THE PRODUCTIVE CAMPUS

A few years after the launch of the Productive Lab, the project turns out to be a success. Beneficiating from this necessary phase of experimenting and learning, UCL decides to initiate a more ambitious project, the "Productive Campus", which aims to reduce significantly the food miles generated by students and staff on the campus and to decrease the University's ecological footprint. Doing so, UCL comes to the forefront of sustainable universities worldwide.

I. How is the Productive Campus implemented?

The Productive Campus project is articulated around two main elements, each one being necessary to the success of the whole:

– First, a more professional structure is created as a spin-off of the University in order to take care of the various tasks related to food production and food distribution. It takes the form of a co-op in which all workers and agronomists as well as the University and the Students Union are stakeholders. The technical and "social" legacy of the Lab is thus ensured. More specifically, UCL runs a training scheme for the new farmers and agronomists in the new Department of Urban Agriculture (cf. below); UCLU is involved in selecting workers within disadvantaged and disabled populations and providing them with social support. ❶

– Second, a vast real estate strategic plan is developed in order to ensure the creation of sufficient farmable surfaces within the campus. This plan runs over several years, starting with the easier and cheaper interventions and going on with the heavier ones, which often take opportunity of big maintenance works (such as façade or roof waterproofness renovating). The cost is thus reduced and can be shared between the University and the co-op. Both would also benefit from "green" loans and subsidies from the government or the EU.

II. How much food is needed?

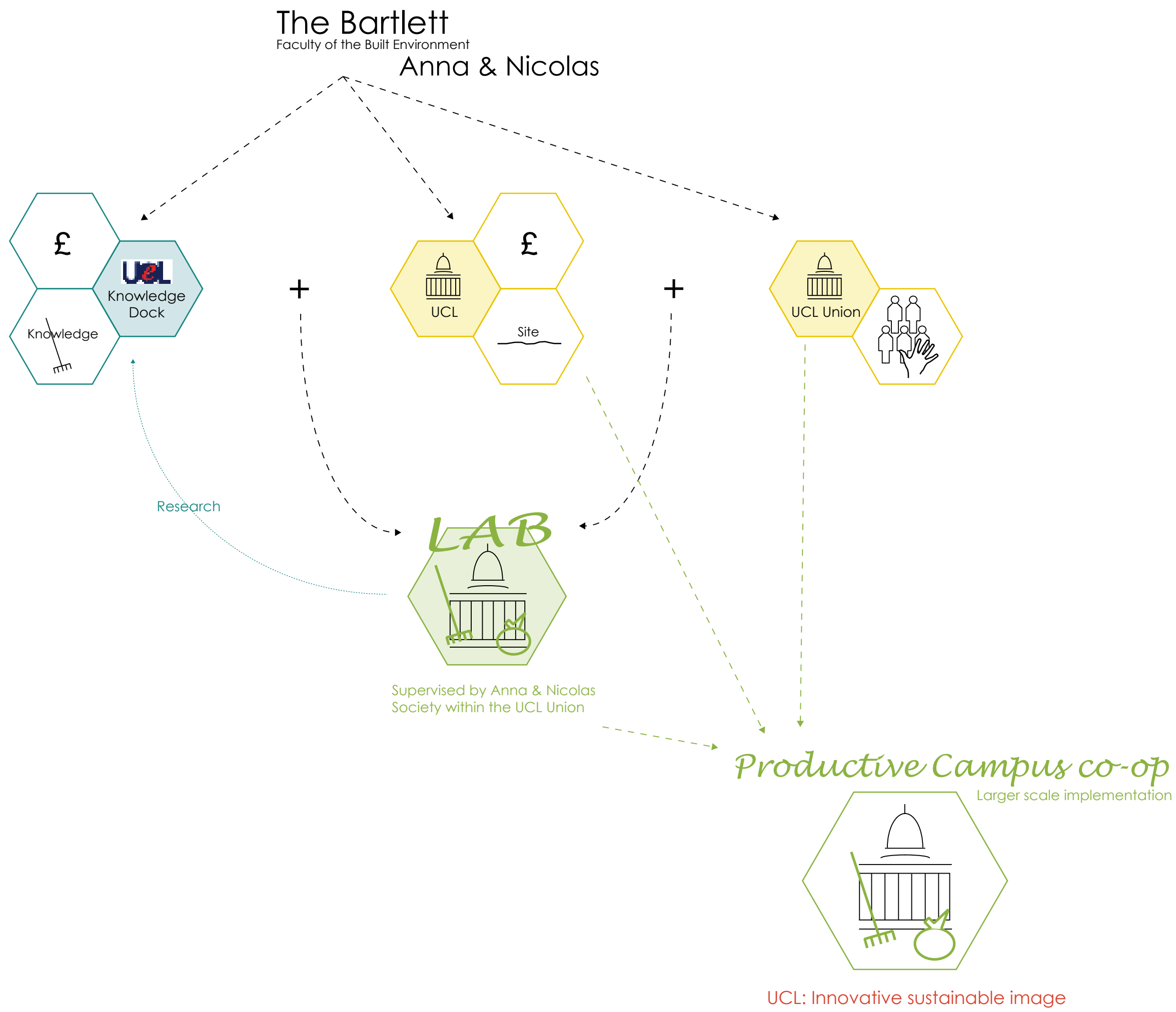
This question can also be asked the other way round: how much food can physically be produced within the campus? However, as this is difficult to estimate before any real-scale implementation, the productive campus is launched with the preliminary objective of providing 10% of the students and staff with fresh fruits and vegetables during week days and term weeks. We will see later in this chapter that this goal is reachable.

Assuming that an average student or staff member is on the campus 35 weeks a year 5 days a year, his/her consumption on the campus accounts for 25% of his/her yearly needs of fruits and vegetables.

Applying the ratios of land productivity presented in the introduction, this means that it would require 40 m² of extensive gardening or 4 m² of intensive hydroponics to feed one student or member of staff on the campus. In total, it would require approximately 120 ha of gardening or 12 ha of hydroponics in order to supply the whole university.

It must be reminded that according to the UCL Estates Strategy, the University estate included 16 ha of academic sites and 36 ha of sports ground in 2002 (1). However, we were not able to precisely locate the latter, despite our inquiries to the Estates and Facilities Division.

(1) University College London Estates Strategy, 2002-2012, accessible online on http://www.ucl.ac.uk/efd/about/strategy/



❶

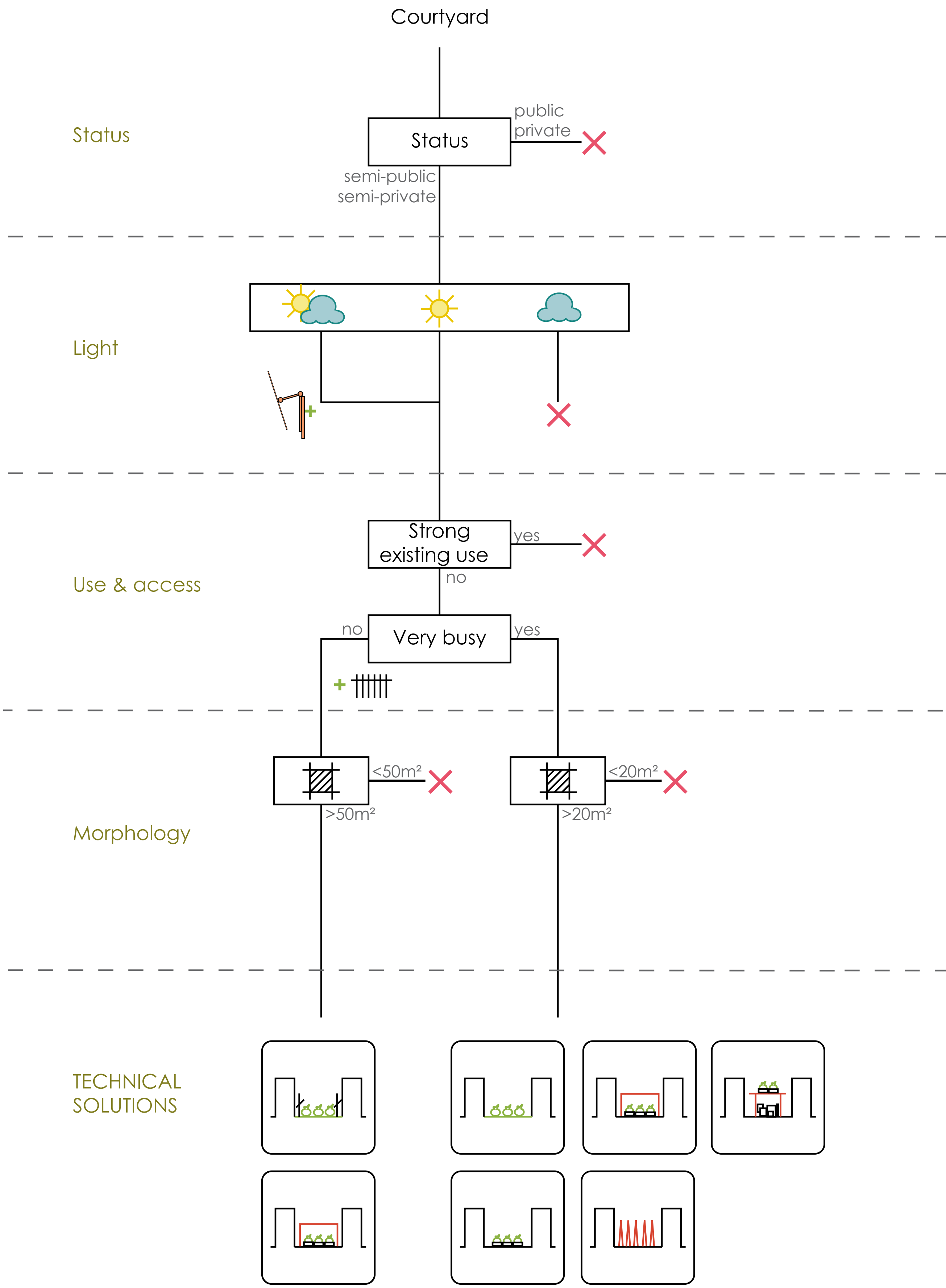
III. Methodology – designing the Productive Campus

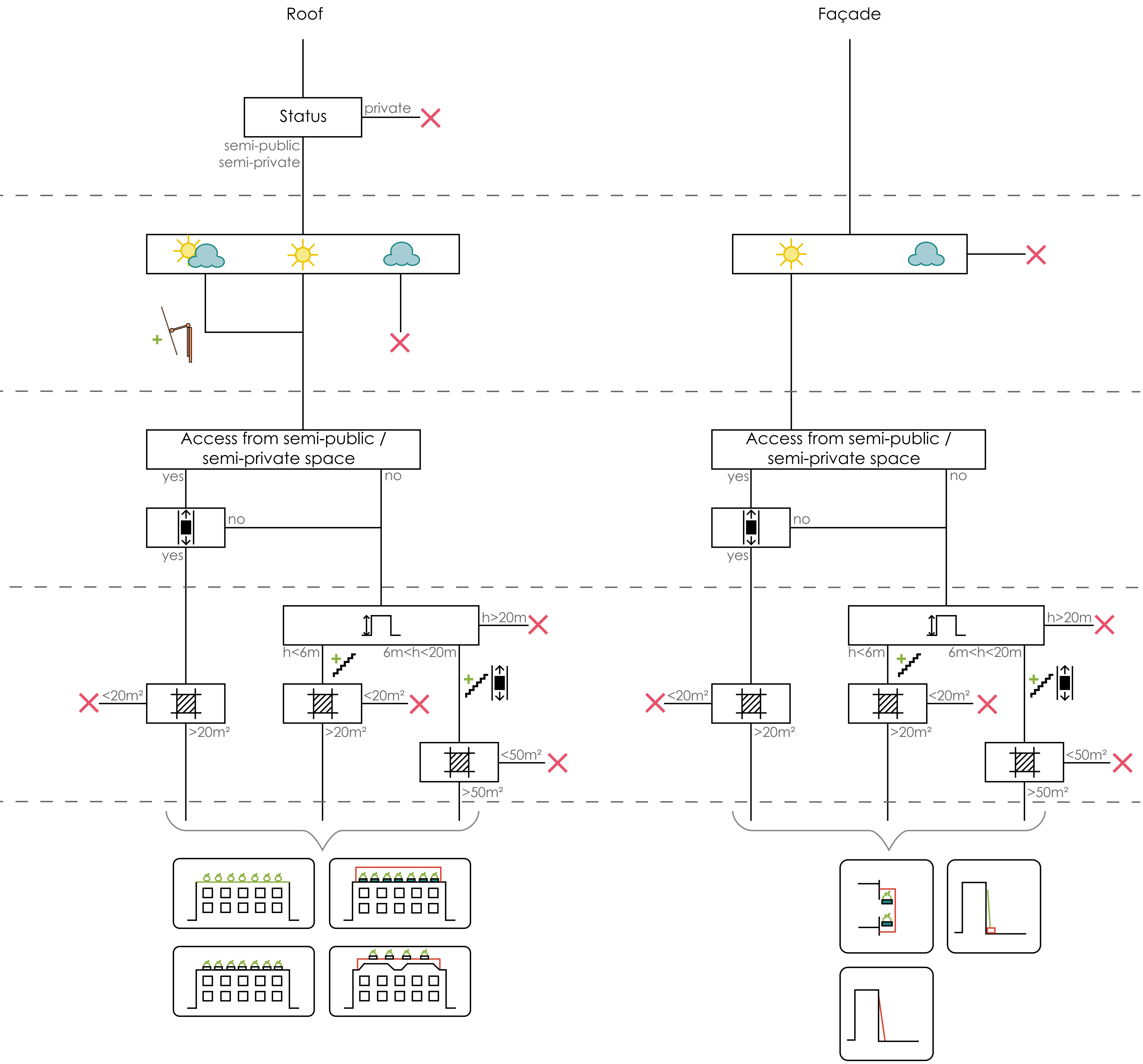
The methodology detailed below is developed in order to select and design the new farmable sites of the campus. This methodology is first based on the selection of the most appropriate surfaces, following a set of precise criteria, then on the choice of the most relevant techniques according to the context.

