TO-MORROW 2.0
GRANGE-IN-THE-HEDGES

CONTENTS

INTRODUCTION

In 2017, the UK government announced a plan for 'garden towns', to address a growing housing crisis. This has received widespread criticism; accused of using the Garden City brand as a shallow exercise in public relations to justify suburban sprawl. This competition offers an opportunity to re-imagine the current relevance of the Garden City in a deeper way.

The Garden City movement originally developed to address the dire living conditions faced by people attracted to towns in search of work, as technology eroded agricultural employment. At its heart, the movement seeks basic social and economic fairness, through holistic design across multiple scales – Town Planning in Practice[1] discusses relationships between landscapes, streets, plots and buildings – and through a process of value capture: reinvesting, for community benefit, the land value increases that arise from development.

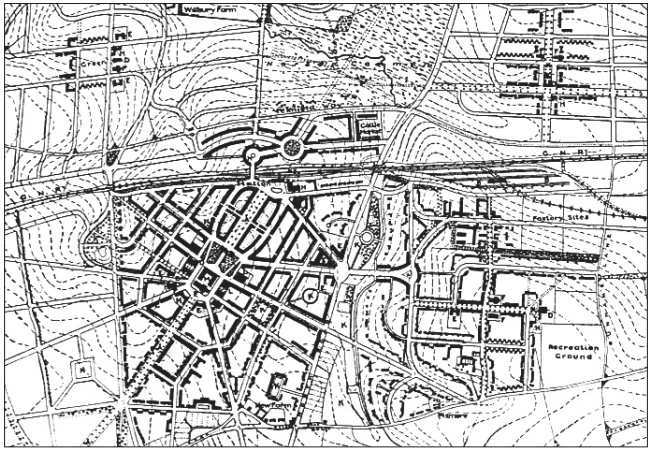
The movement's social values, holistic design and creative approach to commercial forces are as important today as ever they were, but they now face new issues. Current ways of life are damaging natural capital's capacity to regulate climate; to provide food, clean air and water; and to offer cultural inspiration. Artificial intelligence is rapidly reducing the demand for all but highly-skilled workers, generating a precariat trapped in poverty and low job satisfaction; though the creative use of ICT has growing potential to support an alternative cooperative economy. Social systems too face problems; with many people trapped between endemic loneliness and a pervasive sense of stranger-danger.

AIMS

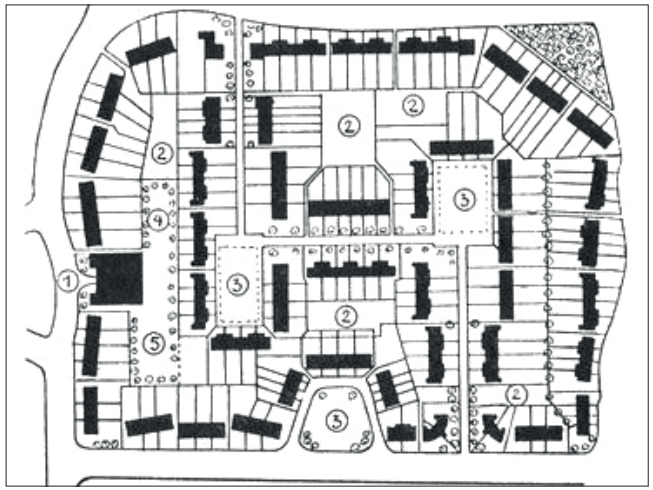
This competition calls for re-imagining the Garden City movement's capacity to address these emerging issues at two levels: through a pathfinder project, and by stimulating wider debate. Our submission uses our Grange-in-the-Hedges project as a research tool for identifying key aspects of the garden city approach which need re-imagination, to maximise its ability to achieve its aims today. The purpose of this report is to identify these aspects, and suggest how they should be re-imagined in practice. We are committed to publishing our ideas as they develop, to support the general development of design culture, so we also propose to stimulate a wider debate by using this project as a final 'worked example' in our design manual EcoResponsive Environments, to be published by Routledge in 2020.

