Cambridge Centre for Housing & Planning Research

Places for People

Infrastructure, place making and sustainability

A report for Places for People

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May 2020

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Executive Summary

This report examines the relationship between infrastructure provision and housing development. It also explores the contribution of the place-making process to designing and delivering sustainable, 'good quality' communities.

Following a comprehensive review of existing literature, research data was gathered using semi-structured interviews with academics, industry professionals and government officials.

This report identifies the need for effective collaboration between all stakeholders involved in the provision of sustainable infrastructure and housing. Firstly, it finds that a regional planning tier connecting local planning practices and national planning guidance would be helpful, as well as ensuring that there is adequate resourcing and skilling of local planning departments in order to coordinate infrastructure and housing development. Secondly, the greater use of institutional mechanisms (like development corporations) in conjunction with a more proactive public sector (via the use of strategic land assemblies) would be useful to coordinate public and private sector actors. Infrastructure of all kinds has a crucial role in providing people with what they need for high quality living. The report identified that infrastructure needs to be delivered alongside housing in order to allow people to have the services they need in place before homes are occupied. To ensure that local authorities do not have to rely upon piecemeal funding for infrastructure to support housing, there needs to be a centralised source of finance which can offer the effective integration of infrastructures and housing development. The importance of including soft infrastructure, e.g. community amenities and facilities, is identified as crucial in ensuring the development of sustainable communities.

Designing and delivering 'good quality' places requires collaboration with local communities and other stakeholders through an effective place-making process. This research underlines the importance of consultation in the place-making process and for this to be effective, openness and transparency from all stakeholders is required. The developer should provide adequate resources, including sufficient time, to facilitate meaningful community participation. This also extends to the long-term maintenance of a development. Developers should consider from the outset what model of stewardship is most appropriate for the development and they should agree strategies for the long-term maintenance and governance with all relevant stakeholders.

In the UK, there is currently a requirement for planners and developers to design places guided by the principles of sustainable development. This involves harmonising environmental, economic and social dimensions if a place is to be long-lasting. The research

identified that it would be useful to develop a measuring tool by which the combined environmental, economic and social sustainability of a place can be evaluated. There is a perhaps a need for the development of industry-wide guidance and a robust assessment method on what constitutes good practice in terms of sustainability, so that developers can undertake sustainable place-making whereby the economic, social and environment aspects of a place are balanced.

Finally, the report explores possible impacts of the expectation for developments to be carbon-net zero by 2050, including the implementation of policies such as the Future Homes Standard. Making housing and wider places carbon net-zero is a complex task and will require cross-sector collaboration through the provision of resources, sharing technical innovations and an industry-wide commitment to meeting this target.

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1. Introduction and methodology

Housing supply has not kept up with demand in the UK. In response to the housing deficit, the UK government stated its intention to build over 300,000 homes a year by the mid-2020s through the doubling of the housing budget, the freeing up of public land for development and the loosening of legislation to encourage development (MHCLG, 2018, MHCLG, 2019a). However, in order to enable such large scale housing development, an active support system, in the form of infrastructure, needs to be in place, not only to guarantee the social and commercial viability of these spaces, but will also to support the needs and wants of people who will live in them (Infrastructure and Ports Authority, 2016).

According to David Cowans, Group Executive for the Places for People Group, housing development, or redevelopment, needs to be more closely aligned to forms of infrastructure such that the design and delivery of hard forms of infrastructure occur at the same time as housing (Cowans, 2019a, 2019b). Closely aligning infrastructure with housing allows it to be tailored to the specific needs and wants of communities, enhancing the current service delivery. Including infrastructure that supports housing (e.g. schools, leisure facilities, access to employment opportunities, transport connections, access to amenities etc.) at early stages of development will enable the formation of a platform of services, facilities and connections offering the prospect of 'high quality' living (Cowans, 2019a, 2019b).

However, the long-term goal of sustainability must guide housing and infrastructure development if they are to provide 'high quality living'. The introduction of the Future Homes Standard and the recent pledge for the UK to be carbon net-zero by 2050 means that there needs to be a reduction in the contribution that housing makes towards climate change (HM Government, 2010, Committee on Climate Change, 2019, MHCLG, 2019b). Consequently, active efforts need to be made to balance the needs of existing places and communities without compromising the ability of future generations to meet their own needs.

1.1. Research aim and methodology

The aim of this research is to examine the relationship between infrastructure planning and housing provision, and to explore what improvements could be made to ensure that housing and infrastructure development are high quality and sustainable in the long term. The research questions posed are:

- What is the best method for matching infrastructure planning and housing provision? What role does 'soft' infrastructure play in accompanying housing in infrastructure planning?
- Who are the main stakeholders in the design and delivery of 'good quality' places? In what ways, and to what extent, are they able to influence this?
- What is meant by sustainability in the building of 'good quality' places? What considerations are paid to holistic sustainable solutions beyond the remit of climate change?

The research involved a literature review of academic, industry and policy sources relating to infrastructure planning and housing provision, place-making and the creation of 'good quality' places and the sustainability of these places.

Ten in depth interviews were conducted with a variety of senior individuals at Places for People in order to understand their current industry practice. Further interviews were conducted with academics, government officials and other external industry professionals. Interviews were transcribed and coded using qualitative thematic analysis in line with the research questions. All sensitive information and potentially identifiable information was then redacted to ensure the participant's anonymity. All data were stored and used in line with the internal data policy of the CCHPR and wider GDPR regulations.

2. Literature review

2.1. Infrastructure

2.1.1. What do we mean by infrastructure?

Hall et al (2012: 1) state that infrastructure encompasses the physical fundamentalities and organisational structures needed for society to operate. Infrastructure acts as a foundation for 'economic productivity and human well-being' because it acts as an enabler and mediator of different flows of goods, information, people and services (Hall et al 2012, Williams, 2014).

Infrastructure comes in two different forms: hard and soft. Hard infrastructure includes physical forms of infrastructure: energy, transport, water, wastewater, solid waste, information and communication technologies, as well as 'green' and 'blue' infrastructures, e.g. green open spaces and water elements (rivers, canals, etc.) (Hall et al, 2012, Williams, 2014). On the other hand, soft infrastructure is associated with the development of human and social capital integral to community-building and the promotion of 'high quality' living (Brail et al, 2017). Forms of soft infrastructure range from access to employment, education and social services to the presence of libraries, healthcare facilities and other community resources. As a result, a place's social and cultural norms, meanings and values are present within their forms of soft infrastructure (Williams, 2014, Brail et al, 2017: 180). The design and delivery of 'good quality' places therefore require the adequate provision of hard and soft forms of infrastructure in order to support the prospect of 'high quality' living for its occupants.

2.1.2. How does infrastructure intersect with wider systems, practices and technologies?

Two approaches have dominated how we regard infrastructure planning: the developmentalist approach and the isolationist approach. The developmentalist approach treats infrastructure as something that develops over time, whereas the isolationist approach views infrastructure as something independent of its situated context (Cass et al, 2018: 163). The isolationist approach does not recognise the interconnected nature of infrastructure as it views the form of infrastructure as something independent of its wider context (McClean, 2017: 18). The developmentalist approach recognises the different intersections that infrastructure enables and mediates, as well as how infrastructure evolves over time in terms of both its use and users. Forms of infrastructure, like transport connections or a school, and its connectivity to a place's wider systems, practices and technologies that are present in everyday life, will develop and change over time (Cass et al, 2018: 164). Star and Ruhleder (1996) and Shove (2017) further echo this by emphasising that the definition of the infrastructure will also change depending upon its use.

The meaning of infrastructure is based on its ability to connect individuals to the services they provide and therefore any potential changes to the systems that infrastructure connects to, the technologies it uses, or the practices it employs, will change how the infrastructure is framed and viewed. Consequently, infrastructure is in a constant form of flux, a dynamic state, which means it cannot be viewed in isolation from its wider situated context in relation to the built environment, the service it delivers and the people who use it.

The dynamic state of infrastructure means that forms of hard and soft infrastructure combine when they are materialised within the urban setting. There is need for both physical forms of infrastructure and their accompanied systems of practice, and this means they cannot be separated from each another, e.g. the presence of adequate roads and the systems needed for the running of public transport (Cass et al, 2018: 164). This is also then true for an area's socio-historical and spatial context. Cass et al (2018) describe this process as 'infrastructuration': an area's socio-historical and spatial context informs the practice of a community which then shapes infrastructure provision and resource allocation. Infrastructure, both hard and soft, is situated within a place's dynamic activities and practices, and communities will support those forms of infrastructure that can underpin their activities and practices. As a result, the everyday activities of a community and its associated forms of infrastructure layer on top of each another and become part of the material context of that area (Cass et al, 2018: 165).

One example of this is the work of Braith et al (2017) on the transformation of Regent Park, Toronto, Canada. Built in the 1940s/50s, Regent Park was informed by modernist planning ideals promoted by visionaries like Le Corbusier. It was intended to deliver good standards of housing for all but, over time, the site fell into disrepair and became associated with crime and squalor. In the early 2000s, a CA$1 billion redevelopment project was proposed for the site in order to create a mixed-income neighbourhood with both non-market and market housing (Braith et al 2017). A key component of the redevelopment was the use of social infrastructure to maintain a strong sense of community, belonging and shared values, and a social development plan developed by both local residents and civil servants was used alongside the physical development plan (Brail et al, 2017: 180). Differing forms of hard and soft infrastructure were combined in the urban setting, enabling the delivery and support of local activities and practices, and showing how a place's socio-historical and spatial context can inform the provision of the different kinds of infrastructure.

Recent UK planning literature has emphasised the need for a design, or place-led, approach to strategic planning. The National Planning Policy Framework (NPPF) states that development should be both plan-led and strategic with up to date frameworks to address

present and future needs of communities. Frameworks should detail the overall strategy for the pattern, scale and quality of the development (MHCLG, 2019a), and plans should set out a clear design vision, developed with local communities, reflecting local aspirations and to ground the plans within an area's defining characteristics. This reduces the potential for development mismatch as can be seen in the recently passed Planning (Scotland) Bill and the reintroduction of Regional Spatial Strategies (RSS). Regional Spatial Strategies were originally introduced by the Labour Government in 2004 and sought to address sub-regional development issues by offering a 'spatial' vision and strategic guide for sustainable development (The National Archives, 2019).

In 2010, the Coalition Government revoked this bill in light of the then imminent introduction of the Localism Act (2011). The Localism Act sought to provide devolved powers to local authorities and meant that they were able to dictate their own needs for development (Communities and Local Government, 2010). However, the abolition of the RSS created a vacuum between local planning practice and the policy goals defined at national level. Consequently, a disconnect arose between local and national levels which then inhibited the ability of local planning to be informed by regional and national policy agendas (Communities and Local Government, 2011). However, the recently reintroduced bill dictates that RSS must be created by local authorities working together and producing strategies that are able to identify the need for strategic development; the outcomes that strategic development will provide, as well as proposed locations for strategic development (Scottish Government, 2019a).