III. 1 Criteria for the inclusion of surfaces

Three types of surfaces are analysed: courtyards, roofs and façades. Indeed, the Productive Lab demonstrated that façades are equally able to sustain cultivations. Nevertheless, we discarded the interior of the buildings because it would consume too much energy for artificial lighting (cf. the "Growing in the dark" experiment).

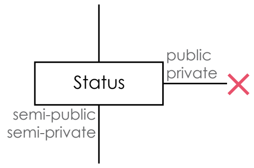
For their inclusion within the cultivable surfaces, the courtyards, roofs and façades are analysed regarding four criteria: the status, the light, the use & access and finally the morphology. The description of the diagrams can be found on the following pages.





Roof
Façade
Status
private
semi-public
semi-private
Access from semi-public / semi-private space
yes
no
yes
no
h>20m
h<6m
6m<h<20m
<20m²
>20m²
<20m²
>20m²
<50m²
>50m²
Access from semi-public / semi-private space
yes
no
yes
no
h>20m
h<6m
6m<h<20m
<20m²
>20m²
<20m²
>20m²
<50m²
>50m²

Status



The first criterion examined is the public or private nature of the surface. Spaces are divided into 4 categories. ❶ This approach is inspired by Oscar Newman's typology based on the observation of territorial appropriation of space within residential units (1).

(1) Oscar Newman, Defensible space: crime prevention through urban design, (New York: Macmillan, 1972)

– Public space: this refers to the public realm: streets, roads, some squares… Such kind of space is by definition not found on the campus, which is legally a private property. In any case, the requirements of free use and access by the public 24/7 make public space hardly suitable for cultivation.

– Semi-public space: this is the space that everyone has access to within the campus, such as the Main Quad, the Cloisters, Malet Place as well as most courtyards and passageways.

– Semi-private space: this space is shared by a more restricted community within the larger community of the University. Typically, the halls, corridors or staircases of administrative divisions or academic departments are semi-private spaces. Sometimes, the access can be restricted to cardholders, such as at the Bartlett: potentially any UCL student has the right to enter the building, but only Bartlett students will actually do so.

– Private space: private spaces are lecture rooms, individual or shared offices, students' common rooms such as the urban design studio. The strong and much specialised use that people make of this kind of space makes it unsuitable for collective farming as developed by the co-op. "Private" farming remains possible as an individual initiative (a few plants on a balcony, for example). Thus, it is not considered within the framework of the Productive Campus.

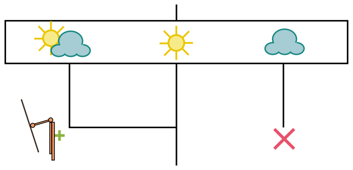
See Anna's Socio Land Lab for a regulation of relationships between private and public areas

Light

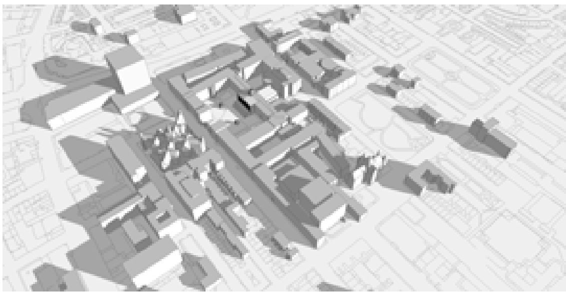
Another crucial element is light. The experience of the Productive Lab (cf. “Growing in the dark”) demonstrated that artificial lighting was energy-devouring and hardly compatible with a fully sustainable approach. Thus, surfaces selected to become farmable should have a sufficient sunlight exposure. If the quantity of light is slightly under sufficient, reflectors can be installed, as presented in the “Bringing Light” experiment of the Lab.

To quantify what “sufficient” means in the test presented below, we used a 3D program’s solar module. We considered the sun situation in early April. This situation is roughly-speaking the same as late September, which means that we considered the worst situation for the 6 months between April and September. We estimated that surfaces should receive at least 4 hours of direct sunlight at that date in order to be farmable. Surfaces receiving less than 2 hours of direct sunlight are discarded. Between 2 and 4 hours, reflectors can be installed to make up for the lack of sun.

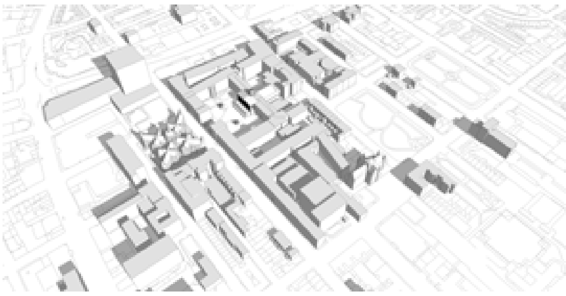
A far more precise analysis would be required in order to assess the actual light conditions of each surface, taking indirect (reflected or diffused) light into account. However, such an analysis is far beyond the possibilities and scope of this report.



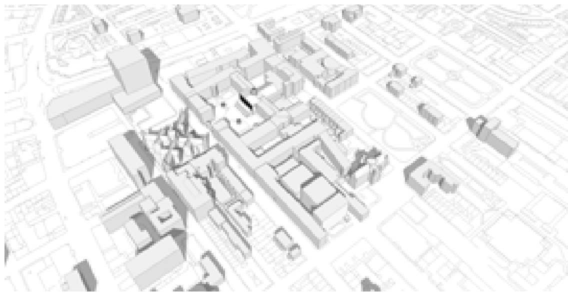
Sun situation in early April



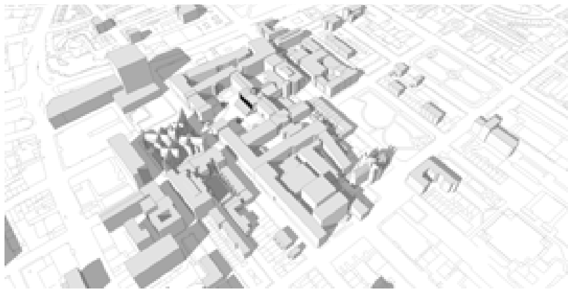
8.00 am



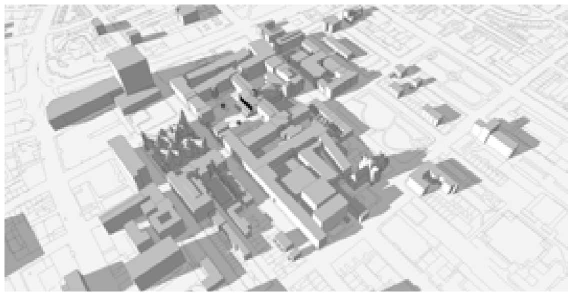
10.00 am



12.00 am



14.00 pm

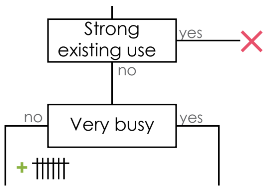


16.00 pm

See Nicolas’s Erith Productive City for an illustration of urban design optimising sunlight for agriculture

Use and access

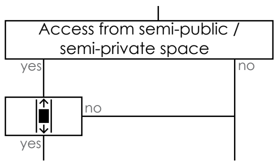
The third element to be considered is the existing use of the surface and its conditions of access.
As far as the courtyards are concerned, we considered that they should not already have a "strong" and well-established use which would compete with agriculture. Such a use could be permanent (sports grounds for example) or temporary (such as the Main Quad of the University, which is the natural venue for all major events or exhibitions in the University). A balance must also be found with green spaces used for leisure and relaxing: all turfs of the campus (which are already scarce) should not be turned into fields!



On the other extreme, we considered the issue of public access, illustrated in a project presented below. We believe that, whenever possible, fields should not be enclosed in order to increase people's awareness about the project and to make it more acceptable. Open-air accessible fields can be seen as a sort of real-size advisement for the Productive Campus co-op! However, we also believe that crop theft or deterioration by passers-by is a serious issue. This issue can be dealt with auto-surveillance and auto-regulation resulting from the co-presence of many people at the same time (1). Consequently, we considered that only sites that are not well connected with the rest of the campus and/or less frequented should host fenced fields or greenhouses. In order to appraise this level of connectivity and potential frequentation by pedestrians, space syntax methods could be used (2).

(1) Bill Hillier, Against enclosure, in Necdet Teymur et al. (ed.) 'Re-humanising housing', Butterworths, London, 1988

(2) Bill Hillier, *Space is the machine: a configurational theory of architecture*, (New York: Cambridge University Press, 1996)



Concerning roofs or façades, the problem is slightly different: the question is to know whether the surface can be accessed with the help of a lift (for crops transportation) from semi-public or semi-private space within the building. Indeed, it seems unrealistic to imagine that workers should have to walk through lecture rooms or individual offices in order to access plants! If the surfaces are accessible from semi-private space, this means that an access control system has to be put in place, as illustrated by the example of the Bartlett below.

If the surfaces are not accessible from within the building or there is no lift, an external access can be installed under certain morphological conditions.

Morphology

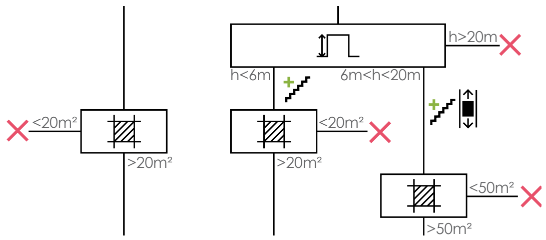
All farmable surfaces should be at least 20 m² in order to reach a minimum level of economic viability. For fenced fields or greenhouses, this is raised to 50 m².

When an external access has to be provided for a façade or a roof, it can be:

- A simple stair, if the façade or roof is less than 6 metres high.

- A stair and a freight elevator (for crops) if the façade or roof is between 6 and 20 metres high. In that particular case, as this is a more expensive option, the surface also has to be greater than 50 m².

Above 20 metres high, the roof or façade is discarded because of the excessive cost implied.



III. 2 Catalogue of possible solutions

The Productive Lab phase enabled to test different technical solutions in order to introduce agriculture adequately into the urban fabric. Thus the Productive Compus can rely on a “catalogue” of techniques, each one suitable for a precise situation. The following catalogue illustrated differentiates courtyards, roofs and façades. It cannot be separated from the criteria exposed above, which take into account light, height, area, access... Indeed the adequate solution can only be found by considering all aspects. It must also be outlined that as hydroponics cannot be used in exterior, this technique is automatically placed inside greenhouses.

Courtyards

– When a space needs light, reflectors are provided.

– In large urban courtyards with artificial ground, crops in raised boxes are preferred; existing gardens can be transformed in fields; greenhouses can also be built.

– In small urban courtyards or gardens, hydroponic “green walls” are preferred because they are more efficient.

– If a courtyard is wasted by technical equipments or parking lots, a light structure is constructed that can support crop boxes, hydroponic walls or greenhouses.

