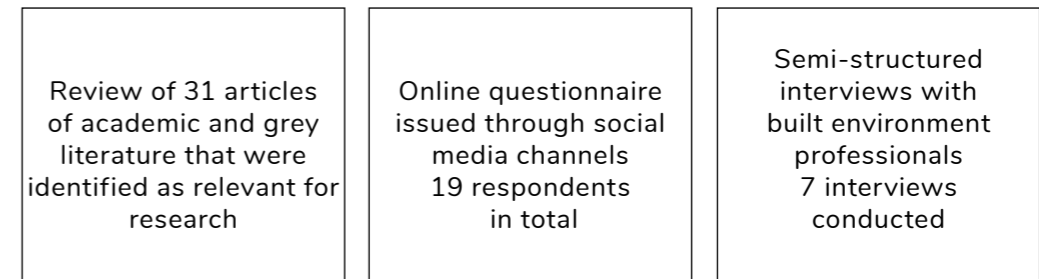
The assessment of design quality as it relates to housing extends beyond pure architecture and involves contributions from other academic disciplines such as environmental psychology, social and building sciences and population health. POEs have seen a shift in their scope and methodology, with increasing interest in evaluations that go further than building level as this understanding in assessment of design quality grows.

- Is current POE just focused on the home or does it take account of the challenges/benefits that residents are experiencing in new neighbourhoods (streets, parking, access to parks/nature, access to schools, shops by walking and cycling)? What are the challenges with gathering this information?
- What sectors are consistently preparing POE? Where are the good examples of housing POE?
- Can POE help with behaviour change and encouraging residents to improve their knowledge of green technologies and understand the workings and benefits of a low carbon home?
- What can be done nationally to encourage the use of POE? Is this something that should sit in national policy or guidance, for example? Is it reasonable that it is a requirement for government funding for new homes?

POEs are by and large still undertaken at building level but more practices and practitioners are turning their heads to neighbourhood level evaluation, especially with sustainability, social value and community health being integral to Net Zero strategies and planning policy. Many built environment professionals understand and state the importance of an evaluation and feedback loop between residents and building developers to improve resident experience, operational efficiency, and the design of places. However, post-occupancy evaluation continues to be fragmented, under-funded, and lacking either the incentives or mandates necessary to ensure its widespread use.

Housing Post-Occupancy Evaluations (POE) can be broadly understood as the systematic study of homes and/or neighbourhoods that are in use.

The methodology for this research is outlined below:



^ Research methodology

Introduction

RIBA published a policy report in 2020 giving recommendations on what government and built environment professionals could do to integrate POE more within practice, making the argument that POEs make for a meanwhile return on investment in the pathway to Net Zero and help create a better future. The report explains that better integration of POEs could improve efficiencies across the sector and have the potential to improve population health and social capital. However, an evaluation of this kind continues to be difficult to integrate within practice in a way that has sustained benefit for residents, designers, and commissioners alike.


Key Findings

- Post-occupancy evaluations must extend to neighbourhood level.
- Integration of social value is needed for sustainability within the built environment.
- Increased data collection would enable practitioners to share learnings openly.
- Post-occupancy evaluation needs to be both encouraged and leveraged as best practice

Recommendations

- There needs to be a mindset shift in industry, local and national government about the purpose and use of POEs if we are to raise housing standards.
- We recommend that the measurement of POE should harness proxy values that can be followed through the development lifecycle, from investment to post-occupancy.
- Those agencies with a responsibility to the nation and their communities for long-term social and environmental sustainability (Homes England, local authorities, public landowners) need to ensure that POE is used as a way of ensuring accountability in the developments they support.
- The costs of POE need to be factored in at the beginning of a project, and an evaluation process scoped and costed within contracts, rather than being seen as a bolt-on at the end.
- There is no point in collecting data if it is not used, so the purpose of a POE must extend further than that of data collection to stewardship (to benefit current residents) and active learning (to improve future projects).

Review of Post-Occupancy Evaluation for housing





Definition

Housing Post-occupancy Evaluation (POE) is a process for evaluating the performance of a home and/or neighbourhood after it has been occupied to ensure it is meeting the needs of its occupants, identify areas for improvement and provide learning that informs better decisions in the future.