This initiative aims to provide long-term direction for large-scale development and to bridge the gap between local and national planning needs, as well as to meet outcomes and priorities based on the information supplied by local planning authorities (Scottish Government, 2019b, Hawkes, 2019). The Planning (Scotland) Bill identified the need for strategic development to enable a place-led plan informed by both national and local contexts. In theory, greater transparency across all scales of governance regarding the development of the area could be promoted and the Bill suggests that infrastructure informed by the RSS would be matched and optimised to local contexts. It shows clearly the potential benefits of a strategic-led approach and how forms of infrastructure can be placed within the specific characteristics of a place.

2.1.3. How is infrastructure currently governed, integrated, regulated and provisioned?

The current landscape of infrastructure provision in the UK is fragmented, with responsibilities for infrastructure governance, regulation and service delivery divided between the public and private sectors. The breakdown of the monopolistic infrastructure providers by successive neo-liberal policies of the 1980s and 1990s brought about the

retreat of state-backed and collectivist forms of urban infrastructure, and saw the rise of 'competing' privatised regimes of infrastructure provision (Graham and Marvin, 2001). Consequently, there was a breakdown of comprehensive and uniform infrastructure provision, meaning that certain places had preferential access to amenities afforded by infrastructure provision (Graham and Marvin, 2001, RTPI, 2019). This fashioned these places into 'premium spaces', where the emphasis on infrastructure provision for certain regions and cities increased` at the expense of others, leading to forms of uneven urban development and the formation of specific infrastructural enclaves (Graham and Marvin, 2001).

Recently, Hawkes (2019) and the Royal Town Planning Institute (RTPI) (2019) have called for the greater integration of infrastructure development and investment. By having a more 'joined-up' view, it is believed that it will be easier to upgrade outdated forms of infrastructure whilst also supporting growth in specific parts of the UK which have been 'left behind' (Williams et al, 2014, RTPI, 2019). With this in mind, McClean (2017: 19) emphasises that the materialisation of infrastructure integration is conditioned by a place's specific institutional and socio-cultural context, so there will be differing networks and systems that impact its governance, e.g. the role of the public and private sectors in the delivery of amenities and infrastructure.

McClean (2017) establishes a typology of infrastructure integration based on five different categories: organisational, technological, sectoral, geographic and social (see Figure 1). He argues that the institutional context of a place will determine its form of integration and the stakeholders involved. For example, the UK acts as an 'enabling' state, promoting more market-friendly and profit-driven policies when delivering resources afforded by infrastructure provision. The UK government has introduced a policy to include the private sector from the onset and wants them to cover some of the cost (McClean, 2017). This form of organisational integration not only grants the private sector greater governance potential in infrastructure design and delivery, but also shifts power away from local authorities. Local authorities are no longer the sole provider of infrastructure and must work with the private sector in order to deliver forms of infrastructure. This opens the potential for the interactions between the local authority and the private sector to be underpinned more by market efficiency and consumer choice than local democracy (McClean, 2017). The institutional context of any form of infrastructure integration will inevitably impact its future design and delivery.

Form of infrastructure integration	Key characteristics
Organisational	• Refers to the governance, management, regulation and ownership of infrastructures • Extends beyond a single network and is part of a 'systems of systems' • Strong central organisations to promote partnerships between different partners
Technological	• Used to facilitate or prevent technological integration, e.g. smart technologies and utilities delivery • Arises due to consumer behaviour rather than the intent of inventors or oversight by regulators • Produces tensions regarding innovation policies at the national level, and political priorities and realities at the local level
Sectoral	• Integration between different infrastructural sectors as well as within these sectors • Within sector, can offer the decentralisation of large technical systems and a shift from top-down governance to bottom-up forms of service provision
Geographic	• Examines the geographical context that underpins infrastructure networks • Enables the linking between large network developments and spatial developments that are context sensitive and design specific to the wider geographic landscape • Promotes greater developmental legitimacy via sensitivity to local contexts and needs
Social	• Integration involves the joining up of the interests of the public to specific black-boxed forms of infrastructure and specific access points • Focuses upon the provision of soft infrastructure and individuals' access to differing forms of infrastructure, e.g. utilities or access to employment, from a single location • Shift from provision to consumption based on access to services and products

Figure 1. The five kinds of infrastructure integration, adapted from McClean (2017)

The integration of different forms of infrastructure will inevitably be realised within the built environment. As part of their interconnectedness, they will form either a single infrastructure domain or a 'nested system of systems' where differing flows, technological innovations, operational and financial interdependencies, as well as manifold governance strategies, will interface with one another. Theoretically speaking, a shared decision-making framework can

be formed between different infrastructure providers and regulators which enhance forms of dialogue, collaboration and coordination across infrastructure domains (Monstadt and Coutard, 2019: 2198). However, the promotion of this shared platform overlooks the material, institutional and functional overlaps within these operational networks. The framing of 'integrating' or 'coordinating' infrastructures is often passive, not taking account of the urban politics that underpin them (Macrorie and Marvin, 2019, Monstadt and Coutard, 2019: 2195). Therefore, greater focus has to be given to the specific social and material relations of how infrastructure is used, experienced, performed and governed within specific spatial circumstances (Monstadt and Coutard, 2019, Rohracher and Koehler, 2019).

An example of this can be seen with this can be seen in a recent collaboration between Cordaid[1], the Dutch Government and the Cape Town Metropolitan Government in applying for Orio Grant Funding. The aim of the collaboration was to rectify the lack of public transport connections that the townships in the Metro South East corridor experienced as a result of Cape Town's inequitable and inefficient spatial structure (Cordaid, 2015a, 2015b, World Urban Campaign, 2019). In 2015, the three organisations came together with residents to inform a series of new Public Transport Interchanges (PTIs) and their associated supporting infrastructures (e.g. public recreation spaces, sanitation facilities and commercial centres) in order to connect the townships to the wider Cape Town area by using a timetabled and regulated minibus-taxi service alongside public transport which is known as MyCiTi.

As of November 2019, the project has moved out of the development phase and a R300 million expansion of public transport bus routes and supporting infrastructures for residents from Khayelishta and Nyanga was announced. This will provide new trunk and feeder routes for the MyCiTi buses, new bus stops and stations, a new bus depot in Khayelishta and will assist in improving PTIs at Nolungile, Vuyani and Nyanga (City of Cape Town, 2019). As a result of this, residents' mobility within these areas will increase, leading to a knock-on effects for access to employment, health-care systems, education and wider social networks, thereby increasing their overall quality of life.

This example lends itself to the idea that integrated forms of infrastructure are not neutral but rather they are dictated by the social and material realities desired by stakeholders, in this case to overcome the townships' relative spatial inequality and public transport inefficiency compared to the rest of Cape Town. Rohracher and Koehler (2019) develop this idea further by referring to infrastructure interfaces as 'junctions'. Infrastructure networks are

[1] https://www.cordaid.org/en/

comprised of a series of different links between actors, resources and interfaces, and so the infrastructure networks themselves are made up of different socio-political discourses, actor strategies and power relations (Lawhon, et al 2018, Rohracher and Koehler, 2019). As a result, these networks should be considered as a space, or 'junction', in which these differing social phenomena interact and engage with one another. 'Junctions' of infrastructure integration should therefore be considered as being determined and governed by the social or material reality, or other wider contextual factors, of the place they are present within.

2.1.4. What roles do the public and private sectors play in infrastructure design and delivery?

Currently, the way infrastructure is integrated with housing provision is complex and confusing. According to the National Audit Office (2019), there is a lack of clarity across multiple levels of governance as to how local, regional and central government interacts with the private sector in delivering infrastructure to support housing provision. The current provision of hard and soft forms of infrastructure alongside housing is the responsibility of not only local authorities, but also of national government departments, national infrastructure bodies, arm-length bodies and private sector developers (National Audit Office, 2019). The Royal Town Planning Institute (2019) goes into further detail and describes five prominent barriers to effective infrastructure integration and housing provision. These are: a perceived lack of integration and leadership at the national level and its separation from local planning policy; varied governance and funding arrangements at a sub-national and local level; complex organisational and investment arrangements with infrastructure providers; the policy and practice of spatial planning in the UK of prioritising short-term needs over long-term needs; and a lack of funds available to local authorities for infrastructure investment and uncertainty about the long-term viability of funding (RTPI, 2019: 15-16).

Of particular note are the varied governance and funding arrangements at the sub-national and local level. No one single organisation has a clear responsibility or view across different infrastructure types and how they are funded. Because of the multiple authorities involved in the design and delivery of infrastructure, there can be some confusion regarding the organisational arrangements of different stakeholders (Holt and Baker, 2014, Wong and Webb, 2014). Holt and Baker examined the interaction between local authorities and national infrastructure bodies in the UK, and concluded there was a lack of awareness on both sides about how each group operates. For example, they noted that both groups had different decision-making frameworks and funding timeframes for infrastructure which then hampered effective communication and organisational integration between the two (Holt and Baker, 2014).

Furthermore, the lack of a centralised pool of funding means that local authorities are reliant upon a mix of funding for infrastructure development, sourcing funding from multiple streams. This has the effect of shifting their attention from the long-term sustainability of infrastructure to more immediate returns to satisfy the needs of their funding sources (RTPI, 2019).

An example of this can be seen in a recent report from the RTPI (2019). In a series of interviews, the RTPI engaged with Staffordshire County Council about the impact of austerity and the lack of easily accessible central government funds for infrastructure development. The response described how the overall context of austerity and the rise of competitive tendering meant that there were smaller funds available to local planning authorities for the delivery of different forms of infrastructure. Consequently, the authority was forced to rely more on private sources of funding and developer contributions for infrastructure provision, commercialising their bidding process and making them more short-term focused (RTPI, 2019: 34). Less consideration was paid to the long-term sustainability of the networks in which the infrastructure is situated, meaning that it is less adaptable to the future needs and wants of the local community, and has less overall resilience to external shocks.

This section has sought to show how infrastructure, both hard and soft, is ultimately bound within the material and social environment. This is important to recognise as, even though infrastructure design and governance will transcend the local level, it is still materialised in that one place. Infrastructure and any form of integration, e.g. material, social or operational, needs to be considered within its wider context, but it is also necessary to explore how infrastructure planning, integration and delivery impacts the actual place itself. The meanings, values and visions of a place can be changed through the presence of hard or soft infrastructure, and it is therefore necessary to explore how such places are constructed and maintained in the first place.

2.2. Place-making

2.2.1. How has place-making developed as a process over time?

Place-making has its roots in the works of Jane Jacobs (1961) and William Whyte (1968), both of whom focused on the nature of urban development and the consequences that this has for the social lives of the individuals who occupy these developments. Place-making was initially concerned with the physical construction of a place with little regard for the influence of individuals upon its construction: emphasis was placed on the physical end product rather than the process and the people involved (Day, 1992, as cited in Strydom et al, 2018: 2). However, place-making has gradually shifted its focus towards the people who make up the process. There are a range of current definitions of place-making but they all refer to place-making as a process that involves a collective of individuals who engage with a reimagining of their specific geo-spatial context (Strydom et al, 2018: 2, Beza and Hernandez-Garcia, 2018: 193-194).