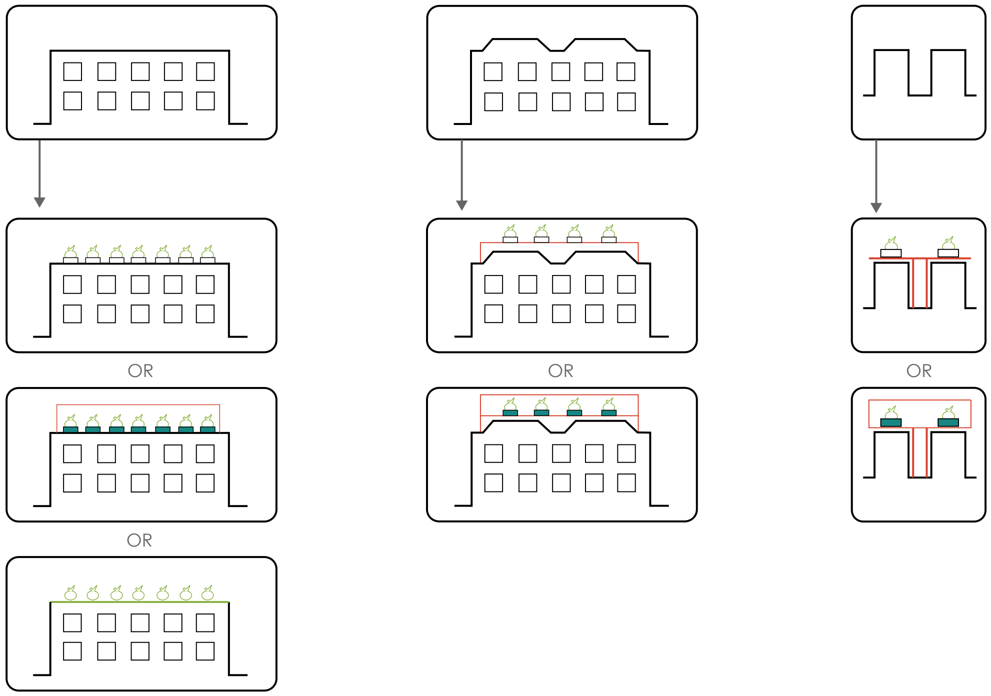
– A solar greenhouse can be built whenever the buildings configuration enables it (façades of different heights, the highest facing south).

Roofs

– On large urban roofs, crop boxes or greenhouses can be installed; if the roof has to be renovated, an eco-friendly productive green roof can be installed: it takes part in a better rainwater management and a better thermal insulation of the building.

– If a roof is occupied by technical equipments or if its configuration does not allow the installation of crops, the roof can be topped with a light structure that can support crop boxes, hydroponic green walls or even multi-storey greenhouses.

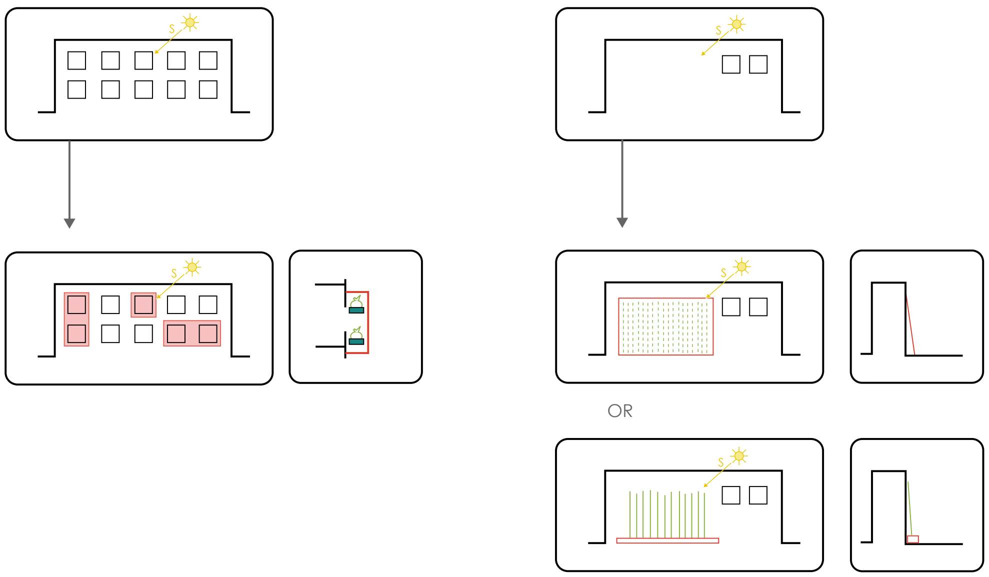
– If several small roofs at the same height are close from each other (as often found at the back of terraced houses), a light structure is installed; it bridges the gap between the roofs and creates a continuous productive surface which can even be turned into a large greenhouse.



Façades

– On a south-facing wall with windows, the double façade system can be installed. As the system is modular, it can cover part of the façade (for example, only the highest floors because this is where the façade gets most light). If the light conditions enable it, it can also cover the whole façade.

– On large blind façades, either hydroponic green walls or supported crops using trickle irrigation can be erected.



III. 3 Simulation

We assessed the validity and efficiency of our methodology by simulating the creation of all possible productive surfaces at the scale of the whole campus. This simulation is based on a 3D model of the campus. We completed the information by a survey of all available flat roofs using an aerial picture and by the use of a solar calculation module for a rough assessment of light conditions (cf. supra).

Indices of productivity

In order to make this calculation, we assigned a productivity index to each of the techniques developed in the above catalogue. The area of each productive surface (either horizontal or vertical) will be balanced by this index in order to estimate its expectable productivity.

The lowest productivity level is the one of allotment gardening. It has been estimated (cf. introduction) that 170 m² are required to feed yearly one person. This serves as reference and is associated with an index of 1.
The highest productivity level is using intensive high tech farming methods similar to the vertical farm project (see case study in introduction). It is extremely efficient and allows year-round crop production. It was estimated (cf. introduction) that it requires 17 m² per person. Thus, as it is 10 times more productive than the allotments reference, its index is 10.

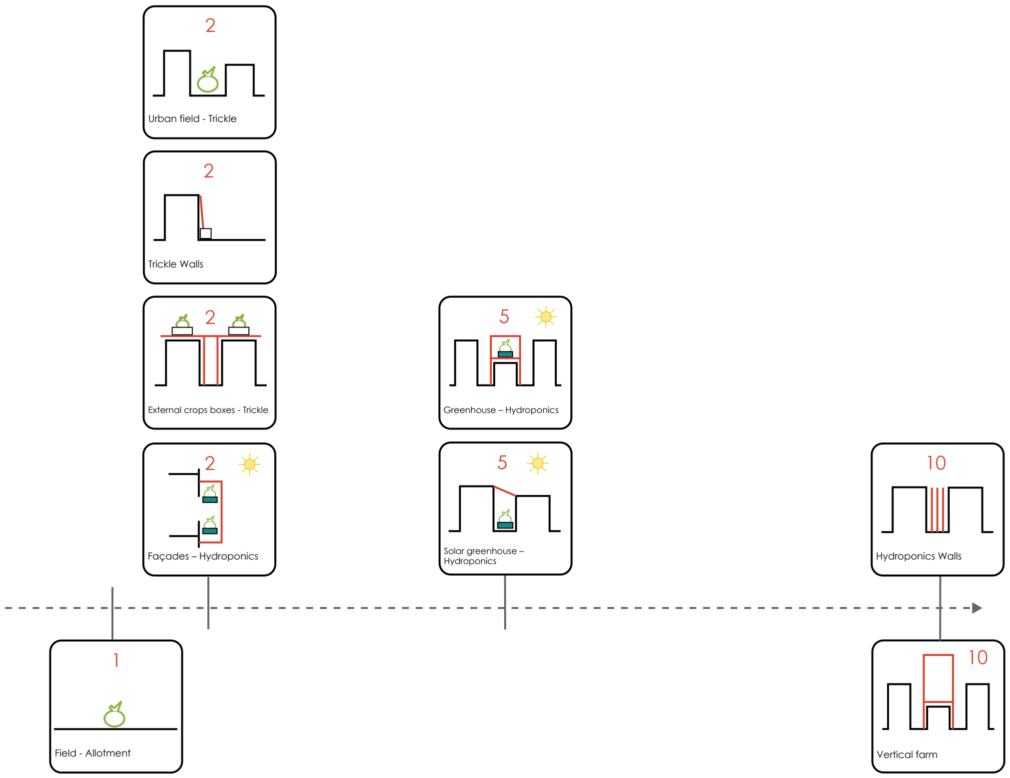
The technical solutions of the catalogue are then spaced out between these two references.

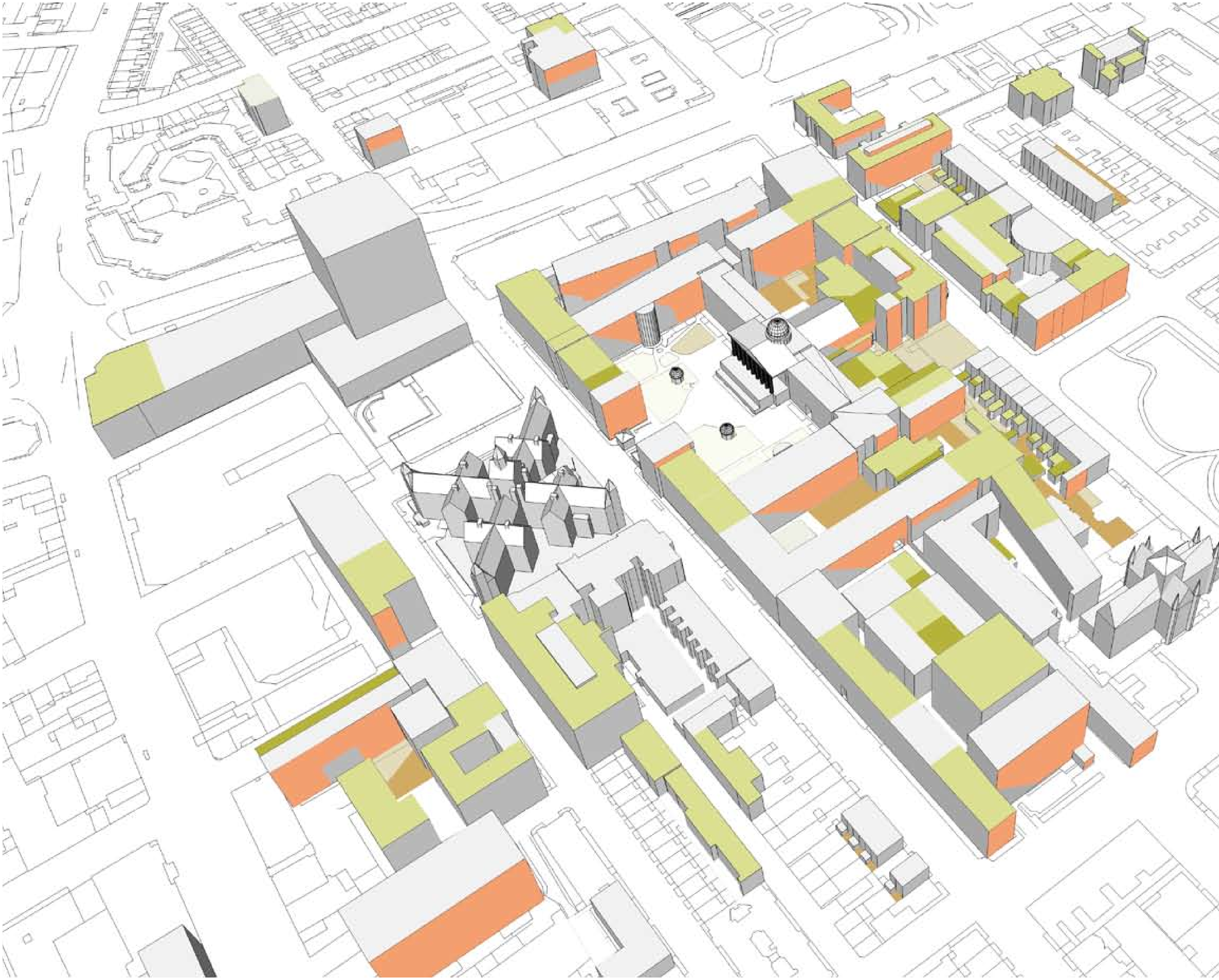
– We estimate that a productivity index of 2 is relevant for techniques using trickle irrigation. [25] This irrigation system enables the integration of fertilisers in the water supply; an adequate flow of nutrients is then given to the crops, increasing their productivity.

