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ma architecture sustainability + design

Ethics & Aesthetics

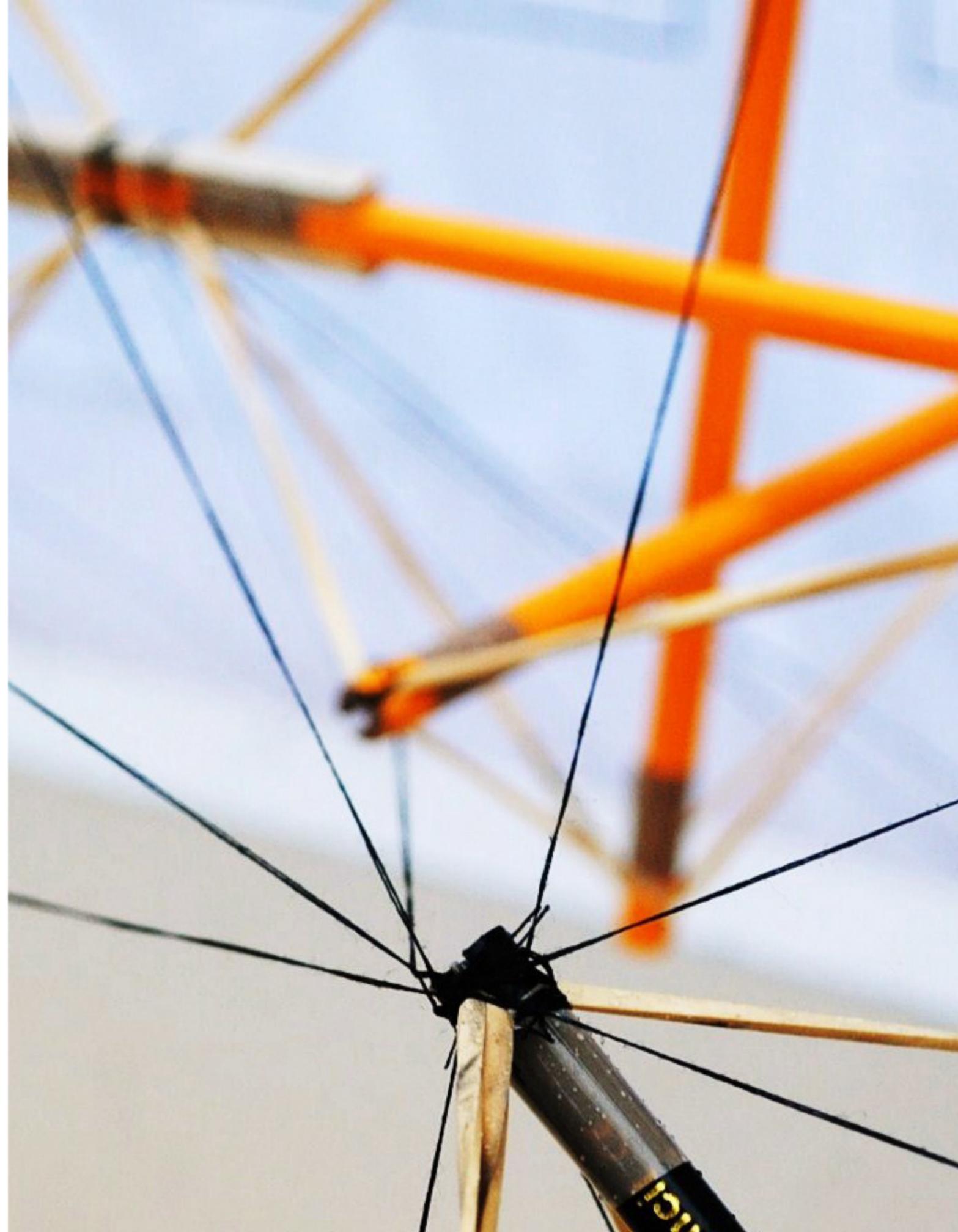
This year we are pleased to welcome Stephen Choi and Roland Karthaus as part time staff on the MA Sustainability & Design programme. They supported us in our continuing exploration of the aesthetics of ethical architecture and the study and critique of urban sustainability. We undertook fieldtrips in London, Paris and Brussels and participated in Diploma 4th Year Construction Week, EcoBuild, the Camden and Islington Passiv Haus Conference and the International Student Architecture Festival 2010 in Southwark, London.

