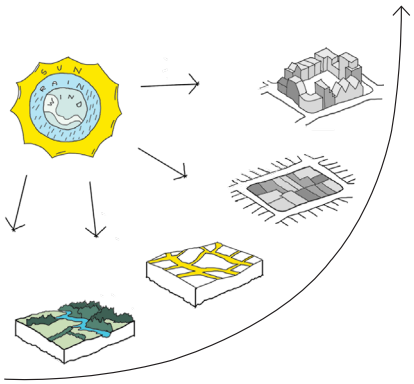
MESHING NATURAL AND HUMAN NETWORKS



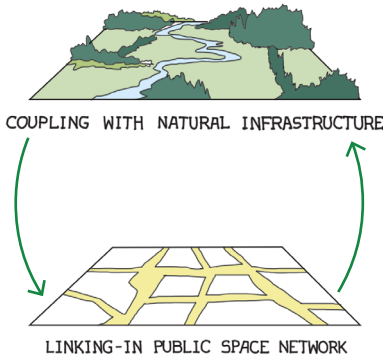


Fig.1a (top, left) Settlements as complex systems made of key morphological subsystems (refer article 1 of this series for more explanation).
Fig.1b (top, right) The article's focus: meshing street network with site's natural infrastructure.
Fig.2 (below) Nestling everyday life with nature from competition-winning proposals for Letchworth Garden City.

This is the second article in our series about re-imagining the Garden City for today's issues, explaining EcoResponsive Environments complex systems approach, through our RIBA competition-winning entry for expanding the world's first Garden City at Letchworth in the UK[1].

The series builds up the scheme through interactions between subsystems, starting with those that are longest-lived and progressively meshing-in faster-changing ones. We start by meshing the public space network with the natural infrastructure of water and green systems (Fig.1&2), to create the scheme's longest-lasting 'deep structure'. It is critical to work with natural systems as they are not only longest-lived but are life sustaining, life enriching and provide a practical response to the climate and biodiversity emergencies.

THE GREEN SYSTEM

The site is defined by hedgerows stretching into the surrounding countryside (Fig.3). These are important wildlife movement-corridors; not only supporting biodiversity against 'sixth extinction' pressures,[2] but also, improving micro-climate and air quality. They respect historic field boundaries and offer the mental health benefits of a green environment[3] without having to wait for new planting to mature, as Letchworth's original planner Raymond Unwin understood[4]: *'nothing so helps the early appearance of a building site as the preservation of existing trees, and…. hedgerows.'* Their value is also enhanced by mature trees and adjacent ditches that increase habitat diversity. For both ecological and social reasons, therefore, the existing green structure is our overall layout's first major driver.

THE WATER SYSTEM

The site's slope and soil type, in the context of climate change's ever-worsening flooding events, requires highly-efficient surface water drainage. The system has to mesh both with the site-contours and the street network, This presents us with a second major design-driver, as Raymond Unwin understood[5]: *'Drainage will not run uphill to suit the prettiest plan; nor will people….go where they do not want to go…..taking generally the shortest route.'*

Fig.3 The site's natural infrastructure; defined by hedgerows, woodland copse, ditches and mature trees.

Woodlands along existing Greenway (Letchworth's cycling network)