A POE can include a variety of methods, such as surveys, data analysis, walk-throughs and focus groups, and can help identify areas for improvement and/or optimise building performance, reduce energy usage and improve occupant comfort and satisfaction.



< Cycling through Trafalgar Place, London
Photograph: dRMM

Current frameworks that are being used

Quality of Life Foundation reviewed the landscape of housing POE in practice through reviewing existing literature; surveying built environment professionals; and interviewing practitioners and academics in the area. There is a wide range of frameworks and methodologies (eg. BUS, Soft Landings etc) being used in practice, with evaluations generally being conducted by developers, house builders, or independent consultants.

A number of different benefits of conducting evaluations depending on who is conducting the evaluation and for what purpose, have been identified (see figure 1).

Figure 1. Types of benefits from POEs

Benefits	Who is the evaluation conducted with?	Why?
Picking up defects	Technical project team	To finalise project deliverables and measure performance against pre-determined technical criteria.
Improving on existing design and stewardship in the home/neighbourhood assessed	Residents that have moved in	To feedback on how it is performing now. Also to look at the future of existing scheme, including maintenance and stewardship.
Feeding forward to future projects	Technical project team and/or residents that have moved in	To mitigate risk and improve design outcomes for future residents.



Good Practice Case Studies

There does not seem to be a consistent benchmarking system nor are there any examples of POE best practice outside of internal case studies within reports (eg. Building for 2050).

These have been noted as opportunities for improvement by respondents in our questionnaire.

Here we summarise some good practice examples that we identified in writing this report:



Chobham Manor commissioned by London Legacy Development Corporation (LLDC) conducted by Buro Happold, Hawkins\Brown

Method

Mixed methods holistic approach to evaluate design quality, performance and identify future lessons

Activities

Resident survey, home interviews, resident focus group, project delivery team interview for qualitative data. Electricity and water usage, district heating, temperature & humidity, noise/acoustic levels, controls assessment thermal imaging, solar photovoltaic for quantitative measures.

Outcome

A holistic approach to post-occupancy evaluation for a masterplanning project to ensure that recommendations can be positioned for any future-facing action and design improvement.

Recommendations are categorised to understand level of priority. Most of the data points gathered are analysed and intended as 'notes for consideration'. Some have been noted to be read in the context of wider project constraints and opportunities whilst others are intended for other institutional entities such as government, GLA, wider industry action.



Houlton, Alconbury Weald, Priors Hall Park commissioned by Urban&Civic conducted by Quality of Life Foundation

Method

Mixed methods resident review surveys using the Quality of Life Framework.

Activities

Desk research, site visit, face-to-face engagement and digital engagement through online survey

Outcome

Evidence-based recommendations that uses the Quality of Life Framework to understand the performance of place in relation to its ability to improve quality of life. The evaluation weaves accountability into the house-building process so that it can become a learning process for those involved. Demonstrates good practice and improves trust with key stakeholders.

The information gathered for the evaluation is fed into sustainability metrics. Insights from the evaluation/ review help to inform design and governance strategies that are resident-led. Assessments will take place every two years on the same site, leading to a long-term evaluation.



Woodberry Down Estate Regeneration commissioned by Notting Hill Genesis and Berkeley Homes conducted by Social Life

Method

Mixed methods (range of qualitative measures and desktop research)

Activities

Door-to-door surveys of households, semi-structured Interviews with older residents, agencies and local stakeholders, street interviews with young people, site survey, review of official data.

Outcome

Social Sustainability Score issued from assessment. The findings are benchmarked against Social Life's sustainability framework which helps to frame the findings around its social sustainability.

It reviews aspects such as social and cultural life, voice and influence, adaptability and influence to gain an understanding of residents' experience including their perceptions around the regeneration. And it will help understand and assess impact over the next fifteen years.



Hanham Hall commissioned by Barratt Homes conducted by BSRIA

Method

Mixed methods approach

Activities

Technical evaluations of building performance including monitoring and evaluation of in-use energy, environmental conditioning, window/shutter opening patterns, temperature, humidity and CO2 levels. Resident questionnaires and semi-structured interviews conducted.