Sustainability & Design comprises of two modules: Environmental Architecture and Urban Ecology. The Environmental Architecture Module investigated sustainability at the scale of buildings, both existing and new-build. This module tested, critiqued and responded to the rapid changes occurring in the building industry, which are led by an increased awareness of climate change.

In the Urban Ecology module, we studied the real societal impact of sustainability at the wider city scale. Students came to an understanding that 'saving carbon' is only one of many parameters (and often not the most important one), which can lead to truly sustainable (city) environments.

In each module, the process of investigation starts with an exploration of deep contextual parameters, followed by an initial, more intuitive proposition for change or transformation. Uniquely, each student tested his/her own design through a rigorous environmental quantification process, which brought unexpected results. Design is used as a method to investigate sustainability. We do not see design as the end product.

From this process of self-reflection, each student develops his/her own architectural language and ethical viewpoint, based on a continuous iteration between design intent and environmental impact. Each project is underpinned by a robust understanding of any necessary compromises made between ethics and aesthetics.



Front page illustration is the Urban Ecology Prototype of a 'growing' bike shelter proposal in Southwark by Cristina Blanco Lion. The shelter is constructed at 1:1 scale for the 2010 International Architecture Festival in Southwark, London.

Illustrations on this page are Lu Xia's zero carbon housing proposal along the railway viaduct in Union Street, Southwark.

Bottom left images show Lu Xia's design development through models, where she is exploring maximising solar penetration and protection from the viaduct by manipulating building form.

Image bottom far right is of a light study by Paschal Volney to animate the viaduct.

Environmental Architecture Module

This year, the Environmental Architecture Module continued to investigate the aesthetic representation of 'low carbon buildings', as well as the kind of modifications required to alter existing structures to these standards, if at all possible or desirable to do so. In the first term, students chose an architecturally significant house. After rigorous contextual studies, each student proposed design transformations to increase the house's environmental performance. These transformations were then rigorously tested and argued both in terms of relative environmental benefit versus the aesthetic merit. For example Margo Sagov, in Goldfinger's Willow Road House's adaptation, concluded that she is "against a 'one size fits all' approach, because precious existing buildings would be spoiled. The best solution should involve careful consideration and testing of a range of interventions, to arrive at the right balance of energy efficiency plus carbon compliance measures suitable for the particular circumstances."

In the second term, the module focused on the true environmental impact of new build proposals, not only seeking to reduce this impact but also to negotiate between the different contextual parameters and their relative importance to the current 'zero carbon' debate. Students worked on a site in Southwark and attempted to achieve 'zero carbon' housing as stipulated by the UK government for all new housing by 2016. However, once tested on such a tight urban site, which is bound by a railway viaduct to the north and tall buildings to the south, students argued that it was in most cases not possible to meet the ambitious 'zero carbon standard', unless unacceptable compromises were made.