GARDEN CITY CONCEPTS

The garden city pioneers linked together the natural infrastructure of the landscape with streets, plots, buildings and their various components to develop a holistic design approach; making free and creative use of pre-industrial spatial types which had evolved through trial and error, across varied cultures, over millennia. Within a compact overall urban envelope, this inherited typology's streets formed highly connected networks suitable for walking; the plots were relatively narrow, with direct access from the streets; and the buildings presented active fronts to the streets, offering natural surveillance, with private space for food-growing at the back; automatically forming ring-like perimeter blocks of various shapes and sizes.



The garden city embodied a highly creative interpretation of this inherited typology; driven by a creative search for 'value capture' – understood as gaining the maximum community benefit from external commercial forces – whilst maximising the cultural and provisioning services afforded by the natural world. This attitude to nature – today we should call it 'biophilia' – inspired Parker and Unwin at all scales of garden city design. In provisioning terms, a multi-scale structure of food-production spaces is sustained throughout and beyond the settlement, through a creative economic model. At the cultural level countryside access for all is ensured through a green belt boundary; whilst low-density development supports natural infrastructure within the city, for health and urban agriculture; short cul de sacs are added to the street network, to increase the area of green public space; creating perimeter blocks with complex shapes, sometimes containing within them communal spaces for urban agriculture, and social uses such as 'gardens for epileptics'.



In the notes which follow, we review the ways in which the various elements of this Garden City typology might benefit from re-imagination, at all scales from overall city form through to the details of building construction.

A CHANGING ECOLOGICAL CONTEXT

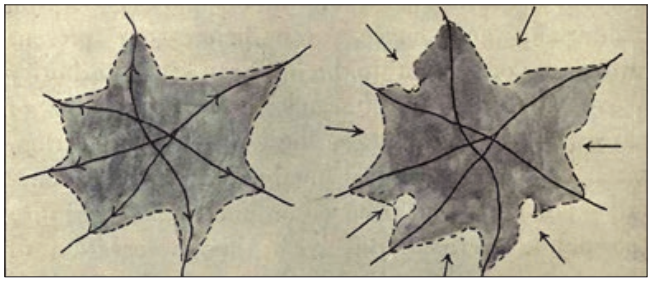
The cultural and provisioning services afforded by the original garden city remain important today, but now we also face damage to natural capital through breakdown of the ecosystem's regulating services; largely due to carbon emissions from burning fossil fuels. At the most strategic level, we need city design not only to minimise these emissions, but also to generate sustainable alternatives. Value capture has to be re-imagined in ecological as well as social and economic terms.

OVERALL CITY FORM

At the largest scale, the garden city was conceived as a 'green field' approach for creating new settlements. Most current developments, however, expand existing settlements on sites that already have neighbours, and even new settlements take a long time to finish. The underlying value of social fairness demands that each new development's negative impacts on its neighbours' interests must be minimised, and positive ones created wherever possible. This has implications both for the design and development process and for physical form.

Beyond short-term commercialism, long-term capture of sustainable value involves weaving generic professional expertise together with the social and ecological specifics of local situations. This increasingly requires two sets of experts in the design process. All of us become expert in the everyday life of our particular localities, through a continual process of action research. In today's situations of rapid divisive change, however, outside professionals can easily get out of step with local neighbours' knowledge; creating unloved places of low value. To address this endemic issue, we propose using modern technology in a new approach to value capture: tapping into local expertise, and integrating it with designers' own more specific knowledge-areas, through community involvement via 'ShareApp' ICT, set up as an integral part of the post-competition design process and supporting a community-led management system thereafter.