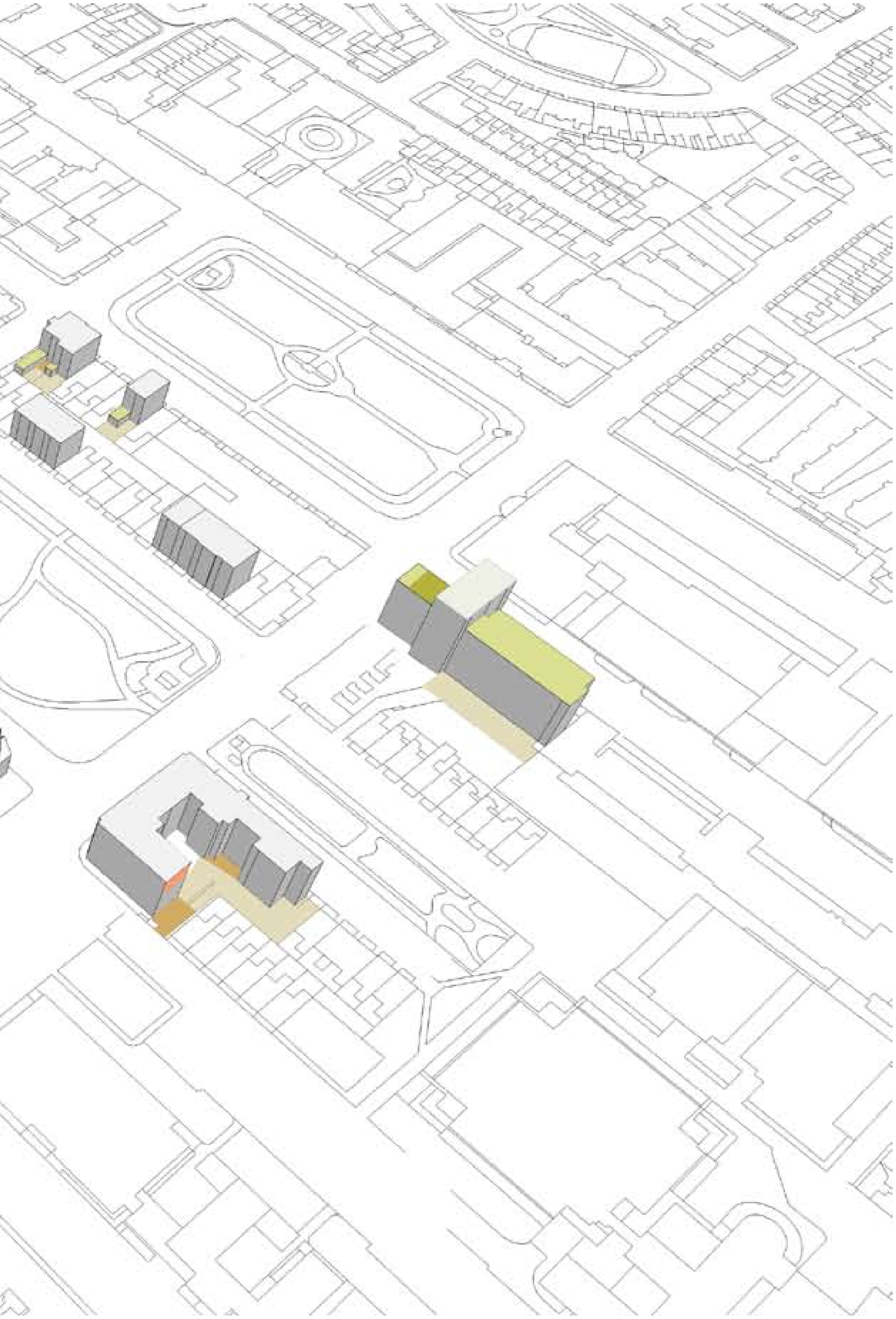
– We consider an index of 5 for hydroponic techniques. [18] With hydroponics plants are grown in a nutrient solution; the constant flow of nutrients increases considerably the productivity in comparison with crops grown in natural soils. However, we were cautious in our approach and did not retain the index of 10 that the full application of all techniques proposed in the vertical farm project would normally lead to. Indeed, we plan no intensive use of artificial lighting and fully-controlled environments.

– An index of 10 is attributed to the hydroponic green wall system; indeed this technique combines the efficiency of hydroponics with the fact that it enables to dramatically increase (by 2 times) the cultivation's surface thanks to vertical gardening. [3]

– An index of productivity 2 is assigned to the double façade system. Indeed, at each floor (average 2.5 m high), crops can be grown hydroponically in a 1 m wide horizontal strip. Thus, when considering the vertical area, the index becomes 5 (hydroponics) x 1 / 2.5 = 2.







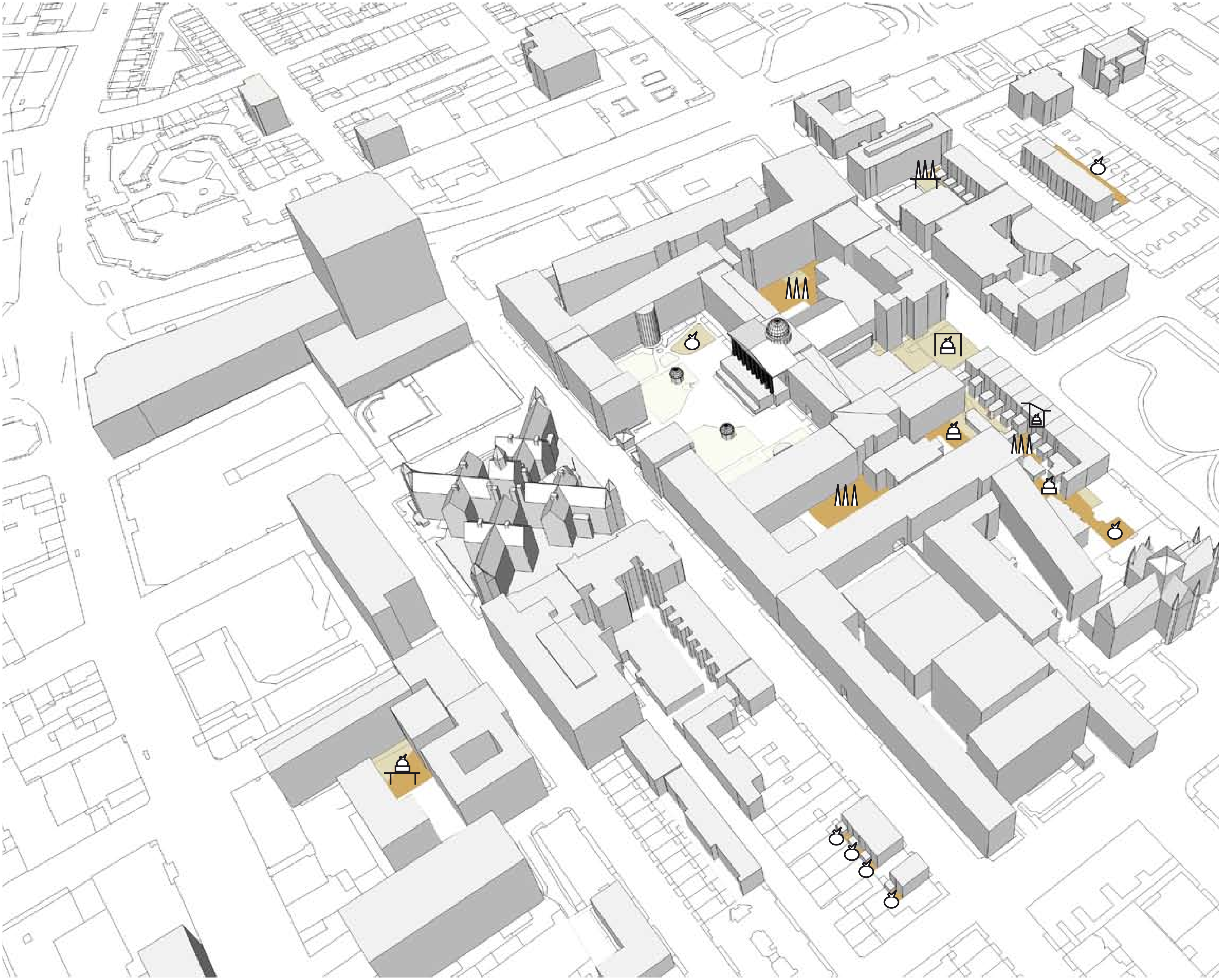
Simulation - Productive surfaces

Productive surfaces on UCL campus using the criteria of inclusion presented above.