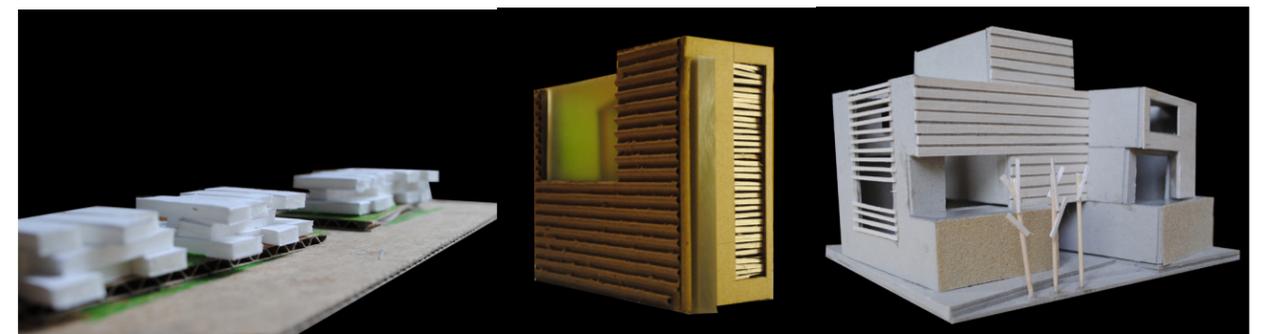
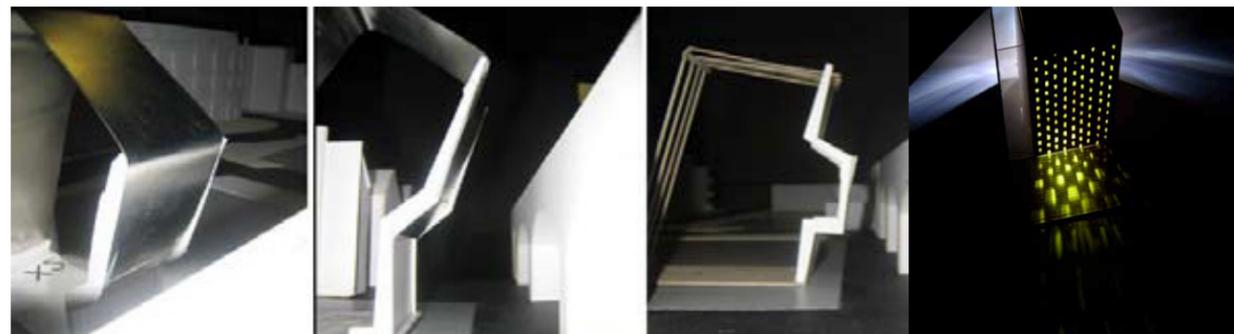
For example, Dimitra Kyrkou concluded that "despite the fact that a Passiv Haus is not zero-carbon in itself, the reduced energy requirements allow potentially smaller and cheaper quantities of renewable technologies to be specified to achieve zero-carbon standards. As a whole, low-carbon housing with a CO2 emission reduction of 56% is proposed, and at the same ensures high environmental, social and aesthetic qualities as well."

Top image by Mehrdad Borna, taken on the MA fieldtrip, while studying Jean Renaudie's 'Jean Hachette' housing in the south of Paris.



Below and left: a selection of Cristina Blanco's zero carbon design development and view towards the viaduct alley way.

Cristina changed her design after speaking to 50 City-dwellers, finding that "the Londoner overwhelmingly prefers to have a roof terrace rather than going with renewables! (79% vs 21%). A number of respondents stated that they wanted both solutions, which led me to the idea of redesigning the roof area to cope with both requirements."