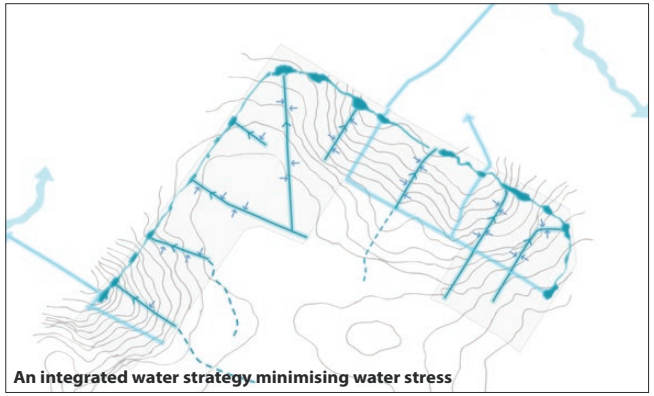
In spatial terms, both population growth and the rate of household formation create an unstoppable demand for housing; with the result that expansion is often required beyond green belt boundaries; cutting existing residents off from the countryside access they previously enjoyed. Naturally they resent this, and fear that the situation will worsen in the future. To address this issue, we suggest re-imagining green belt boundaries as sets of ecologically-sensitive growth corridors, with green wedges between them to allow expansion with minimum disruption of established countryside links, as first suggested by Patrick Geddes in 1915[2].



Geddes, 1915

NATURAL INFRASTRUCTURE WITHIN THE CITY

Within its borders, the garden city's tradition of low density development allows large areas for green systems, and for the water system on which all life ultimately depends. Today's water system faces crises of both flooding and shortage. Low density development is positive in both these terms; minimising the percentage of hard surface areas of streets and buildings, reducing the rate of rainwater runoff and therefore reducing the risk of flooding downstream. In our project, runoff is further absorbed through swales in all the streets where topography allows, eventually running through to a series of retention ponds forming a moat; which strengthens the new green belt boundary and insures against fears of future expansion: an effect reinforced through the bio-political value of reintroduced Great Crested Newts. Providing water for agriculture, the moat links orchards at either end, and is integrated with a new Greenway - Wildflower Walk – planted with trees for shelter from cold north winds, and with local wild flowers to attract pollinating insects. Showcased through the Greenhenge recreation space, linking the settlement through panoramic views to the wider countryside, the cultural value of the moat and greenway is captured through nature walks organised through the ShareApp.



An integrated water strategy minimising water stress

Looking north towards the Green Henge

THE PUBLIC REALM

Despite its natural-infrastructure advantages, low-density development also raises health and emissions problems today that could not have been foreseen in 1903. Low densities discourage walking and cycling, and are uneconomic for public

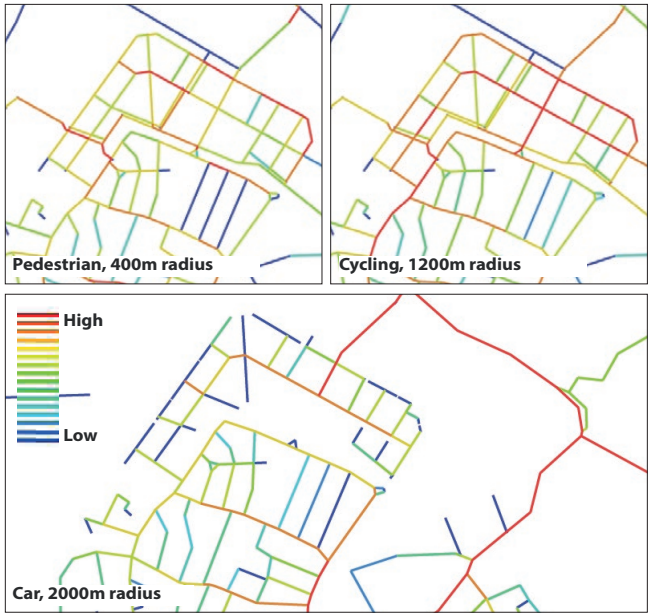
transport, so they encourage car-dependency: even assuming a future shift to electric vehicles, this raises health problems from reduced incentives for natural exercise and through particulate air pollution. Since it is a competition fix, and also appeals to a wide spectrum of potential residents, this project's task is to re-imagine low-density development to minimise the car-dependency it encourages, whilst making best use of the open space potentials it affords.