Mature hedgerows along the existing on-site field margins

Veteran trees along the boundaries of the Grange Recreation Ground

Mature hedgerows and copses along the southern site boundary

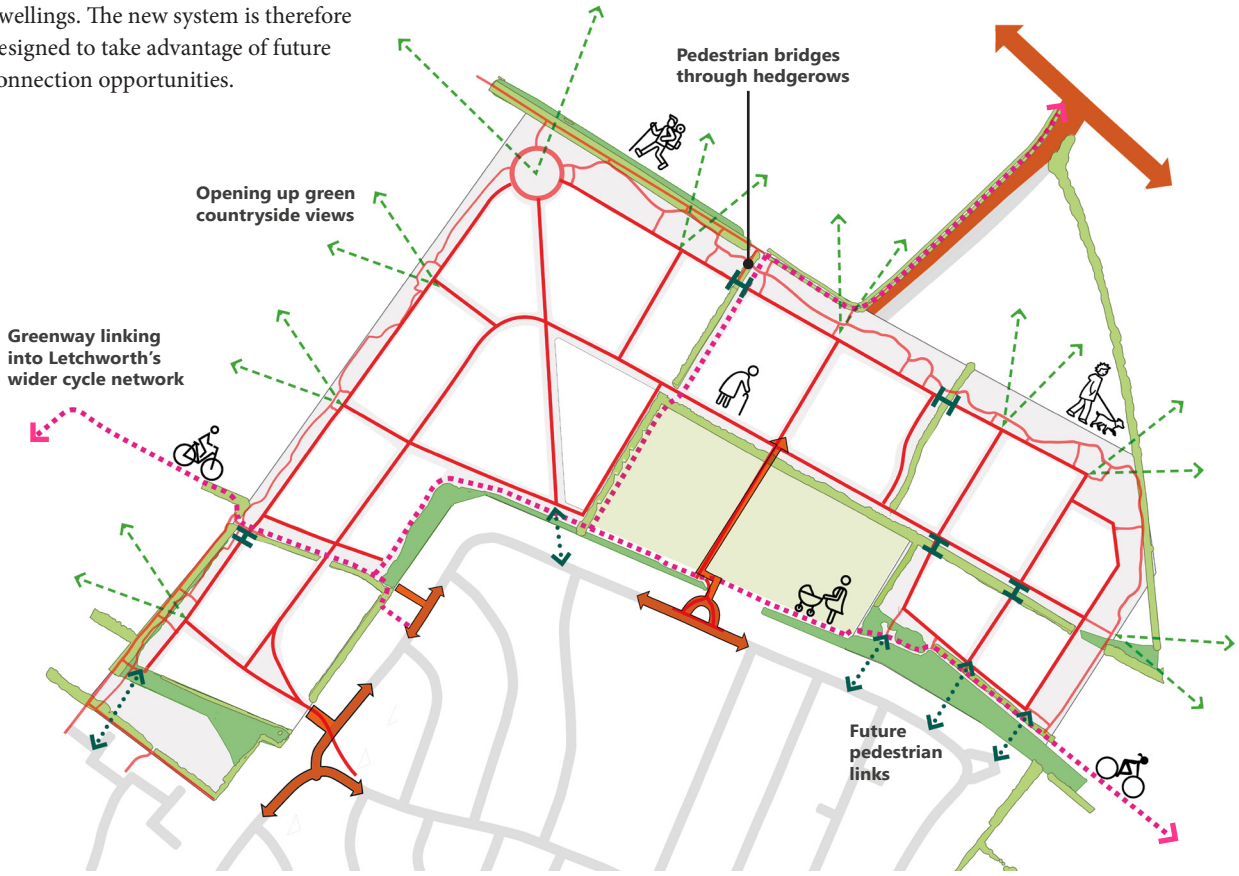
THE STREET SYSTEM

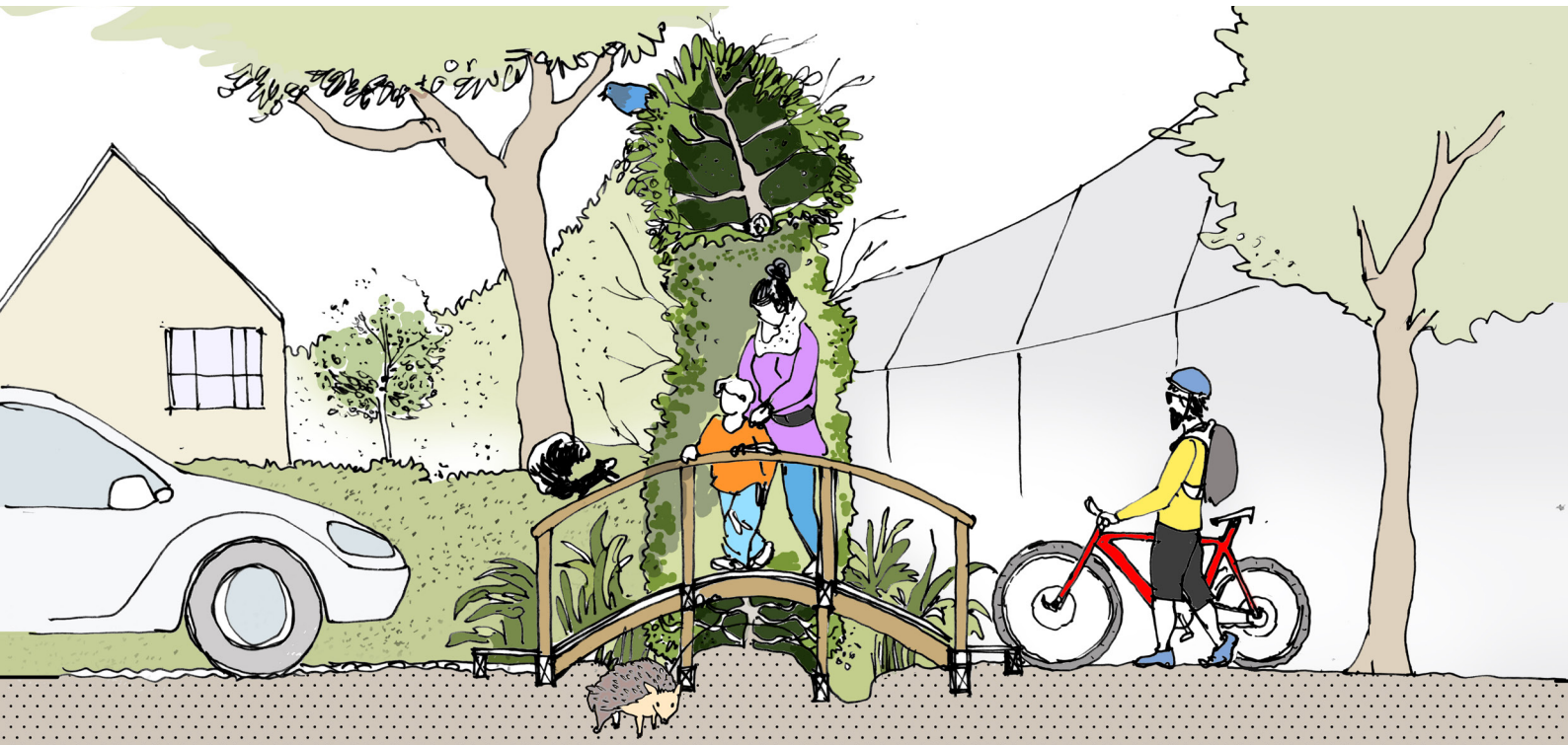
To support healthy walking and cycling, and to minimise carbon emissions, we need a highly-connected landscape integrated street system (Fig.4) that minimises pedestrian detours and maximises pleasurable experiences. It is impossible, in the short run, to minimise detours by connecting directly with adjacent development, without the socially-undesirable and politically-unworkable demolition of existing dwellings. The new system is therefore designed to take advantage of future connection opportunities.

Pleasurable experiences are maximised by opening up to green countryside views beyond the site, and by meshing streets with the hedgerow system, to their mutual benefit, in plan and section. The street plan allows access for hedgerow maintenance, and maximises green street experience. The section allows pedestrian continuity and ground level continuity for small mammals, whilst creating dead-ends for vehicles (Fig.5).

Fig.4 (top) Proposed highly-connected landscape integrated street system.

Fig.5 (bottom) Linking through the hedges: The hedges are woven through the development with light touch pedestrian bridges designed to allow small mammals to pass beneath.