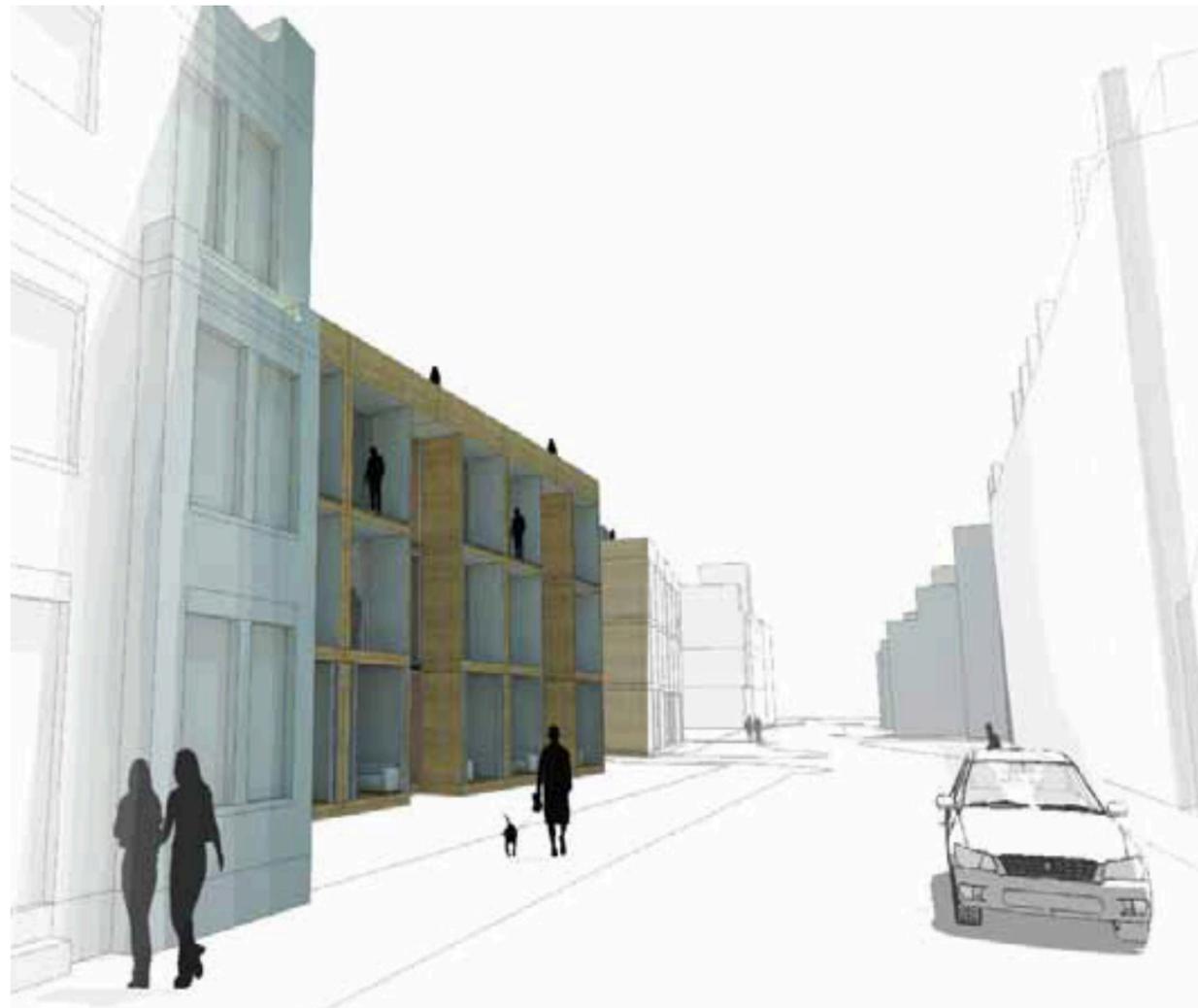


Image above is a street view of Union Street and Paschal Volney's zero carbon housing proposal, which centres around urban food growing on rooftops and in communal gardens.

Urban Ecology Module

The Urban Ecology Module critically assesses the concept of 'the sustainable city', the current debates surrounding the dominant models of urban sustainability, their relationship to competing approaches to urban analysis and design and the importance of urban ecology, both architecturally and environmentally. Throughout this module we study and critique the environmental impact of these urban strategies and theories as well as the formulation of new ideas, while quantifying, questioning and testing the environmental impact and implications of these new ideas.

Students worked in Southwark with Bankside Urban Forest on the development of Urban Ecology Prototypes, quantifying the ecological and environmental impacts of their proposals: from urban food-miles saved, water retention capacity, wider temperature implications for urban heat islands to embodied energy emissions and estimated CO2 absorption from vegetation and an eventual CO2 balance.

Some of these prototypes have been built for the International Architecture Festival 2010 in Southwark.

In the second term, we worked with the American LEED-ND system as a sustainability tool to analyse and judge existing city-blocks. Interestingly, students ended up critiquing and proposing adaptations to the LEED-ND tool itself to allow for a more 'local' approach of the global system.

Dimitra Kyrkou concluded that "in order to build a sustainable place, there is a significant need to consider equally all the aspects of sustainability, from protecting the natural environment and preserving the natural resources to ensuring a livable, beautiful and safe place."