The task of reducing car dependency is helped by the trend towards fewer young people owning cars and taking out driving licences. The reasons are partly financial: any car is a large investment, which lies typically unused for over 90% of the time. This financial tension can be turned to good account by making it cheaper to go electric, through a 'car club' community business with a fleet of electric vehicles, and by ride-sharing supported through the Share-App system.

In parallel, we must re-imagine the form of the public realm itself, to discourage car-dependency by making it less convenient for cars, but more convenient and attractive for pedestrians and cyclists. To minimise hard surfaces and infrastructure costs, the streets are spaced as far apart as possible without disadvantaging pedestrians. The existing hedges, together with new clumps of trees and bushes, are used to create dead ends for cars, and to create the sales premium that arises from 'private access' ambience. In contrast, narrow links through these planted barriers allow the creation of a direct, highly-connected movement-network for pedestrians and cyclists.

Each street segment's connectivity with the system as a whole predicts the traffic flows it is likely to carry. Space syntax analysis shows the overall connectivity of our layout street by street, with the most-connected streets in the hottest colours. These diagrams show how the cul de sacs reduce connectivity for cars, but not for pedestrians or cyclists.

Space syntax spatial accessibility analysis maps



To maintain a biophilic sense of place, to encourage walking and cycling, as many streets as possible are orientated towards open landscape views, and integrated with the existing planting structures of hedges and greenways. On-street parking, surfaced with reinforced grass, reduces traffic speeds on Hedgers' Boulevard, and is located to protect the cycle lanes and allow space for large trees. Chosen to absorb particulate pollution, the trees also reduce the perceived street width, and therefore reduce both the speed and the sensory impact of traffic still further. Solar-powered motion-sensed street lighting supports night-time bio-diversity, and saves electricity.

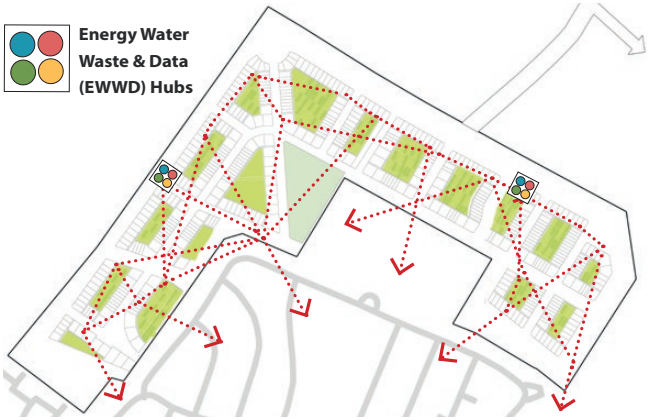
In addition to streets, the original garden city typology provided a great deal of green space in the public realm. Though Unwin himself criticised his own original ideas - typically open-minded, he wrote in 1907 that the 'Spaces in the garden city tend to be too large in proportion to the buildings, and we have much yet to learn as to the best treatment'[3] – these greens were originally well-used; but today's sense of stranger-danger means that most parents restrict their children to the private spaces of the home. Reducing the area of the public realm, together with the widely-spaced streets we propose, allows us to alter the balance between public and communal space established by the garden city pioneers; creating the potential for larger communal spaces within the perimeter blocks.

PERIMETER BLOCKS

The spaces within the perimeter blocks afford opportunities for urban food-production; valuable not only for nutrition, but also because participation in soil-to-soil agriculture offers a hands-on understanding of ecological processes: an invaluable foundation for creating ecologically-aware lifestyles. Since they are also safely disconnected from the wider settlement, these spaces are also suitable for active, relatively unsupervised play in outdoor green environments, with health and socialisation potentials that are sorely needed by the 47% of Letchworth's children who are 'not developing well at age 5'[4].