Outcome

As the building specifications had to comply with Zero Carbon Homes, there were some initial recommendations that were made that could help with design adjustments which were enacted during the evaluation period.

Occupant satisfaction is a key aspect to this evaluation and is being used in tandem with the environmental data to understand the full spectrum of comfort experienced by the user.



How POEs are conducted in practice

A broad range of methods: For large scale developments and regeneration projects, practitioners are beginning to use a broad range of methods in their evaluations, combining the use of hard and soft data to understand human experience alongside building performance data. POEs conducted at Chobham Manor and Hanham Hall show examples of comprehensive evaluations that integrate resident wellbeing, occupant satisfaction and comfort measures alongside technical data. There is no 'one-size-fits-all' way of conducting these evaluations and many are conducted by external consultants.

Feeding the information back: Recent POEs have begun to take a preventative approach where the evaluation data is fed back into the design process and used to assist in improvements. However, POEs have often been conducted to detect defects rather than understanding and evaluating the building and/or neighbourhood in a holistic, diagnostic manner.

A lack of resources: The depth of evaluation is contingent on the financial resource and buy-in available from those that are commissioning a housing development project. A comprehensive and mixed methods approach that consists of indicative, investigative and diagnostic approaches seems to be favourable amongst practitioners but many report that they often lack resource and do not have the specialism to conduct an evaluation of this kind.

A lack of accountability: Practitioners report that there is a lack of accountability in using POE, stating that those that are conducting them currently are often of the worldview that they are beneficial and recognise their value. Clients are still not asking for



Interviewing residents in Hackney, London
Photograph: Qavi Reyez

it and it is not common practice for most, particularly among volume housebuilders, who deliver the majority of new homes in the UK.

Social value framing: As such, many report that framing the data within a value framework and using sustainability metrics such as social value and/or using wellbeing indicators (eg RIBA Social Value, HACT Social Value Toolkit) can help communicate value to a wider range of stakeholders within the housing development process and should be adopted more widely and measured often. HACT's social value toolkit is an example of this, whereby proxy values are associated with certain social neighbourhood level interventions.

Different outcomes: The outcomes of POEs are also different from project to project with most practitioners currently using it as a vehicle to feed forward and help towards future design decisions and quality. In some instances, this helps to understand how to improve performance and reduce the performance gap by making incremental improvements in the design. Data such as fabric performance often helps building engineers develop product technologies along the project lifecycle and in other cases the feedback of information helps practitioners determine how best to proceed with retrofit strategies.

Need for best practice: There is recognition amongst architects and developers that once a building has been developed, amending, or improving the performance can be limited and performance due to building fabric can be mitigated by making strategic design decisions based on evidence from the start of a project. This challenge has been reported as being easier to amend if practitioners have access to best practice examples or performance feedback on other projects that they can refer to.



Door-knocking with Clarion Housing in Brighton, East Sussex



The Tuning Fork Café in Houlton



Key Findings

The move towards a more data-driven industry calls for better dissemination and collection of POE and overall evaluation insights throughout the housing delivery process to all stakeholders involved, including residents. This has the potential to improve efficiencies in performance, design quality and the health and wellbeing of residents. The following are themes that we have identified from the review.

Evaluations must extend to neighbourhood level.

We are now understanding that the environment in which we live is a determinant of health and wellbeing. There is also an increasing understanding about the anthropogenic nature of sustainable development where peoples' health should be placed at the centre of all development. The causal link between climate change, built environment and human health is being further illustrated through research which means that we must shift how we develop housing to ensure the health of our citizens is central to design whilst also reducing emissions.

We understand that healthy homes have the potential to radically improve peoples' lives and this impact on human health and wellbeing extends to the neighbourhood level. Many practitioners have taken indicative and diagnostic POE approaches to understand neighbourhood level impacts on residents by understanding their connection to the area and/or travel behaviour. Current practice shows that a more holistic evaluation helps to account for and understand the interdependencies between public health, environment and housing.