Strydom et al (2018: 167) state that place-making activities involve specific individual or collective actions to reimagine their surrounding environment. This includes renovating, upgrading or the maintaining of lived spaces in attempts to promote the uniqueness of an area, and supported by its site-specific characteristics. Beza and Hernandez-Garcia (2018) take a slightly different approach, viewing place-making as a socio-political and geo-specific community engagement process. The value and meaning of the community are used as a platform to construct a dialogue between local communities, forms of government and other stakeholders in conceiving a positive spatial planning/desired outcome. Within this, attention must be given to how individuals themselves interact with the place. This is because a place can be described as a combination of people, its location and its resources which come together to form a collective sense of identity and purpose for those that occupy it (Project for Public Spaces, 2017, Scottish Government, 2019b). Ultimately, place-making is bounded within its physical environment, but there needs to be recognition in how individuals and groups are able to shape the built environment and its accompanying infrastructures to their visions, values and meanings.

2.2.2. What role do local stakeholders play in the place-making process?

Collaboration within the place-making process takes place between a wide range of stakeholders, ranging from local communities, to private developers, to different forms of government. The interactions with local communities create a form of 'horizon scanning' whereby other stakeholders, e.g. local government or private developers, are able to use community resources (i.e. lay knowledge) to identify any potential issues and opportunities which can be addressed via the place-making process (Rogers and Hunt, 2019).

This identification of local issues and opportunities also affords the potential inclusion of local people and the potential for a bottom-up decision-making process. Chen and Qu (2020) state that a bottom-up perspective to place-making reinforces both the plurality of stakeholders and forms of local democracy. There is a flattening of power relations, as other stakeholders are reliant upon the local community for both their expert knowledge and developmental consent in order to legitimise the development. It is therefore in the vested interest of developers to include local communities in the decision-making process and, by giving them an active role in the creation process, the likelihood of local stakeholders withdrawing from the decision-making process is reduced, meaning that there is continued community engagement.

However, attention has to be paid to the kind of engagement between the parties. Tyler et al (2018) and Ehwi (forthcoming) both emphasise the value of consultation of local stakeholders where consultation is based not only upon localised potential impacts resulting from the development, but also on the potential advice and insights that local individuals can offer. Whilst local stakeholders have an opportunity to influence or provide clarification on certain issues and opportunities, their contribution is still subject to collaboration with the external partner. Therefore, the participatory planning process behind place-making can give local citizens a platform from which to exercise their own democracy and empowerment, but it is subject to the tension between top-down and bottom-up organisations, and to the interests of other stakeholders engaged in the place-making process.

This platform for local democracy and community empowerment is dependent on the enabling environment of place-making. Place-making acts as a central practice whereby different networks, organisations and institutions can come together to form 'a new (or renewed) sense of place' (Cilliers and Timmermans, 2014, Manzini, 2015: 122). The process is highly dependent on 'enablers', who build bridges between different stakeholders, and the 'enabling environment', which conditions their interactions (Cilliers and Timmermans, 2014, Baker and Mehmood, 2015). Cillier and Timmermans (2014) explore this in their article on stakeholder engagement and its impact upon place-making, emphasising that not only is participation voluntary, but it is also not possible to have complete representation of the community. Consequently, it is vital that the place-making process adequately identifies certain 'enablers' are present to ensure effective and meaningful participation by the local community in the decision-making process.

There are two main ideas concerning the creation of place through effective stakeholder engagement: co-creation and co-production. Popularised by Prahalad and Ramaswamy (2004), co-creation originally referred to the 'joint creation of value by the company and the customer, allowing the customer to co-construct the service experience to suit their context'.

Teder (2019: 290) applies this process to place-making, and views it as enabling 'the creativity of designers and people not trained in design [to work] together in the design's development'. By engaging local communities in the co-creation process, it is possible to move beyond the expert culture associated with urban planning and design. As communities play an active part in producing 'a new (or renewed) sense of place by connecting a space with the communities that inhabit it', the process becomes democratised (Manzini, 2015: 122).

The process of co-production refers to the extent to which local citizens or other stakeholders are able to collaborate in the design, improvement, implementation and delivery of public services (Osborne et al, 2013). Co-production in the place-making process relies upon bottom-up engagement from local communities by which they retain control and ownership over the continuous management and reproduction of space (Wolf and Mahaffey, 2016). Co-production is, however, reliant upon the different abilities of stakeholders. Wolf and Mahaffey (2016) state that, whilst local communities and designers are equal in the decision-making process, they bring together different skills when place-making. In co-production, unlike co-creation, there are fixed roles and responsibilities within the design process, and local communities will be reliant upon the expertise of designers. Therefore, whilst the process is democratised, limitations still remain regarding the creative process of place-making and the ability of local stakeholders to shape the planning of infrastructure within these places.

2.2.3. How are 'good quality' places maintained?

According to Carmona (2019: 2-3), the quality and value of a place are linked together and mutually reinforce one another. He begins by exploring the concept of value and how this has traditionally been defined in economic terms. More specifically, he explores its definition via its exchange or use value, i.e. the goods present within a place and the benefits these afford users, and comments on how such definitions ignore the wider social and cultural context that inform value. 'Place value' comprises the complex and interrelated benefits that accompany interventions via specific stakeholders within the built environment, and 'place value' is defined as 'the diverse forms of value generated as a consequence of how places are shaped' (Carmona, 2019: 3). However, the value of a place cannot be separated from its quality, and Carmona (2019) states that place quality is complex, layered as it is by many different concepts which change depending on its overall framing, e.g. its economic, environmental or social contexts. Place quality is often defined by specific factors within broad settings, e.g. the quality of environmental design within a place, and Carmona posits that it is necessary to go beyond this. The place-shaping or place-making process, in the form of the mechanisms and outcomes of development, regeneration and the long-term management of these places, needs to be considered within a place's 'quality' (Carmona,

2019: 4-5). Both 'place value' and 'place quality' are then linked: high quality places deliver greater value and so a virtuous loop is formed as the values of outputs from the community will then determine the place's high quality nature, and vice versa.

Rogers and Hunt (2019) also build on the nature of 'good quality' within a place: both the vision of its occupants and the success of these visions once materialised determine the 'good quality' nature of a place. The idea of 'good quality' is underpinned by the vision of local stakeholders and by the desired traits that are exhibited within that space. These visions or desired traits are then grounded in the potential social environments or aesthetics of that place which can be delivered via place-making. Dempsey (2008) elaborates on this by summarising the different academic and policy criteria necessary for a 'good quality' place: high residential density, mixed land use, accessibility, connectedness and permeability, legibility, attractiveness, inclusiveness, maintenance, natural surveillance, character, and the perceived quality of the neighbourhood. All these factors influence the potential tangible and intangible aspects of a development, and the creation of a 'good quality' place accounts for both the material and immaterial aspects of a community. The success of these materialised visions, as needed for a 'good quality' place, are thus grounded in the place's long-term vision.

Rogers and Hunt (2019) also state that the value of these materialisations comes from their potential success and longevity along economic, environmental, political and social lines. Dempsey (2008) supports this in saying that 'good quality' places are spaces that not only engender feelings of safety, a sense of community and mutual trust amongst residents and users, but also engender shared norms and values. These ideas then become the basis for the perception of a place, and the success of any economic, environmental and political activity within that place is thus incorporated within its wider social context (Rogers and Hunt, 2019). Both Dempsey and Rogers and Hunt emphasise that the nature of 'good quality' is multi-faceted and grounded in the experiences of those who occupy the space. In order to ensure a place's longevity and success into the future, active effort needs to be made to sustain its mixed social, economic, political, and environmental 'good quality' nature.

2.2.4. Place-keeping

The maintenance of 'good quality' places is often viewed as a dynamic and continuous aspect of place-making. However, there is a difference in the intentional employment of certain practices and technologies in the management and conservation of these places after they have been created, re-created, renewed or regenerated (Dempsey and Smith, 2014). This process is known as 'place-keeping' and is defined as the 'responsive long-term management which ensures that the social, environmental and economic quality and benefits a place brings can be enjoyed by present and future generations' (Dempsey et al,

2014: 9). The 'responsive long-term management' of a place is bound within its spatial context, the way it is used, and its current cultural and political context – it is a process which considers the spatial and non-spatial dimensions of a place, and attempts to form a holistic view in order to maintain its 'good quality' (Berleant, 1997, as cited in Dempsey and Smith, 2014; Mattijsen et al, 2017).

There are three main governance models for the place-keeping process: a state-centred model, a private-centred model and a user-centred model (Dempsey and Smith, 2014). The state-centred model sees local authorities planning, delivering and maintaining the space with minimal input from external partners. The private-centred model involves the use of Public-Private Partnerships (PPPs) in delivering the maintenance of these places. The user-centred model involves user-based organisations such as local interest and community groups, charities and NGOs in the place-keeping process (Dempsey and Smith, 2014).

Mathers et al (2015) and Mattijsen et al (2017) explore each of these governance models in the maintenance of open green space. Both articles comment on the nature of the relationships between local authorities, private organisations and local citizens, and particularly on how the relationships are conditioned by the funding and resources available for the maintenance of spaces. For example, local authorities may lack the necessary long-term funding, or be unwilling to maintain a place, and will use a partner organisation to cover this shortfall and give responsibility to that organisation. This will then determine the kind of governance model used and will define the potential engagement of both parties in the maintenance of a place and its associated infrastructure.

This section explored how place-making as a process can be used to design and deliver the mixed nature of 'good quality' places, and the ways in which 'good quality' can be maintained. In order to provide a 'good quality' place, specific forms of infrastructure must be delivered and integrated to ensure the active evolution of a place, based on residents' visions, values and meanings, along with their aspirations for the future of the place. However, a place's long-term viability is not only dependent upon its 'good quality' nature, but also on its sustainability. Therefore, it is necessary to explore how the idea of sustainability is integrated into the design and delivery of 'good quality' places and what overarching themes are conditioning current practices concerning sustainable development.

2.3. Place-making and sustainability

2.3.1. What is meant by sustainability in the wider context of climate change?

The design and delivery of 'good quality' places needs to ensure sustainability, and recent policy literature has promoted a 'sustainable development' approach within mainstream planning practice. This is characterised as meeting the needs of the present without compromising the ability of future generations to meet their own needs (MHCLG, 2019a), and three overarching themes encourage planners to pursue economic, social and environmental objectives.

The **economic objective** focuses on building a strong, responsive and competitive economy by identifying the specific land requirements and coordinating the appropriate infrastructure to support economic growth, innovation and productivity (MHCLG, 2019a: 5).

The **social objective** focuses on the support of strong, vibrant and healthy communities by not only ensuring the provision of a sufficient number and range of homes, but also on fostering a well-designed and safe built environment. This includes the provision of accessible services and open spaces to support a community's health, social and cultural wellbeing (MHCLG, 2019a: 5).

The **environmental objective** seeks to contribute to the protection and enhancement of the natural, built and historic environment through the effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change (MHCLG, 2019a: 5). In relation to climate change, the environmental objective aims to help developments reduce their carbon footprint via the transition to a low carbon economy and the promotion of a place's climate resilience. By considering this pro-actively, the planning approach includes a development's potential to adapt to and mitigate climate change, reducing future maintenance costs for the 'good quality' place and ensuring its viability into the future (Rogers and Hunt, 2019).