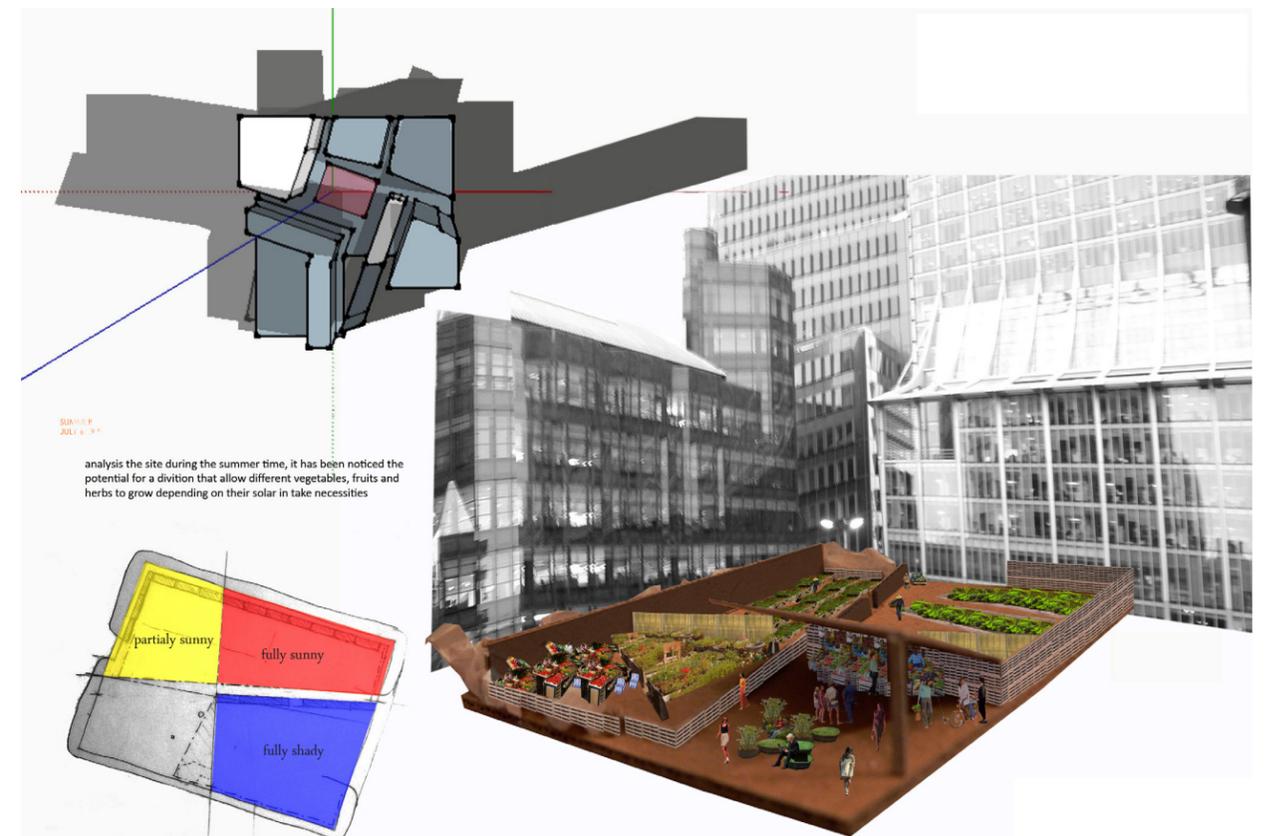
Fanny Galvan-Cedillo investigated urban food growing at Milton Court, now demolished but once part of the Barbican Estate.