Integration of social value is needed for sustainability within the built environment

With Net Zero being a priority, there comes an increased impetus to measure, collect and improve performance across the built environment. Understanding what the data is showing us by

taking a holistic, circular and diagnostic approach will help to make better design, operational and governance decisions. We need to begin to understand that occupant behaviour and environment are inter relational and the more we understand this dynamic through performance measures, the more it will help to future-proof our buildings and ensure that human health and climate change are at the heart of sustainable design in housing.

Collecting data that measures social value is key to understanding how the built environment influences the social determinants to health and quantifying it back to a fiscal value. RIBA's Social Value toolkit and HACT's Social Value Bank are both examples that can help practitioners identify the impact and value that designs have on residents and communities.

The ability to use the data collected through evaluation to understand the social value underpinning many environmental aspects of a development process provides the opportunity to improve population health and, if applied across the sector, health equity could be further improved through housing design. It can increase potential financial savings made by design decisions by being able to make adjustments early on in the design process and learning from other programmes at design concept stage.

Increased data collection would enable practitioners to share learnings openly

Data collection and measurement of performance is on the rise in the built environment and evaluation is beginning to play a big part in connecting the dots between initial planning, reflecting on process and applying user-centric design adjustments. In our review, we have identified practitioners that are using POE to create an evidence base but often report finding it a challenge to 'close the loop' with feedback, implement actionable insights and follow through with recommendations to understand and further measure the impacts due to lack of resourcing and training available.

Practitioners and organisations that use licensed surveys within their POEs are unable to share their findings publicly due to IP which can often prove difficult when needing to learn from findings and integrate with a wider evidence base. Many built environment professionals have reported that sharing

findings and having a better understanding of what best practice looks like, how POEs are conducted, including what the impacts and outcomes have been, can have a positive effect on both operational and design aspects to development.

POE needs to be both encouraged and leveraged as best practice

For many architects and developers, the act of going back to a development once built holds huge implications to their risk liability set contractually at the start of any programme. There is resistance on the part of many housebuilders to conduct POE because of this as it does not fit with their business model of 'build and bugger off'.

While pointing out the social and environmental benefits to a company of measuring outcomes for residents appeals to some housebuilders and developers, there continue to be a sizeable majority who are resistant to this process. For these practitioners, leverage in the form of local/national policy or procurement procedures including financial incentive will begin to change the perception of evaluative processes within housing development.

Although there have been attempts to integrate POE processes within the RIBA stages and encouragement through building standards (eg. BS4101) over the years, there is still a lack of consistency within practice and varying appetite in conducting POE from practitioners. For a process to be followed through consistently, more pressure must come from the State or other government agencies such as Homes England or the GLA to mandate an evaluation process.

Conclusion

Here is what we think the research means with respect to the original research questions set by Department of Levelling Up, Housing and Communities.

Research Questions

1. How are POEs being conducted and delivered in current practice?

There currently is no standardised way of conducting POEs and those that are conducted vary in depth of information and outcome. Practitioners that conduct POEs aim to take a mixed methods approach to understand data from different perspectives. However, it is limited to financial resources and is usually conducted to measure performance of new technologies or to understand performance against what it set out to do rather than as a mitigation tool.

2. What are the opportunities and challenges in gathering the information needed for this form of evaluation?

One of the biggest opportunities that a POE process presents is being able to use the information gathered to future-proof house building. The information can be fed to stakeholders at all levels who can use the insights to understand how to improve their building performance. This can be from understanding both building performance and occupant satisfaction data.

The main barriers in being able to collect and share POE data information more widely are due to the inconsistency in the approach to POE, and the fact that surveys are licensed. This prevents consistent information being shared publicly and unfortunately means that findings cannot be shared outside of the project or programme.

3. What more could be done for practitioners to integrate POE within their practice?

There needs to be more financial incentives that encourages an integrated evaluation process within house building rather than seeing POE as an additional risk factor. The financial incentive must account for skills-training and resources to conduct extensive evaluations for it to be beneficial and impactful. Knowledge-exchange amongst practitioners of what methodologies are working on certain schemes will help to build both interest and best practice examples, which can continue to develop and be built on.