So that all their communal spaces will naturally attract a diverse range of neighbours, each block is surrounded by a mix of dwelling types and tenancies. This affords opportunities to meet a wide range of people – addressing the problem that half of

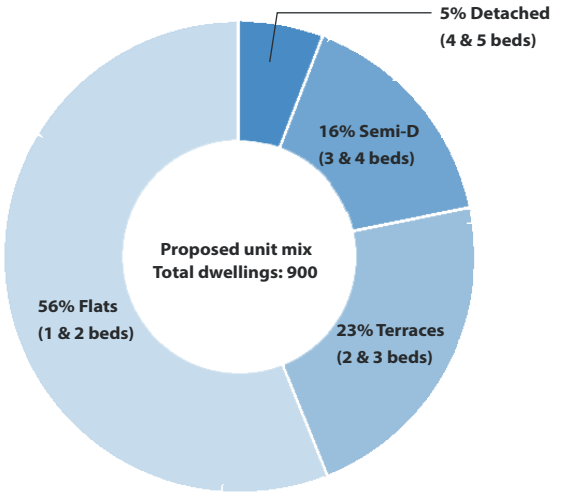
Letchworth's neighbourhoods have older adults 'at high or very high risk of loneliness'[5] - but with a 'gasket' of private gardens as a protective interface with family life. The ShareApp community ICT system will offer opportunities to build cooperative social and economic relationships, from allotment use to space-sharing or care activities.



Service systems, linking all the buildings and activities together through ICT for mutual value-capture benefit, are also organised through the EWWD hubs. Rainwater is collected for cultivation. Grey water is recycled for flushing, and the resulting black water is treated locally in constructed wetland 'Living Machines', then recycled again as EU bathing-quality water for suitable domestic and agricultural uses; using new technology to minimise the waste and cost of water from external sources. Solar electricity is generated through roof panels, and distributed through a community grid. The grid can balance electricity-use between dwellings and blocks, and export any overall surplus to the national grid: value capture again. Food waste is dropped off for composting at the proposed Compost Hubs; minimising landfill and supporting a 'soil to soil' system of local agriculture. Other waste, however, is collected through the existing city-scale system, because recycling is only economic at a scale beyond the individual district.

BUILDINGS

Within the overall structure of streets and blocks, building types are located to capture maximum social and economic value from each plot. These values fundamentally depend on the spatial connections between each plot and the rest of Letchworth: as the space syntax analysis shows, each street's connectivity predicts the relative intensity of movement it carries. Low flows maximise traffic safety for larger families with children. Locations with medium flows are more suitable for smaller households, mostly adults and infants. The busiest streets maximise accessibility, 'buzz' and passing trade: good for smaller houses, apartments and business opportunities. Within this overall strategy, tenancy-blind dwellings will be mixed at the finest grain that can be negotiated in commercial and management terms. This would take into account the 40% affordable stock required as per brief.



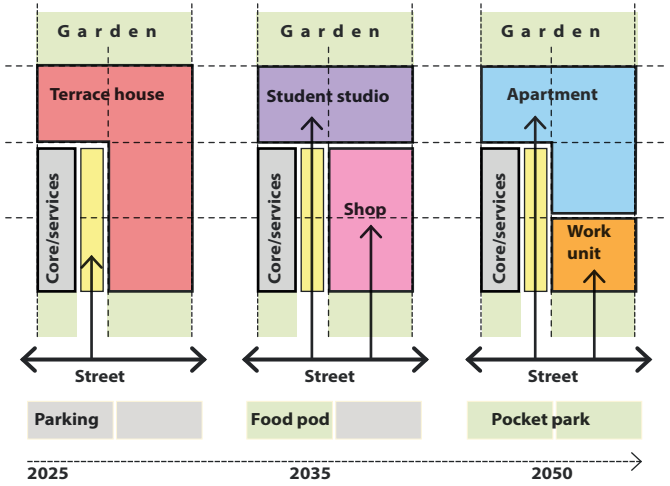
Our layout of streets and blocks can accommodate the mix of 900 dwellings called for in the brief. We have tested its robustness with a range of alternative mixes: the final schedule would have to be adjusted as the pattern of demand evolves through the development process. Demand for community facilities and business spaces will also have to be investigated in detail as development proceeds. To maximise demand, they will be located where our space syntax analysis suggest that footfall will be highest; forming a 'village centre' on Hedgers' Boulevard.