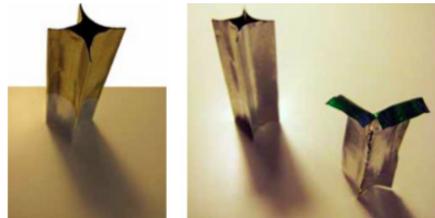
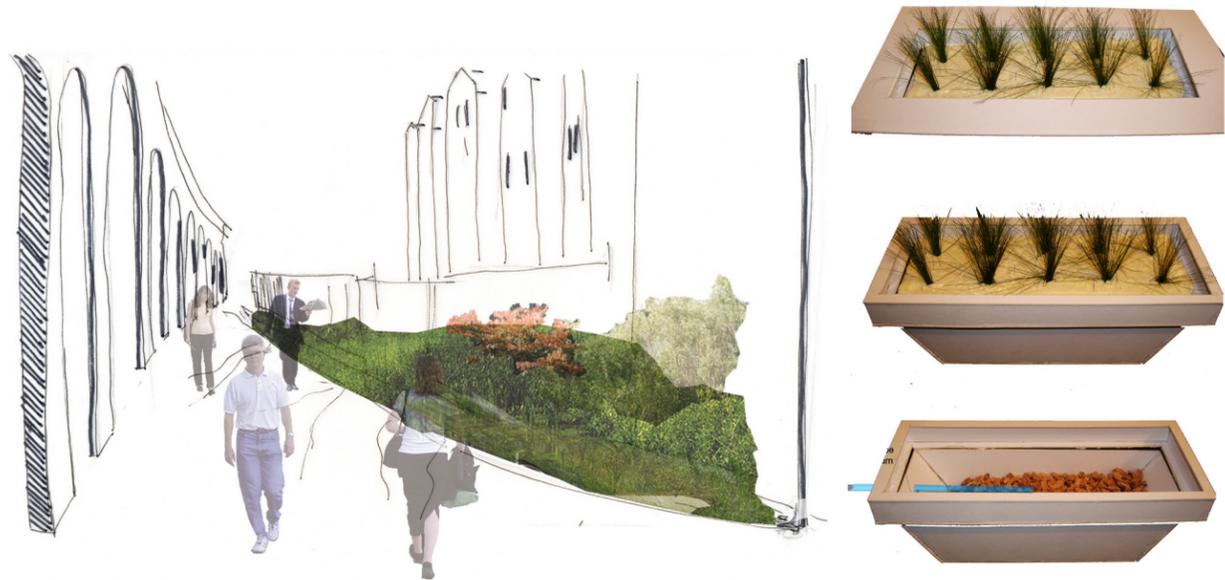
The image below illustrates how urban sites can contribute to food growing, particularly on a temporary basis until the recession lifts and the site will be put to permanent use.

The solar study indicates which parts of the site would be suitable to act as 'an Urban Seed' and which vegetables could be grown there.

Fanny proposes to use reclaimed materials to reduce the embodied energy of the temporary proposal. She estimated that the embodied carbon emissions of the 'Urban Seed' are 31.7 tonnes of CO2.

"However it must be highlighted that three out of four materials are reclaimed, therefore it could be argued that their impact is 'zero'. If that is the case the actual CO2 emission would be 6.3 tonnes of CO2". Fanny estimated that it would take 16 months for the embodied carbon to be balanced by the CO2 absorption of the vegetation.