Courtyards
Courtyards + Reflectors

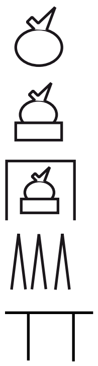
Roofs
Roofs + Reflectors

Façades



Simulation - Courtyards

Techniques applied in the courtyards of UCL campus



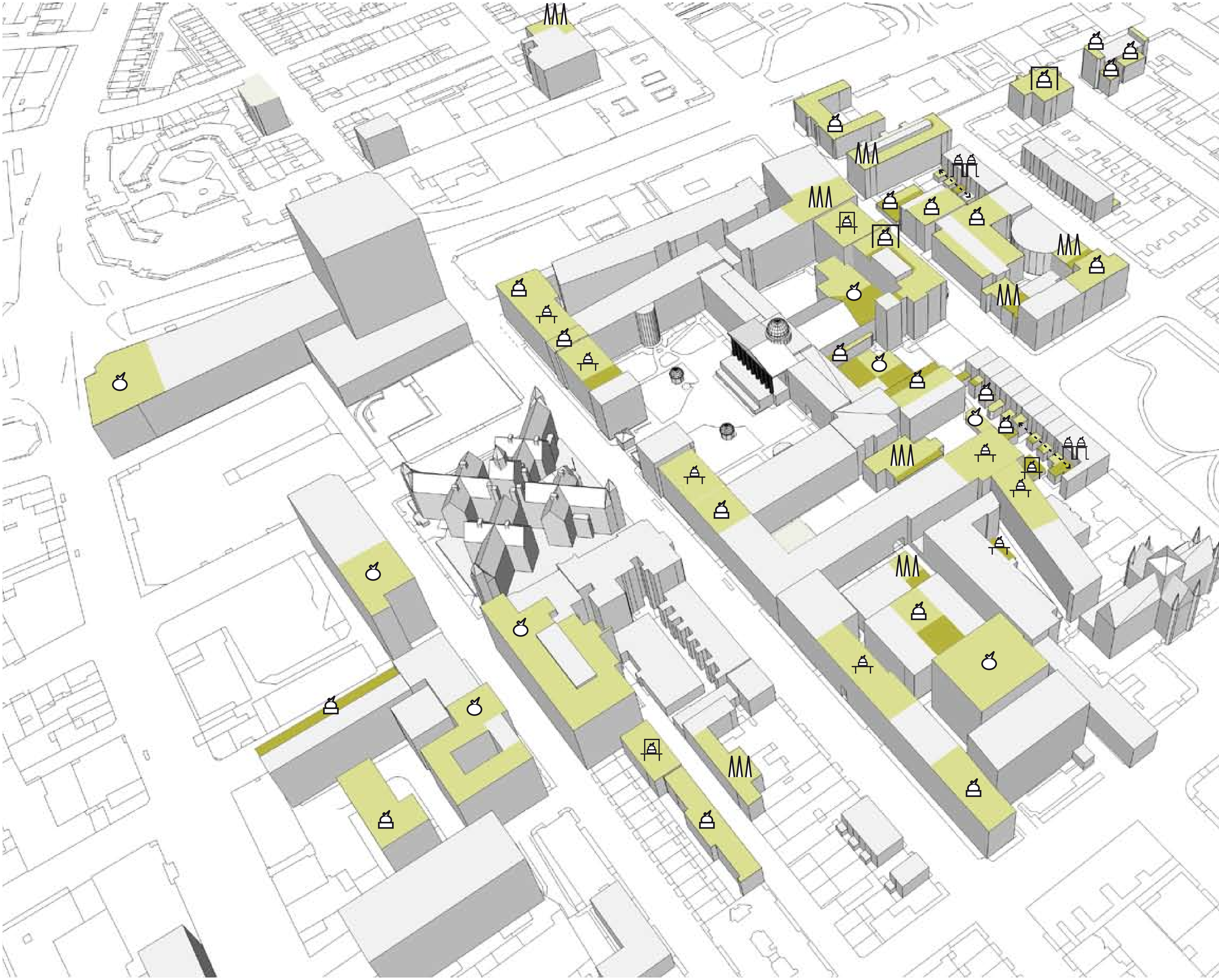
drip irrigation, plain soil

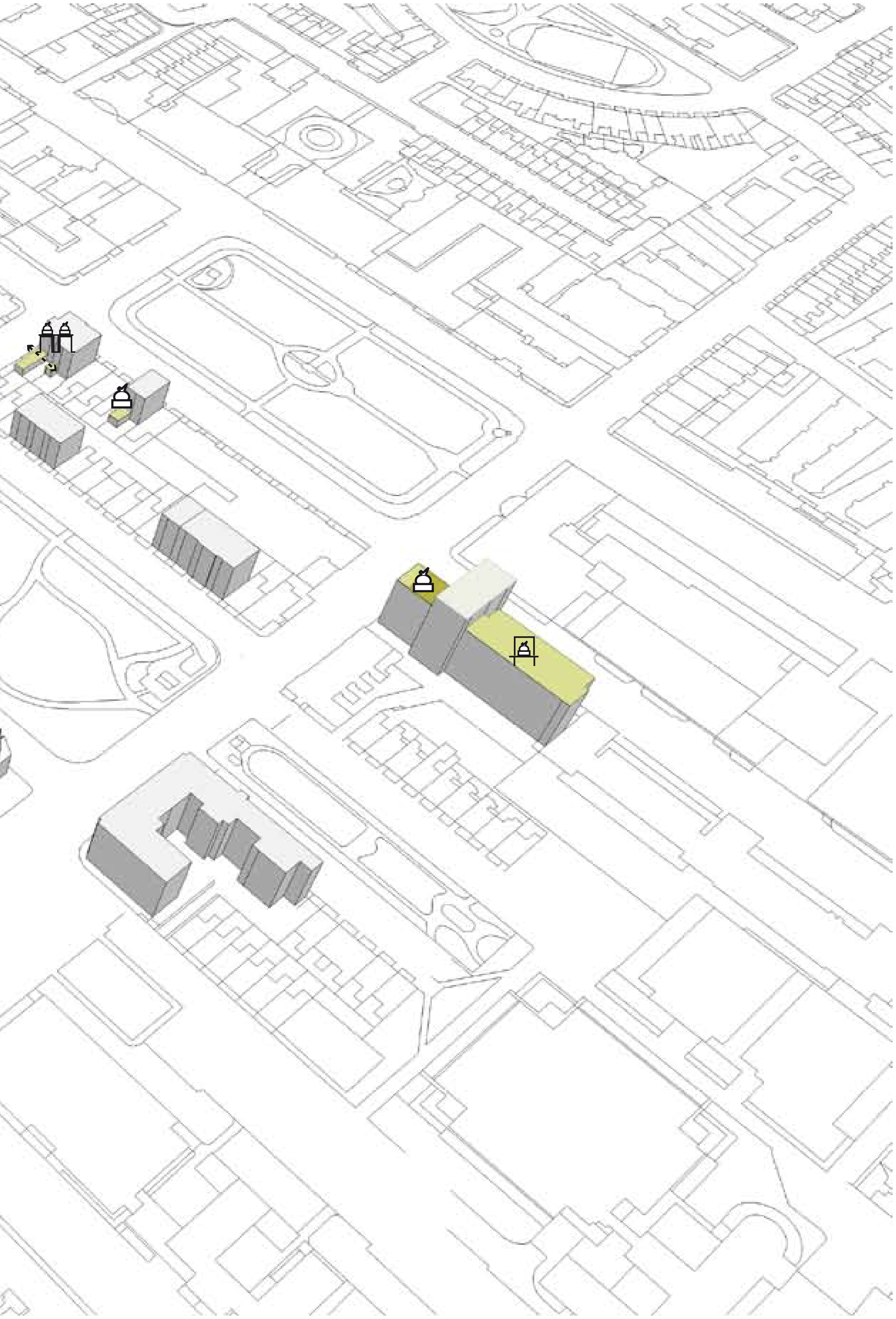
drip irrigation, boxes

hydroponics, greenhouses

hydroponics, green walls

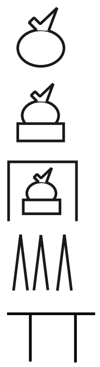
structure





Simulation - Roofs

Techniques applied on the roofs of UCL campus



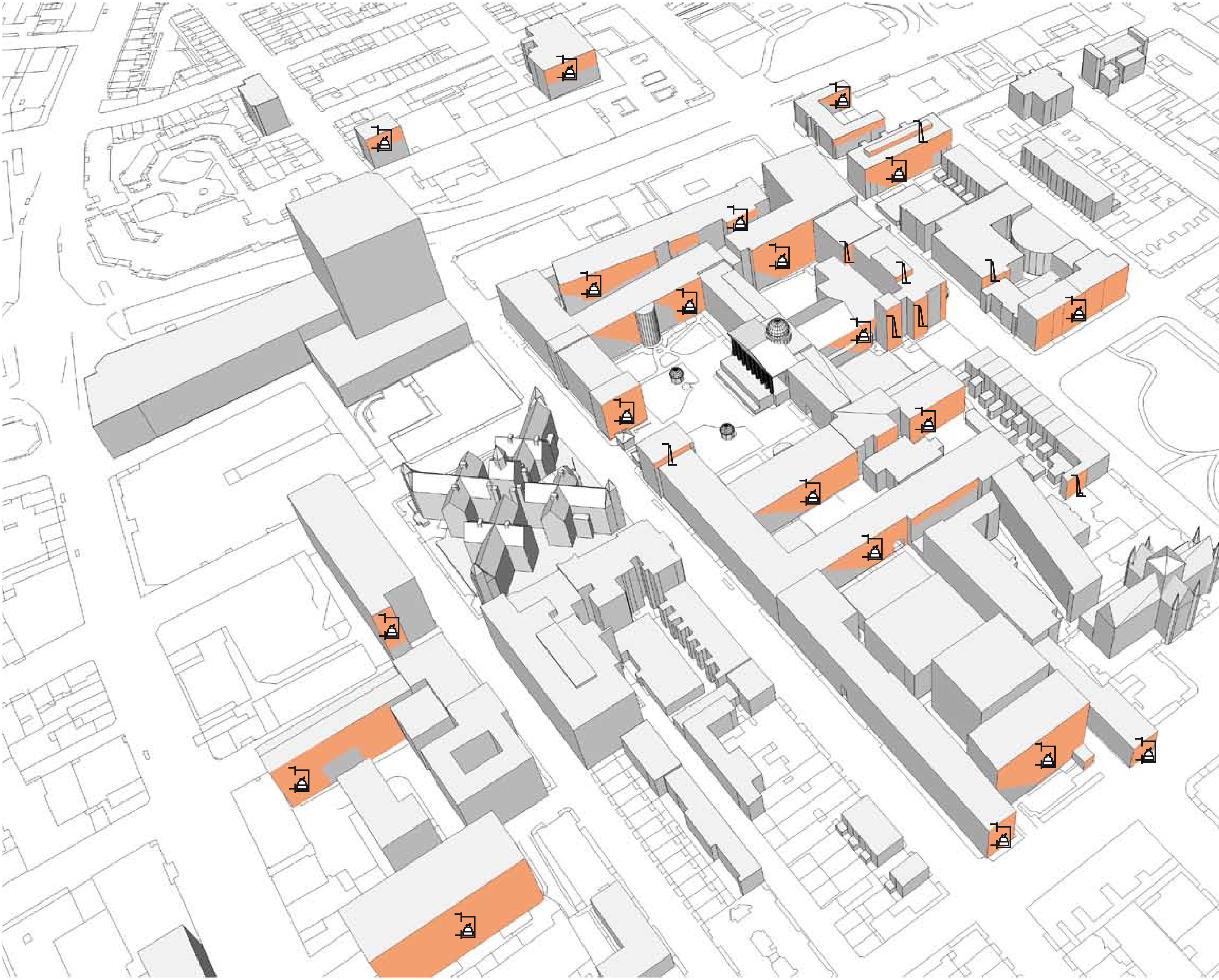
drip irrigation, plain soil

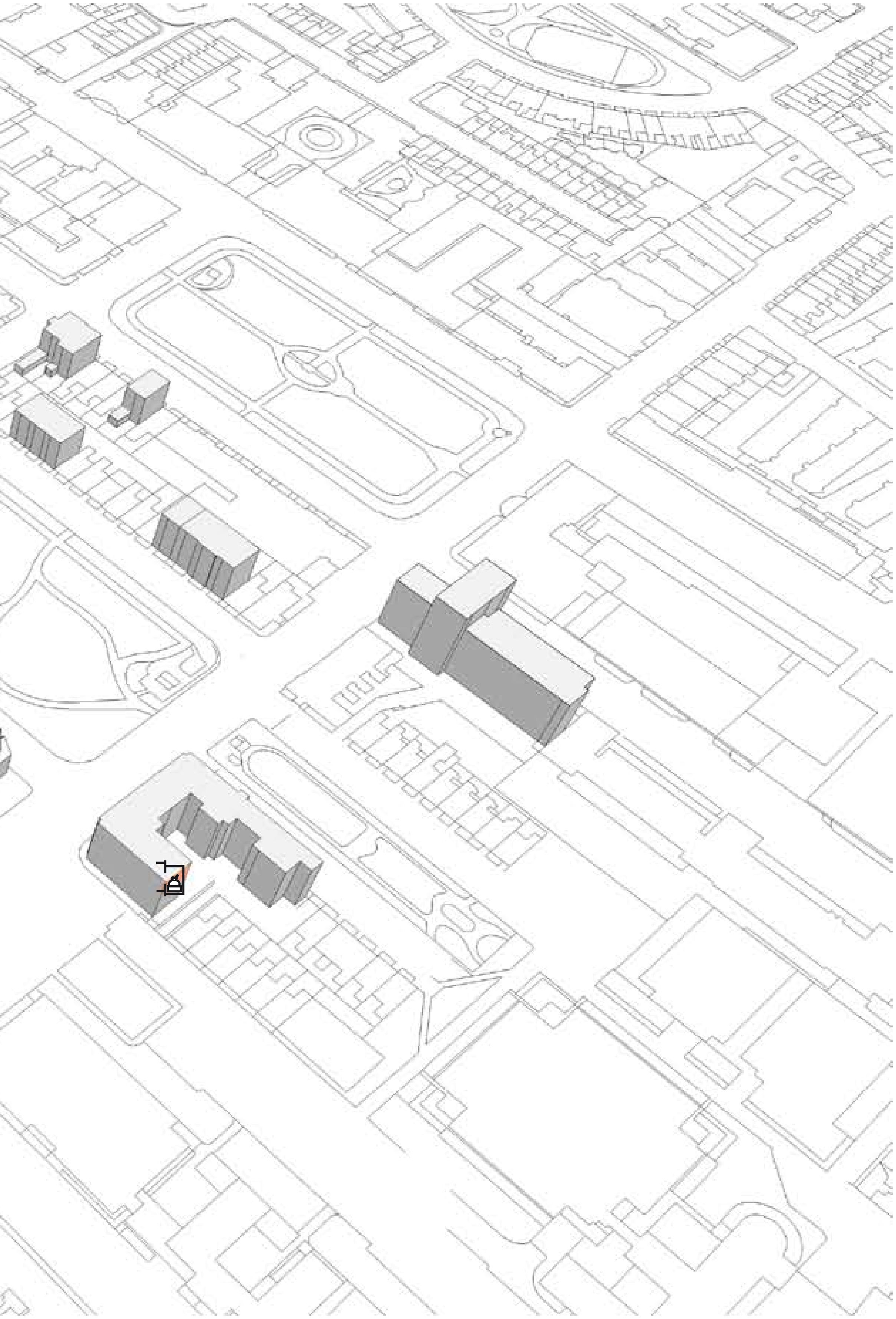
drip irrigation, boxes

hydroponics, greenhouses

hydroponics, green walls

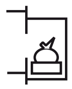
structure

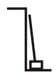




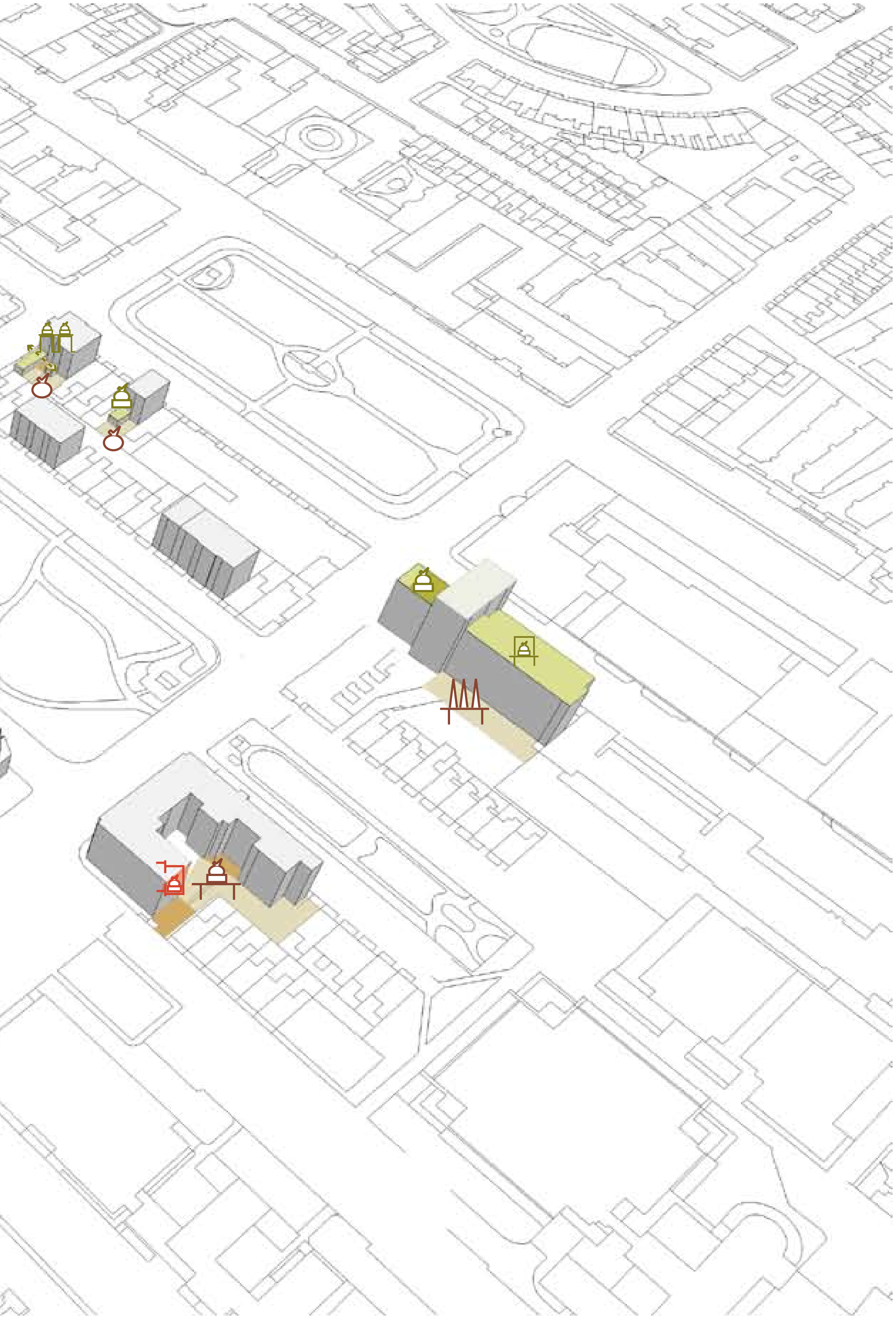
Simulation - Façades

Techniques applied on the façades of UCL campus

 hydroponics, green walls

 hydroponics, double façades

 drip irrigation, green walls



The whole Productive Campus!

Results

The simulation shows clearly that a significant proportion of local food can potentially be supplied to the campus if all available surfaces are mobilised.

In the courtyards, 0.5 ha of farmable land can be created. They equal 3 ha of allotments. On the roofs, up to 2 ha can be converted, which equal 8.5 ha of allotments. In addition, slightly more than 1 ha of façades can be used, which equals 2.5 ha of allotments.

In total, slightly less than 14 ha (in equivalent of allotments) can produce yearly 150 tons of fruits and vegetables. Such a quantity can feed more than 800 people full-time or 3,400 students or staff present only part-time on the campus.

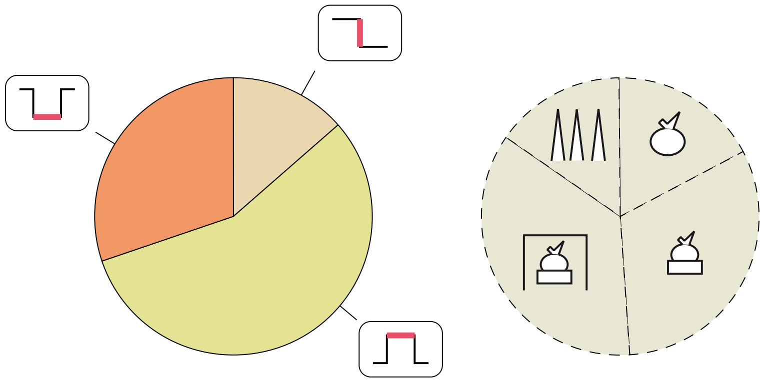
Thus, up to 12.5% of the 27,000 students and staff members can be supplied with a daily portion of fresh fruits and vegetables for their lunch. The objective of 10% is reached and even exceeded!

Several options can be considered in order to push further this percentage. For example, some of the 36 ha of sports grounds mentioned in the UCL Estates strategy could be used (provided that we were able to locate them…).
Moreover, under-used or disused spaces in neighbouring private properties could also be mobilised. Partnerships with administrations or companies could be set in order to make ornamental gardens or atriums in office buildings available for farming by the co-op in exchange of a part of the crops. This would certainly allow them to cut maintenance costs and enjoy a more exciting view from their workplace!

drip irrigation, plain soil
drip irrigation, boxes
hydroponics, greenhouses
hydroponics, green walls

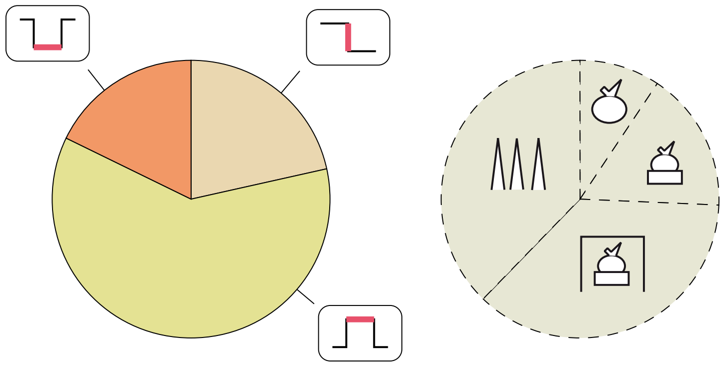
Repartition of farmable surfaces

m²					Total
	1 351	1 220	530	1 912	5 014
	5 002	10 307	2 487	2 915	20 711
	132		10 156	837	11 124
Total	6 485	11 527	13 173	5 664	**36 849**