Social facilities like schools face increasing funding difficulties; so we propose following Dutch precedents, cross-subsidising the school with value-capture from apartments above, designing the school hall and café for outside-hours community use, and making Scholars' Place a dual-use space: cooperative ideas that also capture educational value; with learning seen as integrated with the rest of everyday life.

At the smaller scale of spaces within the dwellings, housing design has to address a range of emerging social changes: ageing population; financial difficulties for young people seeking homes of their own; increased amounts of working from home; growing numbers of people in badly-paid, unsatisfying casual jobs - increasing with the advent of artificial intelligence - with increasing amounts of free time that could be used productively at home; all in the context of increasingly individualised pursuits within the home, based around the internet and social media. These changes have major implications for all aspects of housing design.

Living spaces require relationships with services and circulation spaces that can support changing configurations as family structures change through processes like inter-generational living or exchanging space for care. Learning from the 'great halls' of Parker and Unwin houses, main living spaces benefit from multiple focal spaces such as nooks, bays, and window seats; allowing a variety of individualised activities to take place at the same time, to support family togetherness. Particularly on main streets with potential 'passing trade', the dwelling's street-interface should allow alternative configurations to support emerging types of socially-positive home businesses. These adaptability requirements have to be facilitated through the system of construction.

A simple grid structure supports easy reconfiguration of other internal spaces, and of the street interface in locations where business potential is highest. This allows each generation to update the existing building stock to suit changing needs.



CONSTRUCTION SYSTEMS

The importance of 'passive house' building standards, to minimise emissions and running costs, means that the construction system has to depart from garden city hand-work tradition: only factory production can offer sufficiently controlled working environments and levels of quality control. Factory production also improves productivity by making most efficient use of modern technology, reduces cost uncertainty, provides employment that appeals to young people put off by outdoor on-site working conditions, and minimises site disruption and annoyance to neighbours. However, it has to be carried out locally, to minimise the need to transport large elements, and maximise the opportunities for higher-technology apprenticeships for poorly-qualified local people. The scale of development at Grange-in-the-Hedges makes it viable to install a 'flying satellite factory' on the site. Using mostly cellulose materials, offcuts will be delivered to the block hubs, to be shredded for compost. At the end of the development process, the factory building will remain; its value captured as low-cost community space: at this stage, we envisage a centre for developing innovative practices of urban agriculture and ecology.

AESTHETIC IMPLICATIONS

Factory production, with designs using solar technology, creates pressures towards mechanical uniformity; with solar panels and roof-pitch orientations monotonously consistent across wide climate zones. These pressures raise aesthetic concerns in terms of the local distinctiveness of the garden city's Arts and Crafts tradition.

This is not a new issue, but an intensification of a problem first encountered during the garden city's first encounter with the industrialisation of building components. Owen Jones, the Welsh architect who influenced Unwin's hero William Morris, had shown a way forward: admirable design, he said, will always be found to be in accordance with the laws which regulate the distribution of form in nature[6]. As Jones realised, nature generates scalar systems: a tree has many branches, each with many twigs, each with many leaves, each with many veins: at each scale, something new is revealed. Jones advised following this scalar logic – today we might loosely call it 'fractal': 'the general forms being first cared for, these should be subdivided... the interstices may then be filled in... (and) may again be subdivided and enriched for closer inspection'[7].