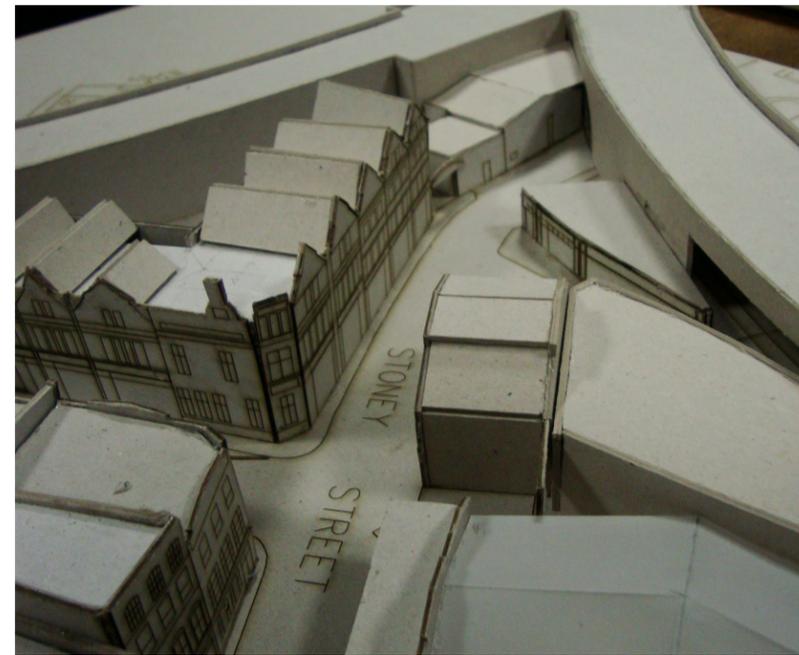
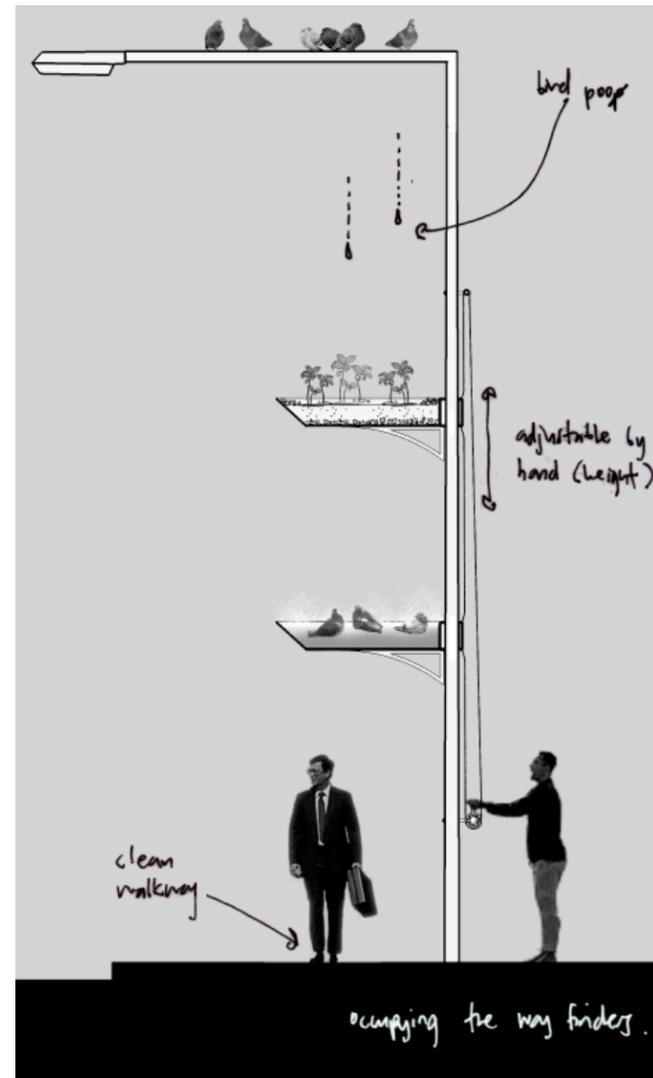


Images at the very top illustrate the proposed Urban Ecology Prototype by Davide Capello, which deals with water management in the city and proposes a return to parts of Southwark as 'controlled marshes' for flood prevention.

Marion Baeli's prototype model (above), is an investigation of herb planters in community gardens made from recycled steel shuttering plates.

Fairuz Abdul Aziz (right) proposed 13 'Pigeon Lamp Post Way Finders', to lead pedestrians from Southwark station to Tate Modern. Fairuz estimated the prototype would absorb up to 13,6kg of CO2 per year, yet the recycled plastic pigeon containers would emit 302 kgCO2 in embodied energy.

This means that it will therefore take 22,25 years to achieve a 'carbon balance', after which the Pigeon Wayfinders would positively contribute to the environment in terms of CO2 absorption.



Borough Market in Southwark was one of the city blocks studied in term 2. (image left)

Lu Xia(below) developed an Urban Ecology prototype to activate the brick blind walls around Southwark's viaducts and to increase the urban swallow habitat.

Lu found that her 'ecologically sound' urban ecology prototype, made from virgin timber, would take 837 years to offset the embodied energy of the structure.

"This is a very long period of time, much longer than the life span of the actual structure itself. Although the actual CO2 reduction from the prototype is very limited, the main idea of the prototype is to increase the population of swallows, hence its benefits cannot be compared to CO2 absorption.

On the other hand, it seems more practical if the prototype is made with reclaimed timber (24.5 years payback)."



Different parts in the system:

1. The planter
2. The soil, also performing as the weight to hold the whole structure
3. Lavender--a fragrant flower that can attract small insects

4. Frames, mounted on the inside of the planter to support the whole structure, it also rest on the wall to distribute its load.
5. Back board--to mount the nest on
6. Base board--to catch any dropping, act as a tray that can be taken out and put back

7. Mesh--mesh is openable, hooked on to the frame.
8. Gap--big enough for swallow to go through
9. Ivy
10. Raised base with drainage hole on the base of planter