Making effective use of land, as well as minimising waste and pollution, has already been incorporated into mainstream planning practice. According to Bovet et al (2018), the major threats to the sustainability of a place are urban sprawl and infrastructure development; land use is viewed within the short term and so is not optimised for future external issues and opportunities. Bovet et al (2018) argue that sustainable land management should be used to frame potential development in order to ensure the long-term preservation of a decent state of natural living conditions, alongside the optimisation of ecological, economic and social needs.

The work of Preval et al (2016) on environmentally sustainable practice in the streamlining of housing in Auckland, New Zealand is a good example of this. They found that households who had access to pre-existing public transport networks reduced the amount of CO_2 they emitted and also reduced their contributions to other forms of pollution, e.g. noise pollution and traffic congestion. They concluded that connecting housing development to pre-existing infrastructure networks was more sustainable in the long term, and that the use of pre-existing resources within sustainable planning practices when connecting in new housing developments can help to minimise any further negative effects upon the wider environment. The location of new, 'good quality' developments must be considered in relation to the broader, pre-existing aspects of the current community, e.g. where people live, work and socialise, or the forms of available public transport.

Attempts have been made to sustainably future-proof homes within the wider context of climate change. Titz and Chiotha (2019) state that the current threats to urban areas and, more specifically, to households, will be exacerbated by climate change. Planners and developers need to promote an area's sustainability and its resilience in order to guarantee its ability to bounce back from future external shocks. The Future Homes Standard (MHCLG, 2019b) directs UK housing developers and planners to make new homes more energy efficient and to help communities embrace smart and low carbon technologies, all with the aim of making the UK's housing stock zero carbon by 2050 (MHCLG, 2019b). The policy states that homes should have their fabric standard increased and should move away from gas-based to electricity-based networks. This will then make it easier to supply heat to homes from large scale, renewable and recovered heat systems and to decrease reliance upon fossil fuels. Large scale, renewable and recovered heat systems are more energy efficient (MHCLG, 2019b).

This emphasis on the future proofing of homes demonstrates how the importance of the threat of climate change is viewed within environmentally sustainable practice. Climate change has considerable potential to change a settlement's internal and external dynamics, and the sustainability of a place and its accompanying infrastructure is increased as it becomes more adaptable to both the internal and external shocks that may alter the fabric of the community.

2.3.2. What role does Green Infrastructure play within sustainable development?

Mell (2008) describes Green Infrastructure (GI) as a series of connective matrices of green spaces found in and around urban and urban fringe landscapes. GI supposedly offers complementary benefits for ecological, economic and social spheres as they offer a way to harmonise the environmental costs of human activities. Titz and Chiotha (2019) state that forms of GI range from green on buildings (balconies, walls and roofs) and on built

structures (street greening, house gardens or railways) through to more open green spaces, such that the social and environmental benefits of GI are felt across the community. GI is defined as a 'strategically planned network of natural and semi-natural areas, with other environmental features designed and managed to deliver a wide range of ecosystem services such as water purification, air quality, space for recreation and climate mitigation and adaptation… [and] can improve environmental conditions and therefore citizen's health and quality of life. It also supports a green economy, creates job opportunities and enhances biodiversity' (EU Commission, 2015).

These factors reflect the multi-faceted nature of GI but it is also important to consider its spatial and distributional impacts. Hislop et al (2018) emphasise that there are necessary trade-offs from such an intervention: the presence of GI, depending on its scale, will prevent that piece of land for being used for another purpose. When linking the concept of GI to sustainable development, consideration needs to be given as to how these green spaces can be optimised for the communities in which they are situated. Reimer and Rusche (2019) build on this in their examination of the cultural heuristics that lie behind the understanding and implementation of GI. They found that local authority interactions with GI differ across spatial and temporal contexts, institutional arenas and cultural imprints. As a result, GI needs to be contextualised within local situations in order to deliver its perceived benefits and effectiveness within sustainable development.

2.3.3. What is holistic, sustainable development?

The National Planning Policy Framework dictates that sustainable 'good quality' places need to accommodate economic, environmental and social sustainability (see above). The economic and social aspects of sustainability are weighted equally with environmental sustainability in order to prevent the valorisation of one aspect at the expense of another (MHCLG, 2019a). The equal weighting of these aspects allows an opportunity for a holistic view of a place to be formed.

Tyler et al (2018) examined the effectiveness of the Big Local programme in reinvigorating the local economies in areas that were 'left behind' in the UK. They found that communities which adopted a holistic, long-term approach to regeneration were more successful than those that did not. The inclusion of other stakeholders who were relevant beyond their economic importance, led to a more cohesive strategy for the area (Tyler et al, 2018: 35-36). Both the NPPF and Tyler et al (2018) demonstrate that the sustainability of developments goes beyond environmental sustainability. Consideration of only one aspect of sustainability leaves a development open to other external shocks which may then undermine the already existing forms of sustainability within the community. Therefore, economic, social and

environmental sustainability all need to be considered in order to ensure the viability of both 'good quality' places and the necessary supporting infrastructure into the future.

A systematic approach needs to be taken when considering economic, environmental and social sustainability within sustainable development. Bastianoni et al (2019: 69-70) state the need for a synthesis of the different aspects of sustainability in order to understand how they combine and act together within a localised setting. As part of this, there needs to be an 'extensive' view which not only looks at the inputs and outputs of this system, but also at other dimensions. The work of Gibbons et al (2020) on Regenerative Development on the Kinnickinnic (KK) and Los Angeles (LA) Rivers in the US is an example of this. They argue that sustainability is holistic in nature and needs to be viewed within the context of a wider living social-ecological system and negotiated with different local actors. By examining both rivers within three meta-principles and the seven sub-categories of Regenerative Development (see Figure 2), they concluded that both places, to varying degrees, were able to shift their frame of thinking towards more systematic and holistic thinking. The KK river, in particular, demonstrated the use of partnerships with local actors to develop their community's regenerative capacity whilst also complementing wider programmes for social, health, economic and environmental aspects of community development (Gibbons et al, 2020: 10-14).

Using this example, Gibbons et al (2020) state that a place's socio-ecological systems will be able to adapt and evolve beyond the initial goals of sustainability and will eventually become thriving and self-sufficient (Gibbons et al, 2020: 4-12). When applied to sustainable planning practice, this means that all aspects of living systems, e.g. economic, social, environmental flows, relationships and patterns, are contextualised within a place-based and participatory approach. All forms of sustainable development are then placed within a wider, holistic, socio-ecological system which can in turn inform the different forms of infrastructure and attempts at place-making, thus designing and delivering 'good quality' places.

Meta-Principle	Features of Regenerative Development
Wholeness	• Works in whole systems • Shifting world-views of human components within living systems to holistic ones
Change	• The identification and manifestation of the potential or essence of a system • Growing regenerative capacity of whole systems (human and non-human components' viability, vitality and evolutionary capacity)
Relationship	• Value added to larger systems • Mutual factors that enable those reciprocal relationships that contribute to more vital living systems • Leverage nodes or convergences in living systems where many flows intersect and cause small changes across the system

Figure 2. Regenerative development and its contribution to the formation of a holistic and thriving socio-ecological system. After Gibson et al, 2020: 4.

2.3.4. Summary of literature review

In summary, infrastructure within the built environment cannot be treated in isolation, connecting as it does to a series of wider practices, systems and technologies (Cass et al, 2018). The stakeholders responsible for the integration of infrastructure and housing are fragmented between the public and private sector (Graham and Marvin, 2001, National Audit Office, 2019) and, as a result, there are an emerging number of problems, e.g. piecemeal funding for infrastructure, and a lack of understanding between local authorities and national infrastructure bodies, which impact the effective integration of infrastructure and housing (Holt and Baker, 2014, RTPI, 2019). The integration of infrastructure and housing is also part of the place-making process. Place-making enables local communities to either upgrade or reimagine their surrounding built environment or aid developers in constructing a place which is in accordance with their visions, values and meanings (Strydom et al, 2018, Beza and Hernandez-Garcia, 2018).

However, the different stakeholders within this process have varying amounts of influence in the decision-making process, meaning that there can be an imbalance in power relations (Tyler et al 2018, Ehwi forthcoming). The place-making process also extends beyond the initial construction of a development, and so there is a need to consider how it is maintained and looked after into the future, otherwise known as place-keeping (Smith and Dempsey, 2014). The NPPF states that developments need to be economically, socially and environmentally sustainable and that there is a need to future-proof settlements against the potential impacts of climate change (MHCLG, 2019a, Titz and Chiotha, 2018). In order to prevent the valorisation of one aspect of sustainability at the expense of the others, a

holistic view needs to be taken which can account for all the varying factors that come together in achieving a sustainable place (Bastianoni et al 2019, Gibson et al 2020).

3. Interview analysis

A series of interviews were conducted with selected individuals from Places for People and other external industry bodies as well as academics in order to explore the research questions. The interview findings can be summarised across three topics: infrastructure development and housing delivery; engagement with different stakeholders and their influence in designing and delivering 'good quality' places; and the sustainability of these places.

3.1. Infrastructure development and housing delivery

Through the interview process, seven themes emerged when looking at infrastructure development and housing delivery.

3.1.1. Actors involved in infrastructure development and housing delivery

Interviewees were clear that there is a relationship between infrastructure investment and development, including growth in housing numbers. However, this relationship is complex with multiple actors, who do not always share the same interests or motivations, involved in infrastructure development.

It was suggested that public and private sector actors have different views on the use of infrastructure to encourage housing development. Interviewees expressed the belief that, in the private sector, infrastructure investment is profit driven, whereas in the public sector it is driven by wider aspirations of growth.

> *…the private sector is by and large driven by profit whereas the public sector… is not profit driven, maybe more investment-driven or growth-driven. (Interviewee 2, Places for People)*

It was thought that infrastructure investment was one way to drive new housing development as the building of infrastructure, such as roads or transport connections, is able to unlock previously inaccessible sites for development.

> *…this sort of public intervention on infrastructure or specific pieces of infrastructure… is linked to a clear end product of unlocking particular sites, particular schemes and particular numbers of housing. (Interviewee 7, Civil Servant)*

Interviewees from the private sector commented that they make an active effort to respond to public sector infrastructure investment and base their decisions about where to build houses on the location of infrastructure.

> *… at the kind of strategic level, a lot of our investment priorities, in terms of geographies, should be predicated on where infrastructure investment is going (….) and looking at where the houses need to go. (Interviewee 2, Places for People)*

Interviewees stated that land availability, the price of land and the potential for financial profit all act as conditioning factors in the strategic decision-making processes for private sector house builders who may want to capitalise upon potential infrastructure investment.

> *…where is there land to build? That is very much our main constraint. So, if we find a piece of land, the first thought is, is it a desirable location and do houses let or sell well in that area? What are the values we can extract? (Interviewee 5, Places for People).*

However, some believed that the value that could be extracted from building housing alongside infrastructure extends beyond monetary profit, encompassing economic and social value for the wider area in which the housing is situated.