Feeling that nature can and does teach us more than any work of art[8], Parker and Unwin designed streets, buildings and gardens well-attuned to these scalar principles. Building envelopes have several gables and bays, each with several windows, each with several glazing bars, each with complex profiles, set in the smallest-scale texture of roughcast. In our project, we draw on this attunement with nature's scalar structure to re-imagine the garden city aesthetic with today's technologies and sustainable materials.

Scales of perception

THE VALUE OF TIME

At all the spatial scales we have explored above, the time dimension is a key to maximising value-capture. The strategy is to make each scale support the most valuable 'highest and best use' in social, economic and ecological terms, at all times throughout the overall development process.

Dwellings and other built facilities will be phased according to the evolving pattern of demand, to benefit the widest range of people, including those in neighbouring areas, from day one. Self-built housing captures economic value directly through sweat equity. To maximise this requires cooperation: the ShareApp will be used to bring participants together, to seek opportunities for mutual aid, and better deals through bulk purchase of materials and equipment hire, enabling affordable self-build models.

Self-building processes will be slower than the rest of the development. The need to avoid value-reducing disruptions to neighbours therefore governs the location of self-built areas within the scheme as a whole. We move the first self-built area away from existing Grange housing, to the north end of phase one: because self-build can start before the rest of the development, it should be finished by the time phase one itself is occupied. The same location-principle will synchronise the two-speed development of self-build and factory-produced areas throughout later phases.

Since contractors' traffic creates minimal disturbance with factory production, it becomes possible to plant street trees from day one: their relative maturity can then yield increasing returns on the sales of adjoining dwellings in later phases. On land where no streets or Phase One buildings are envisaged, we can start allotments and orchard trees as soon as the overall layout is agreed. On future building plots we can start power generation: solar panels work as well on the ground as on roofs, growing a crop of clean electricity: we install them temporarily throughout the site from the start, feeding a community grid for eventual re-use on buildings, funded through a power-purchase agreement with an external power supplier. Users benefit from reduced energy prices for electricity drawn from the community grid, and the external supplier benefits from a secure revenue supply contract.

CONCLUSIONS

This competition created opportunities for an in-depth design exploration, to re-imagine the garden city movement in the context of emerging social and ecological issues. At the deepest level, we found that the movement's multi-scale conceptual framework provided a strong structure for this exploration, allowing us to identify an agenda for re-imagination across a range of scales:

- Re-imagine green belts in terms of growth corridors and ecological wedges.
- Re-imagine water systems in terms of local treatment and recycling, to reduce waste and external supply.
- Re-imagine the balance of green infrastructure; shifting space from the public realm towards communal areas to support child development, address loneliness and support participation in soil-to-soil agriculture
- Re-imagine the street system as a highly-connected network for pedestrians and cyclists, with less local connectivity for cars.
- Re-imagine buildings as generators as well as consumers of energy
- Re-imagine interiors as multi-focal spaces for simultaneous multiple activities.
- Re-imagine building construction as a factory process; where possible on-site to maximise local employment and training opportunities.
- Re-imagine the aesthetic dimension of design in terms of nested scales of sensory experience, with more revealed at each smaller scale.
- Re-imagine the scope for local participation in creating an ecologically sustainable cooperative economy; maximising value-capture through data and information systems.

The next task is to encourage debate around this re-imagination agenda, to re-imagine the mainstream practice of design.

References

1. Unwin, R. 1909, Town Planning in Practice: an introduction to the art of designing cities and suburbs, London: Unwin.
2. Geddes, P. 1915, Cities in Evolution, London: Williams and Norgate, p.96.
3. Unwin, R. 1907, The Beauty of Towns, reprinted in Town and Country Planning, Vol 22, Oct 1954, p528.
4. Letchworth Garden City Heritage Foundation, A View of Life in Letchworth Today, 2017, Letchworth: Heritage Foundation, p10.
5. Ibid, p11.
6. Jones, O. 1856 (1986), The Grammar of Ornament, Ware: Omega Press, p2.
7. Ibid, p5.
8. Parker, B. and Unwin, R. 1901, The Art of Building a Home, London: Longmans Green p26.