4. Could POE be used for behavioural change or be used to encourage residents to improve their knowledge of green technologies and understand the benefits of a low carbon home?

The data collected through POEs can help build an evidence base of how housing is performing. This can help towards gauging a better understanding from an environmental and social perspective. If this data was then analysed, insights could be drawn out and shared amongst stakeholders at all levels, which could impact behaviour change. If the data was analysed and insights regarding energy use were also shown to residents, this could improve resident understanding of energy use. The synthesis of information between collecting the data and disseminating it to residents can have potential to improve knowledge of green technologies and encourage low carbon living within the home.



Recommendations



The takeaways from this research and case studies can form lessons of best practice for those wanting to better deliver post-occupancy evaluations.

Mindset shift

There needs to be a mindset shift in industry, and within local and national governments, about the purpose and use of POEs. An evaluation process that runs from pre-planning to post-occupancy must be contractually written into projects and programmes from the beginning. POE has the potential to provide multiple benefits as its learnings are shared over time; from improving building performance to raising outcomes for people's health and wellbeing; from increasing biodiversity net gain to the creation of more social infrastructure.

But government and its agencies must challenge the 'build and bugger off' mindset of many in the housing sector, who have little interest in the success of past projects, preferring instead to focus on the profit generated by those in the future. We accept the reputational risk involved in such evaluations, but mistakes are made in any industry and without learning from them collectively, the same mistakes will be made again and again. The housing industry needs to use the measurements and findings to test, iterate and improve existing and future housing projects.

'The carrot' - demonstrating return on investment

We recommend that the measurement of POE should harness proxy values that can be followed through the development lifecycle, from investment to post-occupancy. These proxy values can help pave the way for social value to be mapped from land acquisition onwards; moving beyond the current model of social value that focuses on procurement and construction, but not the success or otherwise of finished schemes. POEs have the potential to enable better-designed homes and neighbourhoods which would directly impact population health, helping to drive health improvements and reduce health inequity. By providing feedback to those residents and communities that participate in POE, the process can also increase the sense of influence or control that people feel over their local area, which has demonstrable benefits to their health and wellbeing.

'The stick' - increasing accountability

Those agencies with a responsibility to the nation and their communities for the long-term social and environmental sustainability need to ensure that POE is used as a way of ensuring accountability in the developments they support. At the least, we would recommend appropriate dissemination and include a process to measure impact in briefing documents. Public innovation funding has the potential to incentivise more thorough evaluation and dissemination practices, and the recent Innovate UK/UKRI programmes require organisations to measure and report on impacts. Ideally, we would recommend a statutory duty on English local authorities, including MDCs and Homes England, to secure the optimal uses of all their land through stewardship and development. This would include responsibility on the part of beneficiaries to demonstrate this use through a process of assessment that continues through to post-occupancy.

Financial support

The costs of POE need to be factored in at the beginning of a project, and an evaluation process scoped and costed within contracts, rather than being seen as a bolt-on at the end. This will help incentivise and support the use of POE throughout the project process even after the handover stage. This needs to take into consideration reputational risk and risk burden. In the first instance, we would recommend grant funding to support an industry-standard evaluation process that includes and supports activities of collecting data at a home and neighbourhood level.