> *We can see [infrastructure] has a value benefit, it will unlock both economic and social value, as well as financial, in some areas. (Interviewee 6, Places for People)*

In summary, the interviews highlighted the different stances taken by the public and private sectors in the use of infrastructure to encourage housing delivery. The public sector can encourage house building by strategically providing infrastructure, and the private sector can respond to this, building houses based on the availability of land and the potential value that can be gained from the development.

3.1.2. Housing as a form of infrastructure under the Nationally Significant Infrastructure Projects (NSIP) regime

The interviews examined the consequences of classifying housing as infrastructure under the NSIP regime. Three common themes emerged: the securing of planning consent, whether housing can be viewed as infrastructure, and the potential impact on models of house building.

Currently, under the NSIP regime, 500 homes can be built alongside Nationally Significant Infrastructure Projects in England if they can be justified because of a functional need for the project to occur or are in geographical proximity to the project but are not functionally linked to it (DCLG, 2017). Consent for such projects is given via Development Consent Orders which wrap all the powers required to deliver projects into one consent, including environmental permits and Compulsory Purchase Orders. It is regarded as a transparent and well-understood way of gaining consent, with a defined timescale of examination (normally around 12-15 months after an application is submitted) and an extensive consultation process (Hawkes, 2019). Stakeholders in the consultation process include developers, local authorities, local communities and other relevant bodies, all of whom may contribute to the consultation process before a final decision is made by the relevant Secretary of State (Smith, 2017).

There was some recognition that if housing was classified as infrastructure under the NSIP regime, it might benefit from what is currently a relatively quick and predictable planning consent process.

> *I think what is successful about the regime [is that] projects get consent relatively quickly. Whether that is a good thing in and of itself is an important question, but… I can see why it is attractive for those who want to deliver housing - and large amounts of housing - through a relatively quick and a relatively certain consent. (Interviewee 10, Academic)*

However, all interviewees were of the opinion that classifying housing as infrastructure through the NSIP to obtain planning permission could provoke political conflict and resistance at the local level. They were concerned that this would be viewed as a top-down imposition for providing housing and regarded as undermining local democracy.

> *Nationally Strategic Infrastructure is never going to be locally 'bottom-up' (….) There does need to be a degree of local democracy within it and that is why I am hesitant about it, as putting [housing] in an NSIP looks like you have imposed [it upon them]. (Interviewee 6, Places for People)*

Some expressed the view that housing alone is not enough to be considered as infrastructure under the NSIP regime and that, as housing is only one element of a place, only whole settlements or new towns should be considered as infrastructure.

> *I think a whole new town is a piece of infrastructure because it is about responding to sport, connectivity, economy, and housing is one element of it. (Interviewee 6, Places for People)*

One interviewee identified the fact that the NSIP regime currently offers a way of integrating housing and infrastructure delivery, albeit on a smaller scale. This is because small numbers of housing units can be built alongside central infrastructure which then allows new, small communities to emerge. It suggests that NSIP is already effective in coordinating housing and infrastructure on a smaller scale, and that housing by itself should not be considered as infrastructure.

> *I do think there is scope within the NSIP regime in producing small amounts of housing in support of the main infrastructure project. It is only up to 500 houses… but maybe for some areas, like transport, it could be a quite a good way of seeding new communities or looking at where there is an infrastructure logic in underpinning development. (Interviewee 10, Academic)*

The third theme identified in the interviews was that the classification of housing as infrastructure under NSIP had the potential to change the models of volume house building that are currently in place.

> *… you would probably start to see different sort of players in the market. I wonder what [reclassifying housing as infrastructure under NSIP] would do to the typical volume house building model. (Interviewee 2, Places for People)*

It was mentioned that this potential change could also potentially give more profile to innovative construction methods such as off-site manufacturing.

> *I then start to think about the… innovative house builders who are trying to come in and do a different thing [and] it would give it profile. (Interviewee 5, Places for People).*

Although there could be some change in the typical volume house building models, interviewees were of the opinion that classifying housing as infrastructure under NSIP could be problematic. Classifying housing as infrastructure in order to build housing relatively quickly and at scale would not necessarily solve current problems in the construction industry, e.g. supply chain fragmentation, low productivity and labour shortages. In order to deliver volume housing quickly, there would be a need to tackle some of the existing

problems in the house building industry, independent of any classification as infrastructure under the NSIP planning process.

> *There are so many issues around housing… if housing is to be considered in that way, there are some certain things we should be focusing on in particular… These are the fragmentation of the industry which causes problems like poor quality, inefficiency, lack of productivity, high costs… We should try to understand the problems and fix them. (Interviewee 5, Places for People)*

The responses of interviewees reflect that, while there are some benefits to classifying housing as infrastructure under NSIP, there are also problems. The NSIP regime might enable fast and large-scale planning consents, but it would by no means guarantee that housing would be delivered quickly.

3.1.3. The gap between national and local interests

The interviews suggested that the UK is missing a tier of strategic planning which would connect national and local contexts in providing infrastructure alongside housing.

> *…there needs to be a larger than local approach [to infrastructure planning and housing provision]. If you drop down straight to a local plan, you are missing a tier of strategic planning that the old county structure plans used to do quite well. (Interviewee 6, Places for People)*

More than one interviewee commented on how Regional Spatial Strategies once filled this void, facilitating engagement and effective coordination across different layers and parts of government.

> *New Labour put a lot of emphasis on breaking down the different silos between different aspects of government at different multi-governance levels. [Regional Spatial Strategies] were across different layers and levels of governance across the departments at each level. (Interviewee 3, Academic)*

One interviewee gave an example of this, citing the success of the London Plan as a regional tier in connecting local authorities' planning practices to national planning directives. The London Plan is informed by the National Planning Policy Framework (NPPF) and acts as a guide for local authorities, enabling them to make their own planning decisions in line with regional and national planning guidance.

> *…the Mayor of London was given responsibility for certain regional functions, and one of them was preparing the London Plan, which is the framework for the planning of the whole city. So the boroughs are the local planning authorities, and they have to be consistent with the London Plan, but then the Mayor can't direct local authorities to take specific planning decisions. (Interviewee 8, Academic)*

3.1.4. Coordinated approaches and strategic uses of infrastructure and housing

Interviewees emphasised the role of spatial planning in connecting infrastructure planning and housing provision across different levels of government. They also highlighted the strategic role of spatial planning to address wider issues within places, e.g. to support economic revitalisation.

> *Spatial planning is the tool for better integration of housing and infrastructure delivery. There are no guarantees with a process like that, but it does provide that opportunity for cross-silo and broader thinking [around] the problems that we will need to solve with infrastructure and housing as well. (Interviewee 10, Academic)*

Reflecting on cross-silo and cross-border approaches, interviewees stated that local authorities could collaborate, over and above their duty to cooperate and influence the allocation of infrastructure and housing, by forming their own regional spatial development strategies. One interviewee offered the example of local authorities in the West Midlands which had come together to use transport infrastructure to improve regional connectivity and rebalance economic growth and opportunity. Consequently, this facilitated economic and housing growth within a wider area without putting local authorities into competition with one another.

> *The West Midlands is a good example of balancing and rebalancing growth and opportunity…. [The Black Country authorities have] pretty much taken responsibility like London to think about transport infrastructure in looking at regional connectivity. I have seen areas, like Wolverhampton, experience a level of housing growth because connectivity into Birmingham has improved and, as that connectivity has improved, it has developed its own economic offer alongside it. It is not trying to compete; there is a clear structure or hierarchy of places around it. (Interviewee 6, Places for People)*

Interviewees believed that infrastructure can be used for greater purposes than simply unlocking housing development and can be used strategically to encourage economic

growth and regional development. Spatial development strategies and other coordinated approaches, whether regional or across local authority boundaries, offer a way for different local authorities to work collaboratively, and to solve particular problems in their areas.

3.1.5. Land and the integration of infrastructure with housing provision

The interviews also examined how infrastructure can be integrated alongside housing at the local level, and one recurring point was the importance of land in providing infrastructure for housing and the need for institutional mechanisms to overcome fragmented land ownership.

Interviewees commented that coordinating infrastructure development and housing delivery is made easier if land is under single ownership.

> *It is much easier if the land is in single ownership. So if you have a big masterplan that covers lots of little chunks of islands of different ownership, then no one wants their land to be used for the kiddies' play park rather than for the 300 hundred unit tower that is going to be worth lots and lots more money. (Interviewee 8, Academic).*

Strategic land assemblies were cited as a mechanism which could unite land under single ownership in order to facilitate large-scale development and place-making. Land assemblies unite multiple plots of land and properties into single ownership in order to coordinate development of a single, overall site, removing the need for developers to spend time and money purchasing individuals parcels of land, and making the area more appealing for development. However, it was also stated that using land assemblies can be contentious and potentially locally unpopular because they may require the use of Compulsory Purchase Orders (CPOs).

> *I think that one way of achieving [single land ownership] is for local authorities to take a more proactive role in land assembly and putting together the puzzle of all these different fragmented bits of land ownership. The problem is that it very quickly gets you into the realms of CPOs which no one likes, it is very contentious. (Interviewee 8, Academic)*

Interviewees proposed that the public sector could combine a more proactive role with a strategic, longer term perspective when identifying viable land for development. As part of this, there would need to be a more 'joined-up' approach between local authorities, arm-length bodies (e.g. Homes England) and landowners.

> *It needs to start with the public sector taking a real strategic view of where growth should happen, by having a clear long-term vision and not pushing out a call for sites for everyone else to lob their site in and then trying to go through the process of sorting everyone out on the way through. It has got to be more joined up… I think Homes England has a big role to play and I think that is a better use of their resources than with things like the strategic land assemblies and so on' (Interviewee 6, Places for People)*

Interviewees also noted the benefits of forming development corporations and in enabling a joined-up, more strategic approach to identifying land for development. Development corporations, established by both national and local government to encourage urban development, can provide more effective coordination of infrastructure development and housing provision by linking local authorities with other stakeholders, including private developers.

> *The development corporation model has a lot to recommend it as an institutional approach to [integrating infrastructure and housing provision] (Interviewee 3, Academic)*

Interviewees cited further benefits of the involvement of development corporations. In addition to enabling local authorities to pool their resources, they can be given formal authority and powers to act in a central, coordinating role, determining land use and integrating infrastructure planning with housing development.

> *Those sorts of organisations would have a coordinating role and in the new towns with the development corporations, those models had a lot of good things like in infrastructure planning and development and land use and a basic coordination of the different agents. (Interviewee Three, Academic).*

Strategic land assemblies and development corporations, the vehicles suggested by the interviewees, both offer mechanisms through which land could be consolidated under single ownership, with the public sector playing a key role. As a result, infrastructure could be more efficiently coordinated alongside housing development.

3.1.6. Providing different forms of infrastructure alongside housing

The interviews explored how potential infrastructure need, as generated by proposed new housing development, is accommodated in Local Plans, and the problems that can emerge because of delays in infrastructure delivery relative to housing completion.

Statutory bodies, such as highways and health authorities, have a voice in the Local Plan making and planning application processes and articulate what infrastructure would be needed to support new communities.