Repartition of crops produced (in equivalent of allotments area)

m²					Total
	2 702	2 441	5 305	19 121	29 568
	10 004	20 614	24 869	29 149	84 636
	264		20 311	4 184	24 759
Total	12 970	23 055	50 485	52 454	**138 963**



IV. Managing and servicing the Productive Campus

Different specific aspects of the Productive Campus are illustrated in the following projects. Other projects detail the new facilities and services that must accompany the development of such an ambitious scheme.

IV. 1 Crops in semi-public spaces

As already explained, urban agriculture is also about finding appropriate solutions to enable proximity of crops and people, without allowing their theft or damage by the public. The following project illustrates how productive sites are integrated in two public courts situated inside the UCL main block.

The paths naturally taken by people are traced and analysed in order to install crops on the residual spaces and to regenerate misused areas. ❶

The plantations are not clearly separated from the public, but more sensible boundaries are designed. How can we allow people to circulate into plantations, but at the same time making them feel that it is not the right place to be? How design a boundary that is at the same time easy to go through, yet makes people who do so easily identifiable by passers-by, allowing auto-control?

❶

In the first example a low platform is set in order to install crop boxes 20cm above the public ground. A clear and visible signage is also provided to mark the area as part of the Productive Campus. ❶

In the second example hydroponic walls are erected in a way that allows their structure to be directly next to the public area. People can still see the walls; if they want they can even touch the crops, but for doing so they will have to go through the structure. ❷

❶

❷

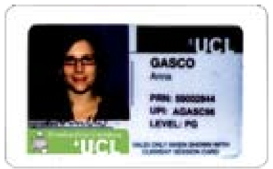
IV. 2 Access management

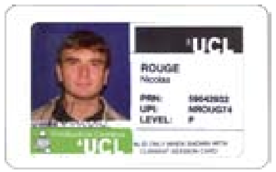
This project analyses how a productive site can be located beyond a semi-private space and what are the rules to be observed by the Productive Campus staff in order to access the plantation area.

The roof of the low building located opposite the main entrance and the workshop open-air area of the Bartlett is used to install crop boxes.

As the structure of the roof is not sufficiently resistant, a new light structure is built atop of it in order to support the plantation zone. The height of the roof being lower than 6 metres, a simple staircase is hung to the existing façade in order to allow access.

As the crops are located on a roof, the admittance to students and the general public is prohibited. In order to reach the plantation, the Productive Campus staff is equipped with a special "Productive Campus areas" access card. Without it, Don, the Bartlett's genial doorkeeper whose desk is just opposite the stair, will not allow the access.