Learning from data

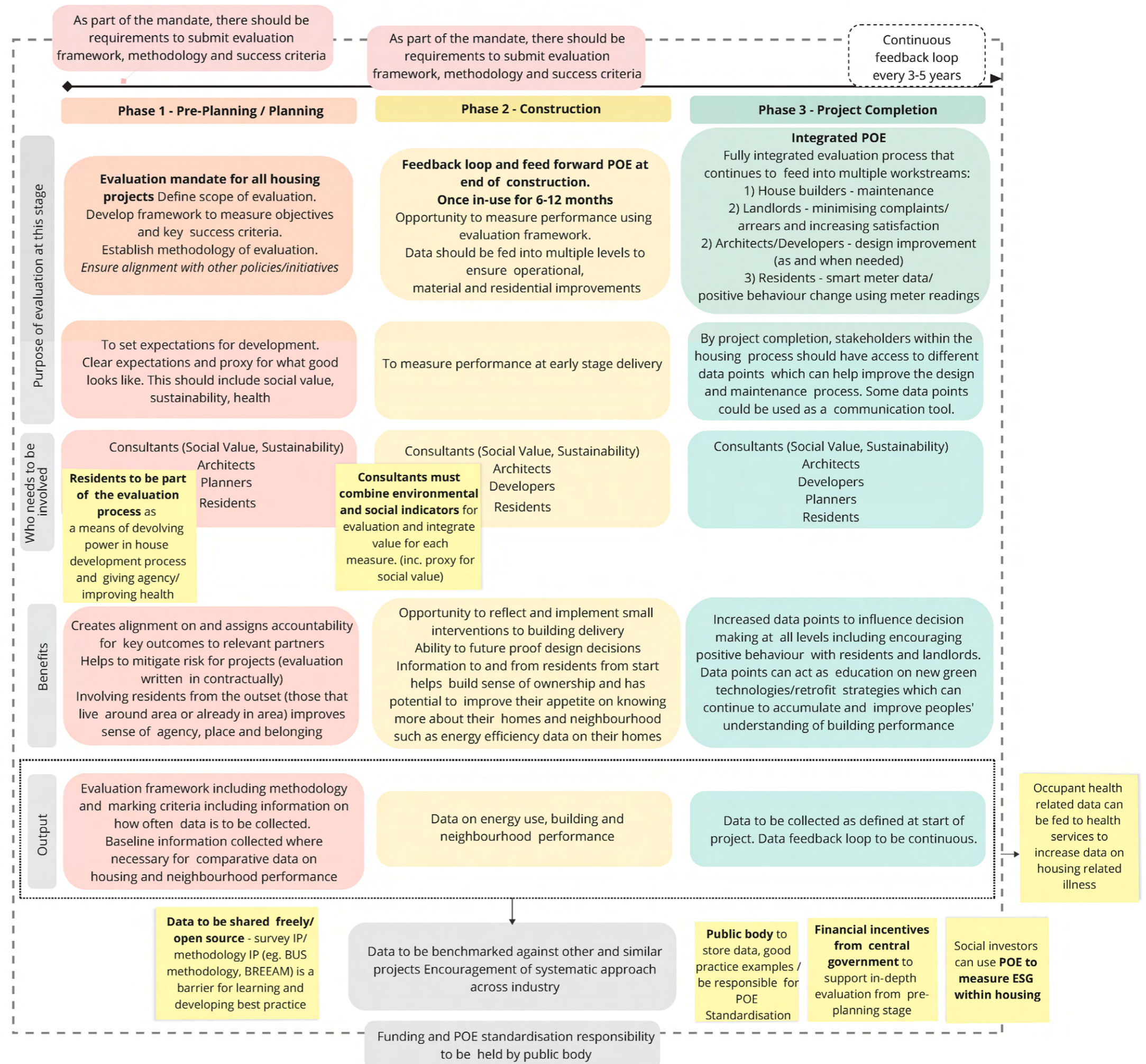
There is no point in collecting data if it is not used, so the purpose of a POE must extend further than that of data collection. It should act to support better decision-making through the design and development processes for housing, including budgeting, design, construction and operation. We recommend that evaluations should be taken at various points within a project lifecycle including after handover to improve the design quality and continue learning. This needs to include resident feedback and be easily accessible by practitioners to make efficient changes as and when needed. Understanding where the information from these evaluations could be appropriate and beneficial will be crucial in the integration of a POE, so project governance (including POE) must be robust.



Recommended Future POE methodology

We recommend that housing evaluation should be conducted often and thoroughly. This can help practitioners to make informed design decisions and help future-proof housing. If some of the evaluation information/data becomes open to residents, this can also build in agency for residents to make informed decisions on the maintenance of their homes.

RECOMMENDED FUTURE POE METHODOLOGY





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Credits:

Written by Matthew Morgan & Sem Lee

Designed by Quality of Life Foundation

Illustrations by Lizzie Lomax

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