> *There are requirements across other departments, like health, to ensure that the regional health bodies are statutory consultees to planning applications and local plans, which will ensure that they are aligned and providing the infrastructure [for] the housing population that comes with that. (Interviewee 7, Civil Servant)*

Statutory bodies' presence in Local Plan making and their participation in the planning application process, enables them to articulate the future infrastructure needs of the residents in new developments, but problems can arise in infrastructure delivery. This can be because, even though the developer has made provision for infrastructure (e.g. allocating land for a GP surgery or funding infrastructure through planning obligations as part of a S106 agreement) the developer or the local authority does not necessarily have direct control over how the infrastructure is implemented, governed, managed, and used. As a result, the infrastructure may not necessarily be ready for immediate use when residents occupy the homes.

> *It can be a Section 106 requirement that a development includes the provisions for a GP surgery for which the developer will provide the space. But the decision about what GP goes in there, when they are moving in and so on - the developer has no control over that. (….) I have seen cases where the surgery sits there empty for three years just because the NHS hasn't got their act together to move somebody in. The local authority has control over some certain things, but they don't have control over the NHS… it is a completely different decision structure. (Interviewee 8, Academic)*

The majority of interviewees believed that a key barrier to a place's success was the coordination of infrastructure alongside housing completion and occupation in a timely manner. Housing can often be built more quickly than the wider infrastructure needed to support a community, and one interviewee stressed how the different development time scales of housing and infrastructure were major inhibitors to meeting the necessary requirements to support high quality living.

> *Housing planning and delivery is not fast enough, but it is certainly on a much quicker turn around than [infrastructure]. So the first thing is that the timescales are completely out of whack with one another, but we are putting*

> *lots of people into places where the infrastructure is eventually going to get to them. But it sometimes doesn't get to them for years' (Interviewee 8, Academic)*

This issue also relates to developer contributions, as local authorities sometimes have to pool these contributions in order to fund the infrastructure needed in a new development. Consequently, housing may be occupied before sufficient financial developer contributions have been pooled to fund the required infrastructure.

> *…we have a slightly bizarre system, I've always thought, in this country, where we put the cart before the horses. We have to gather a load of S106 contributions and so on to put it in the pot to pay for…. the infrastructure. (Interviewee 6, Places for People)*

The time lag created through the pooling of developer contributions is further compounded by the reluctance of some private developers to pay for infrastructure. Developers are perceived as wanting to maximise their potential profits and may try to negotiate down the planning obligations requested by the local authority as part of their Section 106 agreements.

> *These house builders, by and large, are profit-driven, and will try to reduce the element of infrastructure they have to pay for. So you end up with a situation where no-one wants to pay for the bridges, the roads, the doctor's surgery, the school, or anything. (Interviewee 2, Places for People)*

Interviewees suggested that a more effective approach would be to develop a place's infrastructure prior to the occupation of housing. The benefit would be that people living in these communities would have immediate access to the infrastructure needed to support high quality living.

> *We started with close to £20 million of infrastructure going in before we were delivering the housing. We actually brought it forward, ahead of the S106, with the delivery of the first primary school, so instead of it being there for the 1500th home, we had it open for when the first families were moving in. (Interviewee 6, Places for People).*

Interviewees also stressed that putting in infrastructure in advance of housing aids the place-making process. Developing a school, health centre or providing environmental amenities, such as GI, before housing is occupied means that these become central elements of a place,

providing the services people need, and creating a stronger sense of place from the beginning of a development's occupation.

> *We planted thousands of trees (…) and (…) we used the infrastructure requirements to create the sort of environment where people could not just look at the house and move into it, but think about what sort of place this is, and what it is going to be like: "this will be a really nice place". (Interviewee 6, Places for People)*

However, this process needs to be flexible as the requirements of the community may change over time; where the developer is using infrastructure as a basis for place-making, mechanisms which are able to adapt the use of the infrastructure in response to the community's needs need to be built in.

> *There also [needs to be] a flexible approach to infrastructure first, tacking back and forth between physical infrastructure, the needs of the communities and the surrounding area and the opportunity to go back and forth and adapt to change. (Interviewee 10, Academic)*

Coordinating infrastructure with housing in a timely manner or making an active commitment to provide infrastructure in advance of housing, ensures that people will have immediate access to what they need for high quality living, bolstering the place-making process.

3.1.7. Soft infrastructure and housing provision

There was a strong consensus amongst interviewees that hard infrastructure should be supplemented by soft forms of infrastructure.

> *[We need to] think about infrastructure in the broadest sense. It needs to be everything from physical infrastructure to social infrastructure. (Interviewee 10, Academic)*

The interviewees highlighted the need for hard and soft forms of infrastructure to be efficiently timed with housing provision in order to create a successful place.

> *… understanding how infrastructure from the school to the road can actually sequence alongside the residential development [is essential to creating a successful place]. (Interviewee 6, Places for People)*

Several interviewees stressed that the timing of soft infrastructure provision is important to support a sense of community. They stated that if soft infrastructure is used strategically, its physical presence can act as an anchoring point for a community as the place can develop around it.

> *We put in a really big health centre and a school, and those became centres of place. We built them first and so the development built around them, [which meant that] it felt sort of organic. Rather than retrofitting a school or a park, there is a real sense of place and the homes are built around that. (Interviewee 9, Places for People)*

Interviewees also mentioned that providing community spaces supports successful place making.

> *You might not want to have a social interaction, but you still want to go and sit in a café with other people… An absolute essential [part of a community] is a community space where people can be together whether it is a park, a hall or a café. (Interviewee 9, Places for People).*

Highlighting the importance of soft infrastructure in supporting a sense of community, one interviewee referred to the strategic use of Clarnico Quay[2] by the developer. A community space, Clarnico Quay has been designed to promote the 'spirit of the area' by creating a 'community buzz' in a central location within the development. For this interviewee, soft infrastructure has the potential to support the development of a sense of community in a new place.

> *…it will open up its space 25% of the time to local community groups in the pub area which won't be used on a Monday or a Tuesday. So you can use that for a local community group and… you are animating the place by having something there early. There is also a community benefit there as well, as… it's a good way to create a buzz about the place early on and creates opportunities for local people too. (Interviewee 1, Places for People)*

[2] Clarnico Quay is a mixed-use space which will open in Autumn 2020 as part of Places for People's development at East Wick and Sweetwater, located in Stratford, East London

The interviewees reinforced the importance of soft infrastructure for supporting a sense of community and highlighted how it is needed alongside hard infrastructure in order to create a successful place.

3.2. 'Good quality' places

3.2.1. The main stakeholders in the design and delivery of 'good quality' places

The interviews explored the main stakeholders involved in the design and delivery of 'good quality' places and the complexities that arise from their interactions. All the interviewees had different ways of conceptualising a 'good quality' place, although there was a consensus that such places are both mixed use and mixed tenure.

> *As part of the delivery of that high-quality place, you will deliver high-quality housing of all tenures [as well as] a mixed-use area, as this has broader linkages to the surrounding area… [A 'good quality' place] is somewhere where someone wants to live, work and play. (Interviewee 4, Industry)*

The interviewees identified a range of stakeholders that come together to create 'good quality' places and deliver the services needed. According to one interviewee, these are:

> *The developers; the architect/landscape designers; people occupying and using the space; local authorities; National Government agencies relating to infrastructure provision; utilities' companies (energy, power and communications); public organisations responsible for health and education; and commercial organisations who occupy the space. (Interviewee 9, Places for People)*

The nature of mixed tenure communities, with differing household size, demographic make-up and household life stages, can make it more complex to deliver appropriate services to these places as there will be a diversity in needs and wants.

> *…if I am 25 with two kids, my needs are very different to if I am 25 and single, or 25 with a partner. (Interviewee 9, Places for People)*

In addition to planning infrastructure and designing a place to account for this diversity, multiple interviewees recognised the challenges that developers face in predicting the needs of future occupants.

> *You don't know who is going to move into those places. The people who are future occupants don't know they are going to move into those places. It is almost impossible to engage with the individuals who are going to live in this place. (Interviewee 8, Academic).*

However, interviewees acknowledged that developers are able to consult in existing developments, e.g. where regeneration is taking place.

> *Often, if you are doing an estate regeneration scheme, you can identify the actual occupants and work with them. (Interviewee 8, Academic)*

When building new developments, the previous experience of developers in creating mixed tenure and mixed use areas can act as a substitute for future residents' views, providing an understanding of what certain individuals may look for in their future place.

> *[The design and delivery of 'good quality' places needs] an understanding of those different personas [in order to] build personalities and [an] understanding of the feelings around them, and then we can use those to create the places where people will live. (Interviewee 9, Places for People)*

3.2.2. Consultation between different stakeholders

There was a strong consensus that ineffective communication between different stakeholders can be a major barrier to designing and delivering 'good quality' places.

> *The developers assume that they know what the planner's priorities and constraints are, but actually they might not. They don't have forums where they really sit down regularly and talk this through. (Interviewee 8, Academic)*

Interviewees also commented on how ineffective communication and forms of engagement can lead to conflict.

> *There has been conflict and [stakeholders have] been at odds with one another. They have not been able to break down historic problems of engagement and their success has been less tractable. (Interviewee 3, Academic)*

Stakeholders can have competing interests and conflicting views that are hard to reconcile. There are multiple reasons why people may oppose new developments, and those who are planning new developments have to try to understand these views.

> *And yet because people take sides, you need to try and make it work between the planning authority, the landowner/developer and the community… You have to understand why they oppose development... It is fear of infrastructure, it is lack of opportunity, it is people moving in from outside. It is a whole host of different drivers. (Interviewee 6, Places for People)*

Developers need to be responsive to input from wider stakeholder views and may need to change their plans in line with the comments and responses given by the local stakeholders.

> *…there were 20 or something different changes. They were the direct result of what people did, or didn't, like. (Interviewee 6, Places for People)*

3.2.3. Influence of communities within the place-making process

There was a view that the place-making process should not be solely a top-down process. By not overly defining or curating a place, there is opportunity for bottom-up engagement on behalf of the community that will live there.

> *If the tenants or customers got together and said we would like to take that over and turn it into an allotment, why can't we let them? Because that is ownership of a place, that is proper place-making. If we tell people that they can't put gnomes up outside their front door, if you can't grow flowers up your wall and that sort of thing, that is not allowing them to own a place. (Interviewee 9, Places for People)*

Interviewees stated that it takes time for true place-making to occur as only so much can be designed and planned by the developer in advance. It takes time for a community to develop and begin to shape their place and meet their diverse and multiple needs.

> *… you can't immediately place-make, it is not 'pop up' placemaking…. I think [somewhere] probably needs 3-5 years to feel like a place [because]… people need to get comfy in [a place] and start using it, and having it become part of their … not this beautifully curated place that people can't touch and live [in]. (Interviewee 9, Places for People)*

3.2.4. Sustainability and 'good quality' places

The interviews suggested that sustainability is multi-faceted, and the various aspects of sustainability must be taken into account by developers. A variety of wide-ranging definitions of 'sustainability' were given by interviewees.