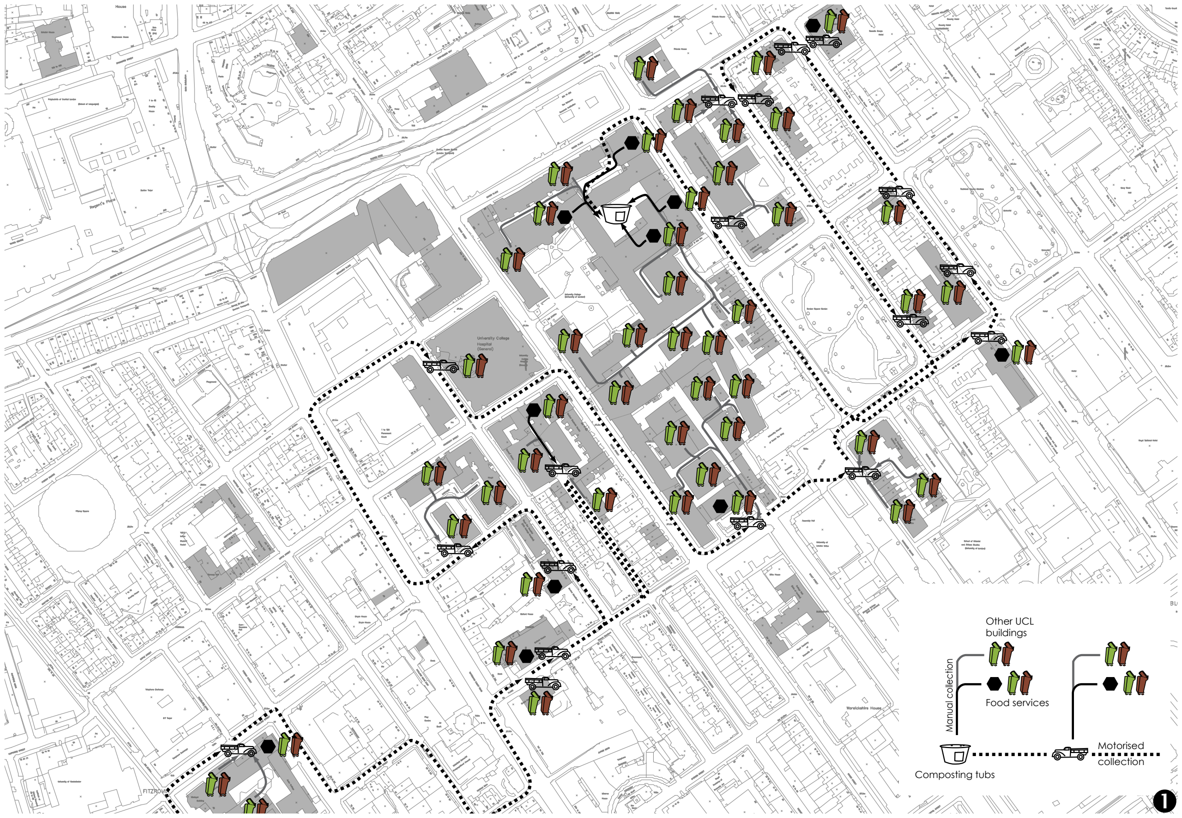




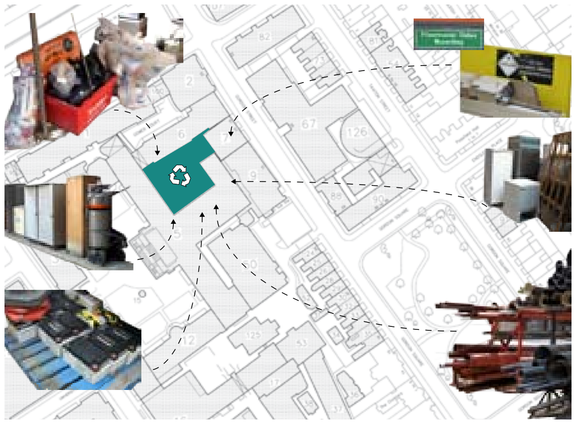
IV. 3 New composting facilities

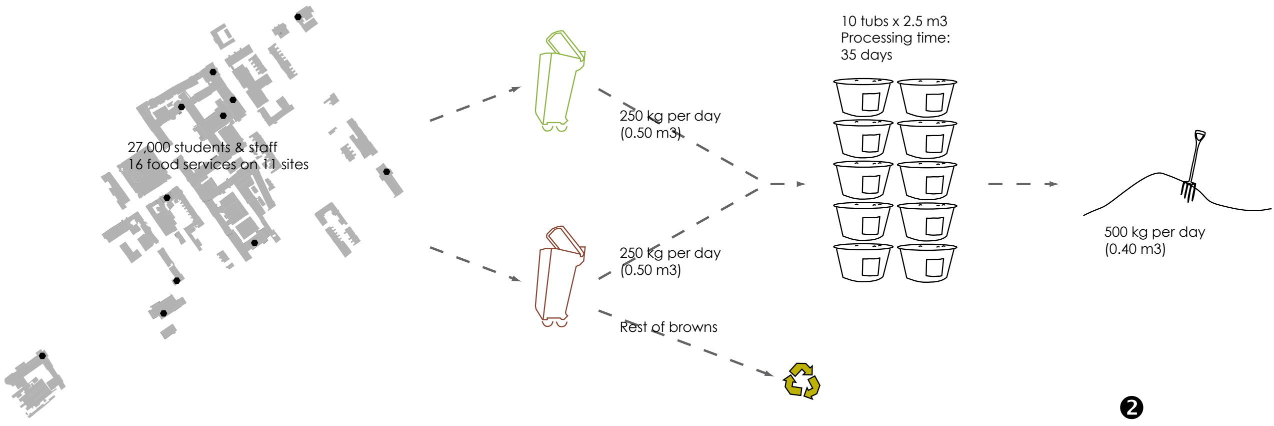
Quite naturally, the low tech composting system of the Productive Lab is extended during the development of the Productive Campus in order to face an increasing need for natural fertilizers.
The manual collection using wheel bins is replaced by a motorized collection ❶ that allows the system to be expanded to the whole campus.

The organic waste is still processed in the same courtyard situated in the main block of UCL. The 25 turning bins are replaced by 10 in-vessel compost bins that can handle twice the quantity of waste and produce twice the quantity of compost. ❷ As the highly-engineered process used in the new bins is significantly faster that the natural process occurring in the turning bins, the global volume of bins remains unchanged. Moreover, in-vessel composting requires less labour as compost is aerated automatically and not manually.

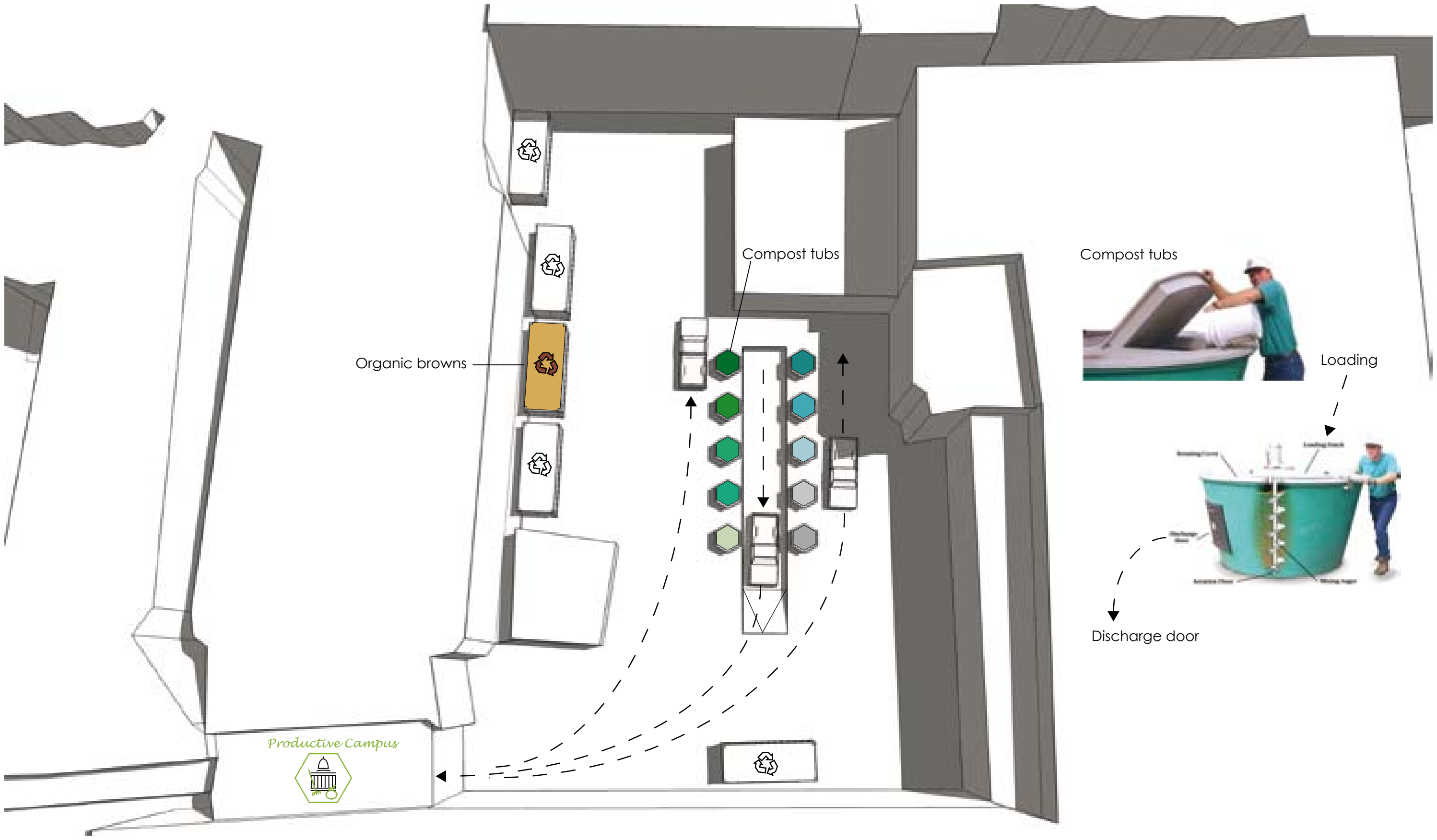


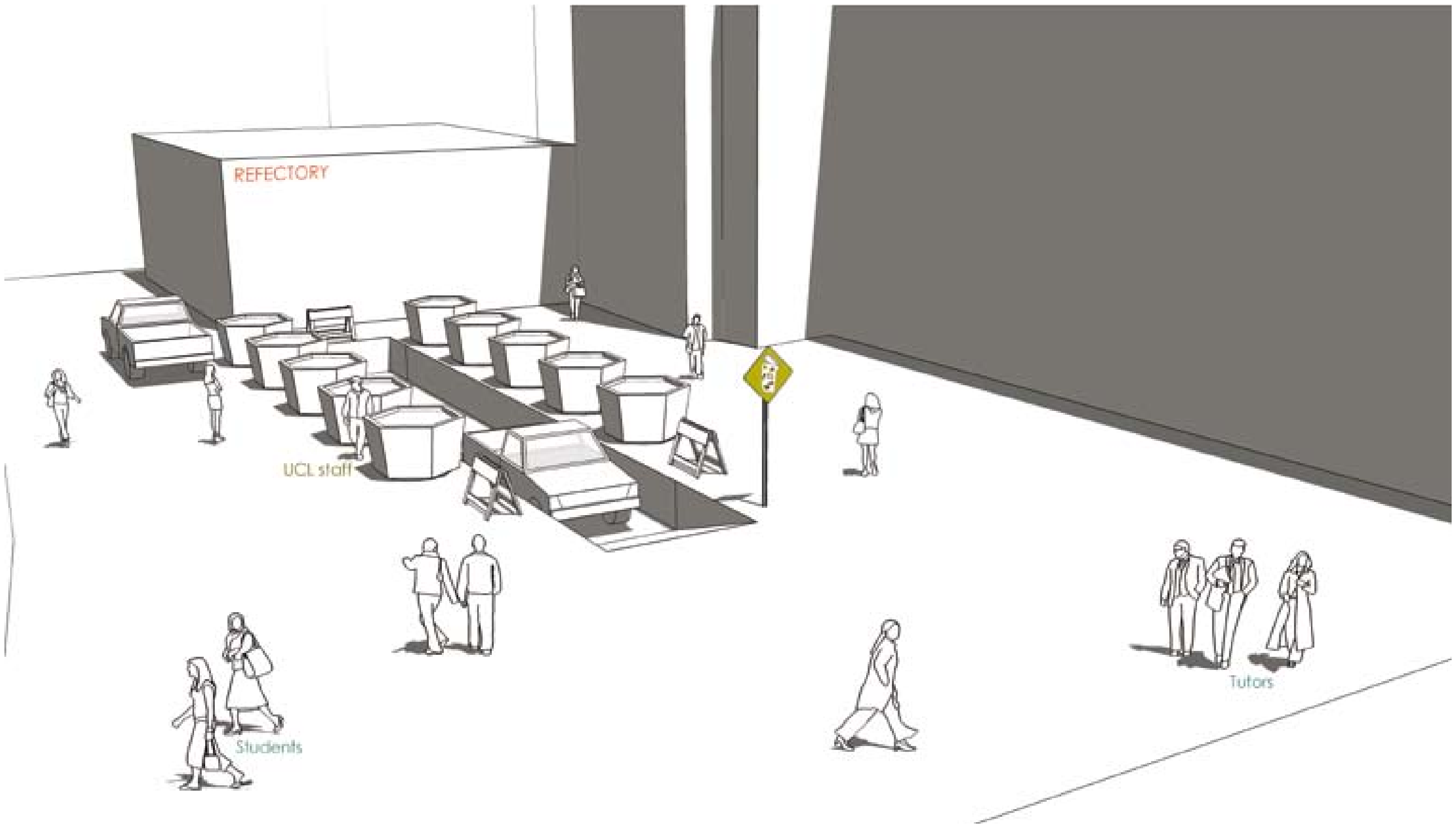
❶





❷

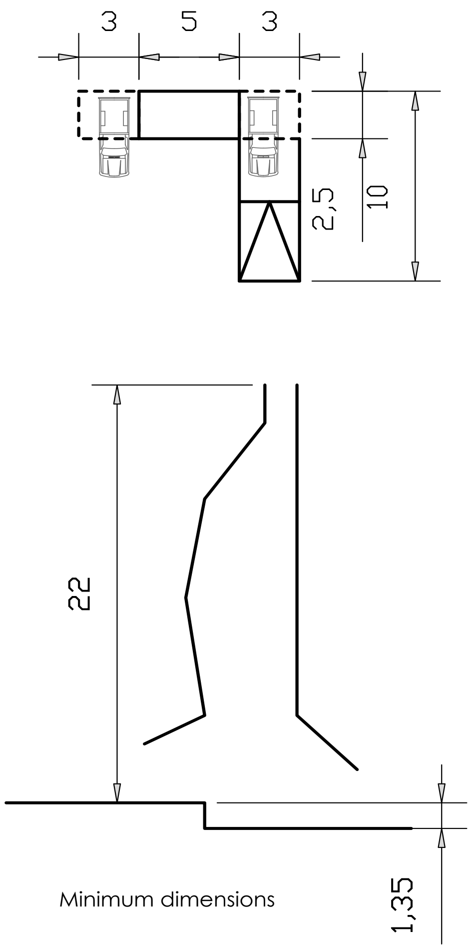

Compost tubs
Compost tubs
Organic browns
Loading
Discharge door
Productive Campus