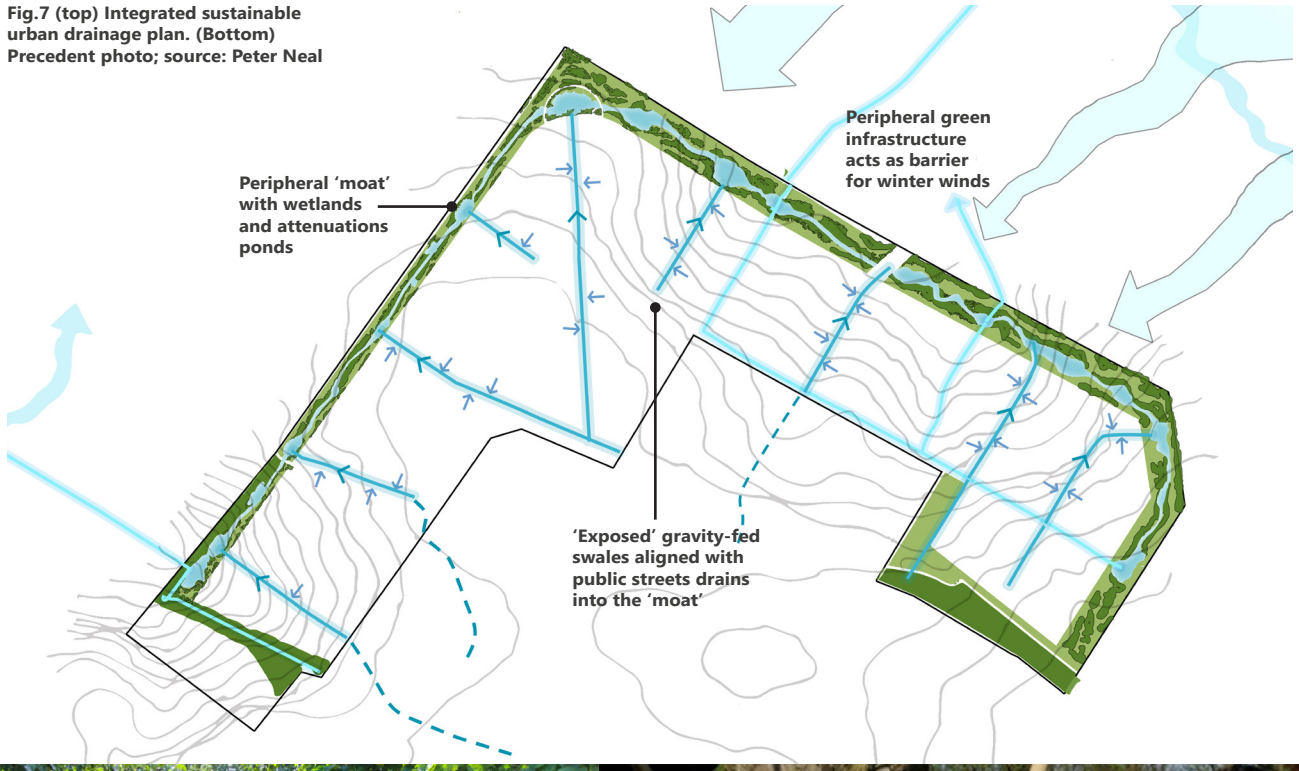




Wherever possible, surface water drainage is exposed within the street system through swales and rills, offering object lessons in ecology with wildlife support and sensory richness (Fig.6). The surface water drainage can also include rain gardens and provides attenuation, via the 'moat', to capture and slowly release water into the wider drainage network. Designed to increase biodiversity by supporting threatened amphibians, the moat also creates a strong edge to the settlement; following Unwin's advice[6] to *'set a limit to which a town shall extend continuously without some break, some intervening belt of park or agricultural land'* (Fig.7).

Fig.6 (right) Sketch of swale street offering object lessons in ecology.

Fig.7 (top) Integrated sustainable urban drainage plan. (Bottom) Precedent photo; source: Peter Neal



DEEP STRUCTURE

By this stage we have laid out the project's 'deep structure' (Fig.8). Our next article will explain how we mesh the land-uses and building plots with this structure to mutual advantage (Fig.9).

Suggestions for further reading

1. https://www.letchworth.com/design-competition
2. Kolbert, E. (2014). The Sixth Extinction: an unnatural history, London. England: Bloomsbury
3. Kaplan, S., (1995). The restorative benefits of nature: Toward an integrative framework. Journal of Environmental Psychology, 15(3), pp.169-182.
4, 5, 6. Unwin, R. et al. (1994). Town Planning in Practice. Princeton Architectural Press.

Fig.8: The masterplan's 'deep structure' as the foundation for developing it further

Fig.9: The main boulevard