> *[Sustainability] is another one of those words that doesn't really mean anything - or it can mean everything. You could talk about environmental sustainability, you could talk about physical sustainability of how the buildings are going to stay up before they crumble into dust, you can talk about social sustainability, or all three in some combination or another. (Interviewee 8, Academic)*

The majority of interviewees were of the view that sustainable places are those where developers have considered how the use of a place will change in the future. It was agreed that sustainable places are those which are more likely to remain high-quality in the long-term.

> *So it is a question of not just thinking about what you are creating now, but what it will be in 10 or 20 years' time. (Interviewee 4, Industry).*

In order to ensure that both homes and surrounding infrastructure are sustainable, developments are guided by specific design principles and policies, such as the Future Homes Standard. Even though the Future Homes Standard has not come into law, developers are pre-emptively trying to adapt their development activity accordingly.

> *…there is a set of activities or obligations that we are trying to deliver. Some of which are driven by regulations, or some by just good protective planning. There is something called the Future Homes Standard and all those sorts of things and - they are going to have an impact upon us and it is important we get ready for it... (Interviewee 1, Places for People)*

The interviews conducted during this research reveal that there is more to creating sustainable places than simply ensuring that housing and physical infrastructure are built to sustainable design principles. Developers need to create an environment which sustains a community over time by encouraging people to stay in that place into the future. In order to achieve this, it is necessary to ensure that the place is able to adapt to meet the requirements of the community as they change over time.

> *To me, the word 'sustainability' has connotations of long-lastingness and longevity. So, are we actually trying to build places where we want to encourage people to stay for a long time? (Interviewee 8, Academic)*

Interviewees felt that individuals make an active judgement regarding the quality of a place, and a sustainable development is one which is judged to be of high-quality over an extended period. It follows that when people consider that a place meets their needs and is a desirable place to live, they are more inclined to want to continue to live and invest there over time, and the place does not begin to deteriorate.

> *I think the sustainability of a place is defined by people wanting to stay in that place… A sustainable place is a place where people want to come, to invest there and live there. If you want to get out of it, or not invest, then it is not sustainable and will fall away. (Interviewee 3, Academic)*

Multiple interviewees voiced the opinion that in order to be sustainable, developments need to become embedded in the social and economic infrastructure of the wider area. Transport infrastructure linking developments to nearby places is essential in order to ensure residents have access to jobs, leisure amenities, and other essential services in the surrounding area. As such, a sustainable, high quality place is able to integrate with other settlements around it.

> *I think it is something… that needs to be there so that each place is not an island. [A place] shouldn't be something that has just landed in the area, it should be something that integrates into the area…. and fits into the broader vision of an area. (Interviewee 4, Industry).*

The sustainability of a place is multifaceted, and comprises its physical aspects, e.g. energy efficient homes; the willingness of people to reside there; and how well it is able to connect to wider infrastructure and other amenities in the surrounding area. In order for a place to remain high quality into the long-term, developers not only need to adhere to specific design principles which underpin the design of long lasting homes and infrastructure, but also to create an environment that is appealing for people both in the present and for many years into the future.

3.3. Sustainability

3.3.1. Stewardship and sustainability

Interviewees felt that consideration of the long-term future of developments should be the starting point in designing sustainable places. Importantly, this involves thinking beyond the design of housing itself, so that how the wider landscape accommodates peoples' lifestyles is a key consideration.

> *I think you have to start from a place of imaging what it will be like in 50 years. What will people be doing? It is not just where the homes are going to go, it is their experience of walking down the street, or of their children growing up there. Start from that and design backwards - and housebuilders have never done that. It is designed from the housing upwards. (Interviewee 6, Places for People)*

The interviews also revealed the importance of thinking from the outset of development about who will look after the place and who will make decisions regarding its governance in the future. This is an essential element of planning for sustainable places, as places need to be continually managed in the future in order to ensure they meet the needs of residents.

> *Stewardship and governance are key… because that really comes into play with how you approach the planning of a place, how you think about the delivery of infrastructure, and how you think, long after the development period, about what is going to happen to that place. (Interviewee 6, Places for People)*

In one case, an interviewee commented on how their housing association intends to make sustainability a central part of their future governance strategy for one site, Gilston Park[3]. Active considerations are being made about how land use and community amenities might change over time. By using a Community Land Trust, the housing association will ensure that the land assets are kept within community ownership, thereby empowering local people to manage and curate their community over time. In doing so, stewardship for the place is

[3] The Gilston Park development is a proposed site located in East Hertfordshire and is just a mile north of Harlow, Essex.

passed to residents, meaning that decisions can be taken to ensure the space continues to meet the needs of the local community by members of the community itself.

> *We have something [at] Gilston where we are transferring land assets into community ownership, with an endowment for the future of the community. (Interviewee 6, Places for People)*

The interviewees recognised that not every house builder will consider their places' stewardship and future governance mechanisms, as private developers may only have short-term involvement in a place. This poses a challenge for ensuring that places are managed sustainably into the future. Housing associations, on the other hand, may own affordable housing or manage property in an area and so have a long-term commitment both to their tenants and the place itself.

> *[Private developers] hand the keys to someone's house and ideally they would have very little to do with them again. We've always said that we see it as the start of a relationship but, because we only build affordable housing or market rent or some of the commercial, we have an equal stake in the success of an area. So we think about how it's going to be managed. (Interviewee 6, Places for People)*

This evidence suggests that the development of sustainable places requires clearly set out strategies for how to involve residents in long term management of their community. Such strategies should be considered from the outset of development. Different types of developers will have varying time commitments to their settlements and, as a result, the stewardship of a future development is not always considered at the beginning of the place-making process.

3.3.2. A holistic approach to sustainable places

Interviewees were keen to emphasise that, in order to build long-lasting, high-quality settlements, developers need to pay attention to the relationship between different aspects of sustainability. In order to build a place which is successful in the long-term, it is important that developers consider how a space will serve its residents in economic, environmental and social terms. Delivering a healthy environment, enabling access to jobs and leisure facilities, and providing essential services (such as schools and hospitals) for the community are all required to ensure the development of a sustainable place, and success is unlikely to be delivered if any single one is missing.

> *…So I am very much about the holistic view: economic, social and environmental…. aesthetic as well. (Interviewee 5, Places for People)*

Interviewees emphasised that there is a difference between the idea of sustainable development as a policy goal, and its implementation in reality, and whilst the principle of 'sustainable development', which involves the balancing of the economic, environmental and social attributes of a place, is defined in planning policy guidance (such as the NPPF), it does not offer clear guidance as to how developers should go about achieving this.

> *You know the NPPF talks about sustainable development, so everything has to be couched in those terms. I am not sure, in a lot of cases, of how much thought goes into the use of those words. I am not accusing anybody of bad faith, but just putting those words on the paper doesn't automatically make it apparent about what those words mean in this particular context. (Interviewee 8, Academic)*

The balancing of the economic, environmental and social requirements to achieve sustainability can be difficult. One interviewee emphasised that the design and delivery of a sustainable 'good quality' place requires an understanding of how its environmental aspects (e.g. carbon neutrality) will impact other economic and social dimensions (e.g. the structure of the local economy, or the types of jobs present in that area). Typically, greater focus is given to environmental sustainability in the built assets, rather than a location's economic and social sustainability. This can have negative repercussions, as it can mean that other factors which are just as important for ensuring sustainability of the place – including access to jobs, social amenities, and community facilities – may be overlooked.

Interviewees suggested that there is no specific measuring tool by which the combined environmental, economic and social conditions can be assessed as sustainable or not.

> *How are we being sustainable as a business by denying these things? It is about all those very clear topics like carbon, water, waste, etc. but bringing all these together [in a place], how does that overlay local economics or local jobs in that area?... It is huge, but there is no KPI or measured outcome, no monitoring or reporting. The fact is that these places are not sustainable and, if they are, they are [sustainable] by default and not by design. (Interviewee 5, Places for People)*

Therefore, while a holistic view taking into account the social, environmental and economic aspects of sustainability might be useful when designing a place, it can be challenging to

balance these facets of sustainable development in a way that is context sensitive and site specific.

3.3.3. Climate change and becoming carbon net-zero

The wider construction industry is currently making an active effort to reduce its carbon footprint and increasingly, sustainability within the built environment is framed by the requirement to be carbon net-zero[4].

> *There has been a prominence [in industry] very recently around zero carbon within the built environment, and the built environment counts for around 40% of carbon emissions. So it is definitely an issue that the industry is grappling with. (Interviewee 4, Industry)*

Even though the housebuilding industry is trying to reduce its carbon emissions, the interviewees recognised that effective collaboration is needed between the public and private sectors in order to meet net-zero carbon targets by 2050.

> *If we are truly going to meet those zero carbon targets, the final 10-20%, [government] aren't going to be able to do at the central level. They are still going to have to do a lot to get to that 80%, but that final two miles is going to require the development community to deliver something very different at a local level. (Interviewee 10, Places for People)*

In acknowledging the role of private sector developers in reducing their carbon emissions, multiple interviewees illustrated the steps that they are willing to take in order to change their business practices and become environmentally sustainable.

> *I think that these days we shouldn't be doing anything that is going to be unsustainable or that hugely negatively impacts the climate. (Interviewee 9, Places for People)*

However, they expressed the view that there are substantial challenges in retrofitting housing stock to become carbon net-zero.

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[4] The requirement for the UK to be carbon net-zero by 2050 was made legally binding through an amendment in the Climate Change Act 2019. Net-zero means that any activities that emit carbon dioxide into the atmosphere must be balanced with activities that remove said carbon.

> *I think our challenge is how we retrofit zero carbon. [Homes] have been built and we should look after them - it takes more carbon to build new stuff whereas if we found some way to look after [existing stock] and find some economically viable way of retrofitting and making them more energy efficient and carbon neutral, that is something that should absolutely be in our business plan. (Interviewee 9, Places for People)*

Making housing and wider places carbon neutral is a complex issue and will take time to achieve. Cross sector collaboration will be required, as will the introduction of the necessary infrastructure to support the transition of places to carbon neutrality, e.g. the widespread installation of charging stations for electric cars or increased public transport provision. These challenges add to the potential complexity in achieving carbon net-zero housing and places, especially since these efforts have only just begun.

> *So we really have to do a lot of work on what is appropriate and where that then ties into our existing estate. So, zero carbon is zero carbon, cross-sector, vertical, horizontal. We are now thinking about how we baseline our stock so we know what our starting position is and we can fill that gap, and we will have to retrofit infrastructure solutions to allow that stock to be what it needs to be. And for this organisation here, we are right at the start of that journey. (Interviewee 5, Places for People)*

The infrastructures and housing that sit within places are increasingly being viewed in terms of the mitigation of climate change, but the measures needed to make housing and places carbon net-zero are complex and will take considerable time to achieve.

4. Conclusion

This conclusion draws together key findings regarding the connections between infrastructure and housing, the place-making process as part of designing and delivering 'good quality' places, and their overall sustainability. It addresses the research questions and offers recommendations aimed at ensuring that sustainable places can be built in the future.

4.1. What is the best method for matching infrastructure planning and housing provision? What role does 'soft' infrastructure play in accompanying housing in infrastructure planning?

Responsibilities for infrastructure planning and for housing provision are fragmented across various stakeholders, including local authorities, central government bodies, private developers, arms-length bodies, and utilities companies (Graham and Marvin, 2001; National Audit Office, 2019). Although these stakeholders work together to deliver and integrate infrastructure and housing, they may have different motivations and seek different outcomes. For example, public sector actors - such as central government or local authorities - may strategically invest in infrastructure to encourage housing development, economic development, or improve regional connectivity, but private developers are more likely to be driven by the need to realise financial profit by building housing alongside existing or planned new infrastructure. It is inadequate to build housing alone – sustainable places require a range of (perhaps less directly profitable) infrastructure and are therefore usually delivered through a combination of public and private investment. Coordination between key stakeholders is therefore essential in order to build successful places.

Interviews with stakeholders confirmed that spatial planning is a key mechanism for effective collaboration between different levels of government. It provides a strategic vision for development, connecting local planning practices with national needs expressed through planning policy (Scottish Government, 2019a, 2019b, Hawkes, 2019). The benefits afforded by spatial planning, a joined-up approach which connects different spatial scales, go beyond delivering housing with infrastructure and could help solve other problems. For instance, it may help to identify 'left-behind' areas, enabling replacement of outdated infrastructure or promoting growth within those places (Williams, 2014, RTPI, 2019). Therefore, spatial planning is an effective vehicle for linking infrastructure planning and housing provision and has wide-ranging benefits.

There are, however, difficulties in achieving a joined-up and strategic approach to infrastructure delivery and housing development. Local Plans are required to adhere to national planning guidance offered by the NPPF, and to meet local community expectations,

while setting out the design vision underpinning local development (MHCLG, 2019a). This research identified the need for a 'larger than local' approach to development, but also highlighted the fact that the possibilities for such an approach to strategic planning are somewhat restricted because of the gap left by the removal of the RSSs. The lack of regional guidance causes difficulties in coordinating infrastructure and housing planning effectively across different spatial scales, from national to local.

The integration of infrastructure development and investment is not only impacted by the lack of clarity between different aspects of government in their interaction with the private sector (National Audit Office, 2019), but also by the lack of centralised sources of funding for local authorities. Local authorities are more reliant upon developer contributions and source funding from multiple streams in order to fund infrastructure development, meaning that funding is piecemeal (RTPI, 2019). Consequently, the funding for infrastructure is focused more upon the short-term and the immediate returns for the funders. Therefore, in order to provide infrastructure alongside housing in a timely manner, there is a need for a centralised source of funding.

Collaboration between the public and private sector can be more efficiently coordinated through the wider use of institutional mechanisms like development corporations, or by the public sector taking a more proactive approach through strategic land assembly. Development corporations enable different public and private sector actors to come together with different resources and work with one another in establishing a common platform for development, e.g. public sector with land and the private sector with developmental expertise and monetary resources. Furthermore, strategic land assemblies are useful since they offer a mechanism to consolidate land under single ownership, enabling private sector developers to collaborate with the public sector and landowners to encourage development. These mechanisms offer a way for the public and private sector to effectively coordinate their activities.

The research suggests that guaranteeing the delivery of hard and soft infrastructure before housing is occupied ensures that people have access to the resources needed to support high quality living. Providing soft infrastructure, identified as necessary for the development of human and social capital, before housing occupation was identified as being vital to successfully support a sense of community (Brail et al, 2017). Interviewees also recognised that developing soft infrastructure prior to the completion of housing development enables the infrastructure to act as an anchoring point for the community (Cass et al., 2018): for a sustainable community to form, other infrastructure such as GP surgeries, schools and public spaces are necessary, and this infrastructure then becomes embedded in the community fabric (Williams, 2014, Brail et al, 2017).

The research also explored some of the consequences of classifying housing as infrastructure under the Nationally Significant Infrastructure Projects (NSIP) scheme. Although planning consent for large-scale housing development could be given relatively quickly under this scheme, this was perceived as reducing local democratic accountability and thereby increasing the risk of generating local resistance and political conflict. Additionally, there are a number of barriers to rapid large-scale housing construction, including supply chain fragmentation and labour shortages within the construction industry. However, the current regime does offer an effective mechanism for integrating the delivery up to 500 homes with Nationally Significant Infrastructure; communities of a smaller scale can be developed through the scheme. Thus, the NSIP regime is not the best method for delivering housing on a mass scale, but it can be effective in integrating central pieces of infrastructure and housing.

4.2. Who are the main stakeholders in the design and delivery of 'good quality' places? In what ways, and to what extent, are they able to influence this?

A 'good quality' place is one which balances economic, social and environmental value from the perspective of multiple stakeholders (Carmona, 2019; Roger and Hunt, 2019). Interviewees felt that a high-quality development is one that is both mixed tenure and mixed use. This research identified a range of stakeholders involved in the design, delivery, and maintenance of 'good quality' places, including local authorities, statutory bodies, private sector developers, and local communities (Dempsey and Smith, 2014; Beza and Hernandez-Garcia, 2018). The place-making process can be complex, challenging and time consuming because there are multiple stakeholders whose views and needs must be taken into account. Whilst consultation and adherence to Local Plans are designed to enable developers to meet the demands of existing stakeholders, the voice of future occupants of new developments is often missing from the consultation process. The prior experience of developers may mitigate this to a certain extent where they are able to account for which amenities and housing types are needed by people of differing ages, backgrounds and life stages. The design and delivery of 'good quality' places is complex, as it has to account for the different needs and wants of multiple existing and future stakeholders. Therefore, there is a real need to dedicate time and resources to facilitate open and inclusive stakeholder engagement.

Place-making processes are crucial to enable local communities to reimagine or upgrade their surrounding built environment, or to aid developers in constructing new developments in accordance with their visions, values, and meanings (Strydom et al., 2019; Beza and Hernandez-Garcia, 2018). The value of the consultation process in place-making is important

in understanding how development may impact local contexts, as well as affording developers the opportunity to gain insight and advice from local communities. For place-making to be successful, the process needs to identify specific 'enablers' who will represent local communities and enable meaningful participation in the decision-making process. By building trust between developers and local communities, the co-creation or co-production of places can be facilitated, resulting in more successful outcomes marked by higher levels of community acceptance (Wolf and Mahaffey, 2016; Teder, 2019). Developers' and residents' visions for their place may be in conflict with one another; the developer should be responsive to this and should not overly curate or define a place thus allowing residents to have meaningful input into shaping a place to their own needs. The extent to which local communities can shape the place-making process as part of the design and delivery of 'good quality' places depends on effectiveness and quality of the engagement between developers and other stakeholders, thereby making the place-making process collaborative and not top-down.

After the construction of a development, the place-making process transitions to one of place-keeping, and there is a need to consider how that place is managed into the future. Place-keeping is a process which involves stakeholders ranging from asset management companies, private developers, local authorities, local communities and user groups to form long-term management strategies and implement them (Dempsey and Smith, 2014). The influence that relevant stakeholders have in shaping their development thus extends beyond the initial construction of a place into the future.

4.3. What is meant by sustainability in the building of 'good quality' places? What considerations are paid to holistic sustainable solutions beyond the remit of climate change?

The sustainability of a 'good quality' place comprises multiple elements. The NPPF dictates that sustainable development must meet the needs of the present without compromising the requirements of future generations, and that such places need to be economically, environmentally and socially sustainable (MHCLG, 2019a). Developers need to design a built environment which encourages people to remain invested in a place as their requirements change, through the provision of different types of housing and amenities to suit different needs. In order to be sustainable, new housing developments must be embedded in a wider system of infrastructure, including schools, public transport connections and community facilities, that can support a community in the long term.

Furthermore, it is important that developers 'future-proof' and try to increase the resilience of their development from external threats such as climate change. As such, sustainable

developments must be able to anticipate and adapt to continually evolving needs of local communities.

The interview analysis echoed findings in the literature review: good quality, sustainable places need to take account of the economic, environmental, social and physical aspects of the space (MHCLG, 2019a). However, the guidance offered in achieving a balance between these factors operates more as a general blueprint rather than as specific guidance for developers. It does not account for the specific local contexts which developers must engage with in order to create places which work within particular localities, and the idiosyncrasies of local places mean that it is impossible to apply a 'one size fits all' approach to achieving sustainable development. Developers must take account of particular, local challenges if they are to produce a good quality place which fits in with local economic, environmental, social and physical conditions.

The focus on sustainability within the built environment is shifting towards the mitigation of climate change. The commitment to make the UK carbon net-zero by 2050, along with policy such as the Future Homes Standard, are important considerations for developers and other stakeholders when designing and delivering 'good quality' places. Reaching these aims will require cross-sector collaboration (Committee on Climate Change, 2019, MHCLG, 2019b). Delivering these goals is likely to be challenging as efforts to make housing and its associated infrastructures carbon net-zero have only just begun and there are currently neither systematic nor economically viable ways of achieving net-zero carbon status. Therefore, in order to create places that are able to accommodate the requirements needed to mitigate climate change, there needs to be greater government support in developing approaches that facilitate this. Nonetheless, stakeholders in housing construction have a key role to play in delivering carbon net-zero homes and the associated infrastructure necessary for building developments which are sustainable for the communities within them, as well as for the planet.

5. Recommendations

- A layer of strategic planning beyond the local authority level, e.g. a tier of regional planning, is needed to ensure that infrastructure planning and housing provision are in step with one another.
- Given the important role of planning in coordinating housing and infrastructure, there needs to be adequate resourcing for local planning departments and investment in the skills of planning officers.
- Effective public and private sector coordination for housing and infrastructure delivery should be facilitated by the wider use of institutional mechanisms (such as development corporations) and a more proactive public sector approach (including the use of strategic land assemblies).
- Infrastructure needs to be delivered alongside housing so that the services people need for high quality living are in place before homes are occupied.
- To ensure that local authorities are not reliant upon piecemeal funding for the infrastructure needed to support new housing, there is a need for a centralised source of finance to guarantee that essential infrastructure can be efficiently delivered alongside housing development.
- In order to ensure the delivery of 'good quality places', soft infrastructure (e.g. community amenities and facilities) must be delivered in a timely fashion alongside hard forms of infrastructure (e.g. roads, railways) and housing in order to effectively support the development of a sustainable community.
- There is a need for good practice guidance on consultation to support collaborative approaches to development consultation based on openness and transparency. Developers must commit adequate time and resources to facilitate this. Local residents may need support to engage effectively, particularly in disadvantaged communities.
- To ensure that places are able to adapt to changing needs, community members must have continuing opportunities for their voices to be heard in the long term governance and stewardship structures of a development. In order to maintain the physical and social structures that enable high quality living, developers need to consider, from the outset, who will maintain the place into the future and who should be responsible for its governance. Developers and other stakeholders must agree strategies for involving local communities in long-term management and governance.

- Industry guidance on good practice that balances the economic, social and environmental aspects of sustainable place-making needs to be developed. There would be value in developing a robust way to assess sustainability in the broadest sense, as well as identifying and disseminating good practice examples.
- To meet targets for carbon emissions that are economically viable and sustainable, developers need to collaborate with government and other actors not only when designing new places, but also in retrofitting existing developments. Achieving net-zero carbon needs sector commitment, technical innovation and resourcing.

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