REFECTORY
UCL staff
Students
Tutors

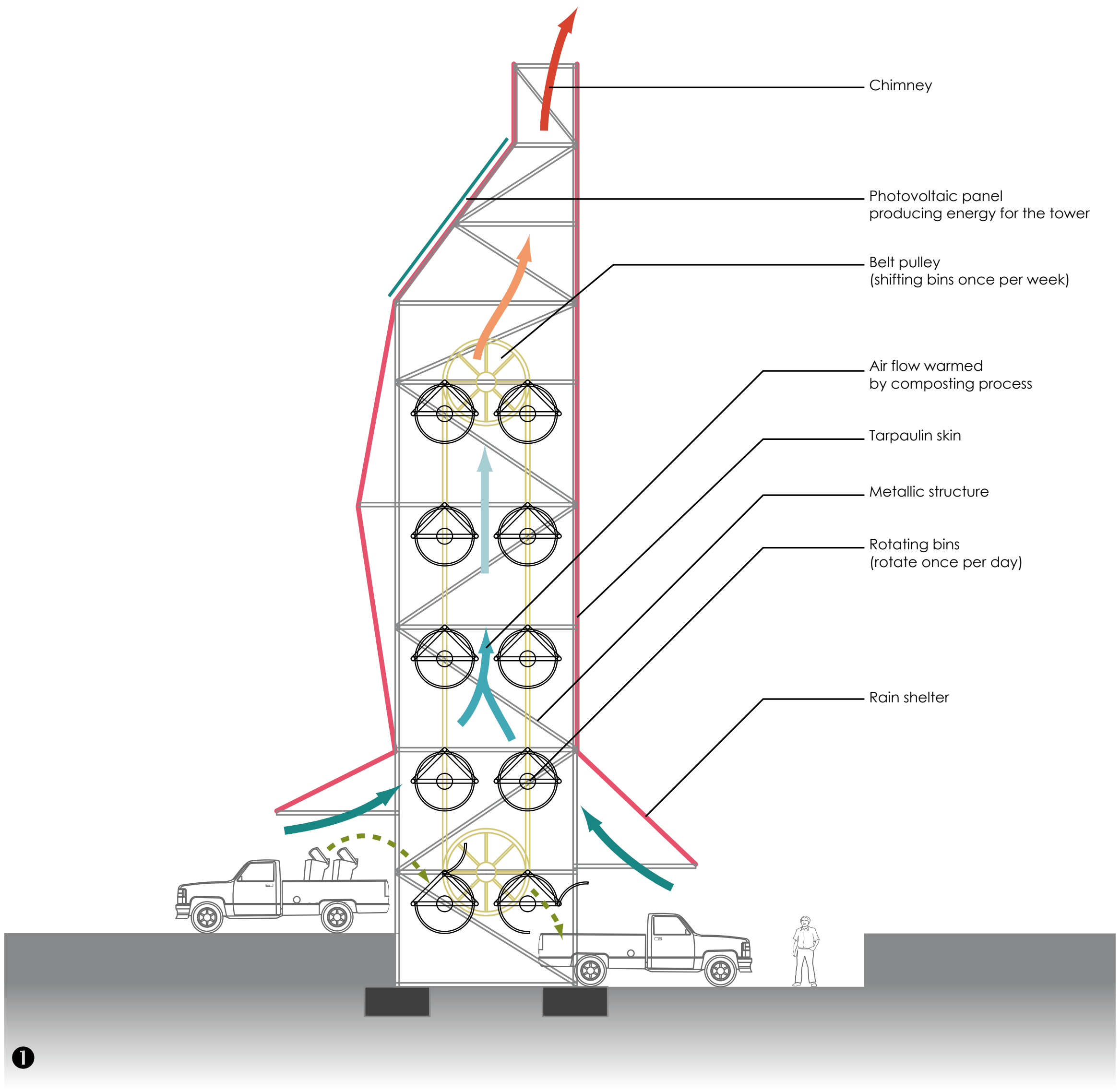
The in-vessel compost bins system is far more effective, yet it is still very space-consuming. After some time, in order to leave more room for cultivations, an innovative system of "composting tower" is imagined.

The principle of the composting tower relies on the observation that composting materials only need to be at ground level when bins are loaded or unloaded. In-between, a natural process occurs that does not require any human intervention if aeration is provided by mechanical shaking. Thus, bins can be attached to a belt and pulley system that moves them up and down during the time of the composting process. Moreover, as this process releases heat, the whole tower acts as a chimney and a natural upwards airflow enables to deal with any potential odour issue. ❶

In addition, the UCL campus is provided with a brand new and sustainable landmark! ❷



Minimum dimensions



❷

New perspectives for organic waste 29

Composting is not the only way of using the organic waste produced in large amounts in cities.

Producing biogas is another option. Biogas is generated when bacteria degrade organic material in the absence of oxygen, a process known as anaerobic digestion. Anaerobic digestion can use almost any organic material as a substrate - it occurs naturally in digestive systems, marshes, rubbish dumps, septic tanks and the Arctic Tundra. It is most often produced from landfill waste, wastewater or manure.

Biogas is a mixture of methane, carbon dioxide and many other molecules. Methane is very hard to compress. Moreover, biogas needs to be significantly cleaned up in order to be used in a local gas distribution network; this is an expensive process. Thus biogas is most often used locally rather than in a network or in vehicles. It is often burnt right away in order to produce electricity and/or heat, for example in combined heat and power units (CHP). It can also be used directly for cooking or heating, as experimented in the passive house of the Vauban ecological development in Freiburg, Germany.

A new perspective can also be foreseen: organic waste as a source of biofuel. Biofuel is today produced from crops of colza, wheat or beet. Yet, if demand was to increase (which is likely considering the rising price of oil and the growing concern about greenhouse gases), the farmable land needed would quickly become excessive and biofuel would compete with food crops.

In order to avoid that situation, biofuel could be produced out of organic waste such as straw, crop waste, wood or organic domestic waste. The main source of energy is the lignocellulose found in those materials. There are several research programmes going on in order to improve the transformation of lignocellulose into bioethanol, used as biofuel. The technology is still not fully optimised but the first results are encouraging.

Sources:
Paul Harris, University of Adelaide, An introduction to biogas, http://www.ees.adelaide.edu.au/pharris/biogas/beginners.html
Passive house in Vauban, http://www.passivhaus-vauban.de/idee.en.html
Institut National de la Recherche Agronomique, http://www.inra.fr/les_recherches/exemples_de_recherche/les_champignons_filamenteux_pour_produire_les_biocarburants

Culture of the fungi "Pycnoporus cinnabarinus" - Source: htpp://www.inra.fr/

Composting in North American Universities

30

The University of Waterloo in Ontario, Canada, experienced several small-scale composting facilities, including:

- The Environmental Studies Coffee Shop. This is a small lounge area serving beverages, sandwiches, and snacks to students, staff, and faculty. Since 1993 then a small six litre container is located in the Coffee Shop where compostable food can be disposed of. The container is emptied once per day into the composter located outside the building. A Waste Management Facilitator is hired to empty the 'compostainer' into the outdoor compost and turn the compost once a week. The soil produced from the composter is used in the gardens outside the building.

- Vermicomposting in offices on campus. This project, conducted in 1998, was implemented in three offices on campus. It was relatively well accepted, except in one case where there was a lack of information due to a poor involvement of the project correspondent.

Still in Waterloo, a group of students studied in 2004 how a campus-wide composting program could be implemented in their university. An off-campus solution in a large-scale composting facility was finally recommended, mainly for cost reasons. The study was also carefully studying the disposal of organics in the 5 main food services of the university: new specific bins would be filled directly by patrons and emptied by food services staff into a site-specific loading dock where trucks would come collect them.

The study identified the main problems as follows:

- Cost: Universities are hesitant to implement an organics recovery program due to increased costs in comparison to landfill.

- Education: Due to the large turnover of students, there is a need for continuous education to decrease contamination and to encourage participation.

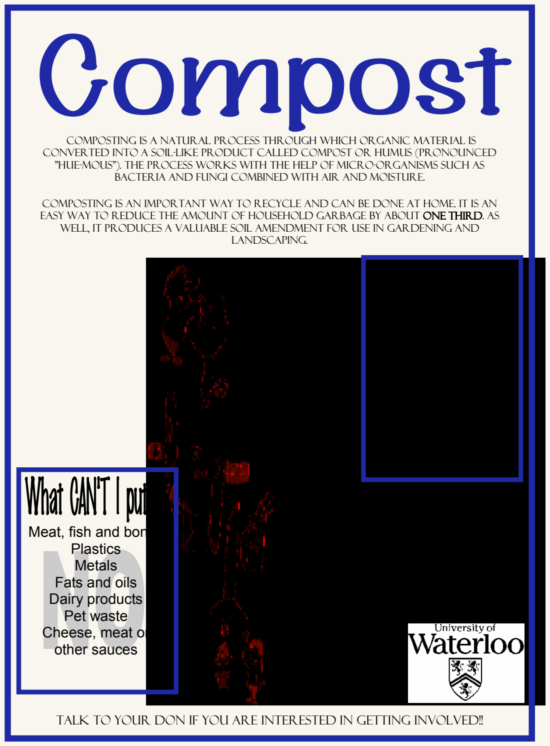
- Maintenance: In general, people are uncomfortable with change. The food services employees would be involved by emptying and disinfecting organic waste bins several times per day. This presents possible resistance and may require additional staff.

These problems can certainly be handled with a real involvement of staff and students, as a similar program is running successfully on the downtown campus of the University of Toronto, Ontario, since 1994. However, in Torointo the University also opted for an off-campus composting option.

Many universities across Canada and the USA have studied the feasibility of large-scale local composting programs. Some have actually put it in place, such as Texas A&M University. However, as far as we could investigate, none were downtown campuses.

Sources:
Jessica McEachren, Andrea Formanek, Kevin Dance, The Feasibility of a Campus Wide Composting Program at the University of Waterloo, April 2004, http://www.adm.uwaterloo.ca/infowast/watgreen/projects/library/w04campuscomposting.pdf (accessed 17.07.2006)
University of Toronto Waste Management System, http://www.appa.org/files/PDFs/Nower.pdf (accessed 17.07.2006)
Assessment of Rice University as an Environmental System (includes a detailed feasibility study of a composting system for Rice University), http://www.owlnet.rice.edu/~bake302/ (accessed 17.07.2006)

http://www.wastemanagement.uwaterloo.ca/



Aerial view, University of Waterloo campus - Source: http://www.georef.com/

IV. 4 The Main Quad market extension

This development of the Main Quad market initiated by students during the Productive Lab stage reflects the development of the Productive Campus: it is now managed by the co-op and turns quite naturally into a weekly event that attracts a large crowd from all over Bloomsbury and beyond. Its opening hours are adapted in order to allow more workers from the neighbourhood to stop by before going back home.

IV. 5 Managing information

In order to provide UCL students and staff with fresh information and foster an active involvement of everyone, a dedicated website is launched.

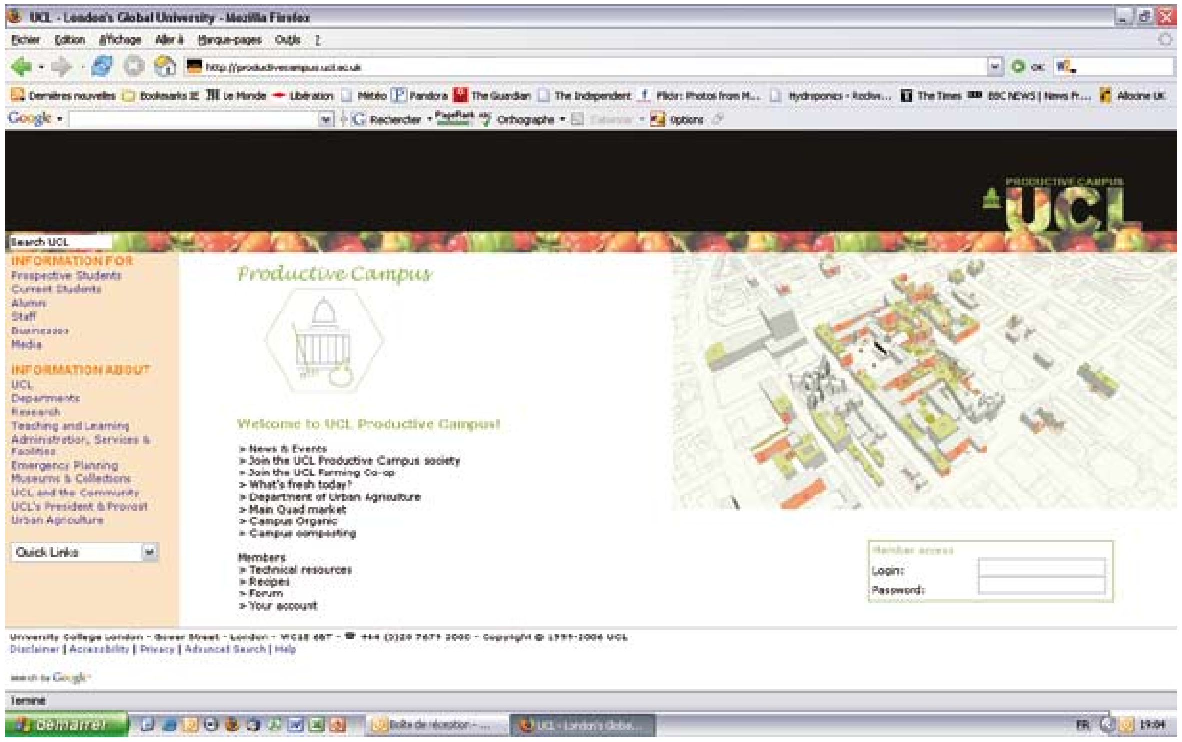
This website includes:

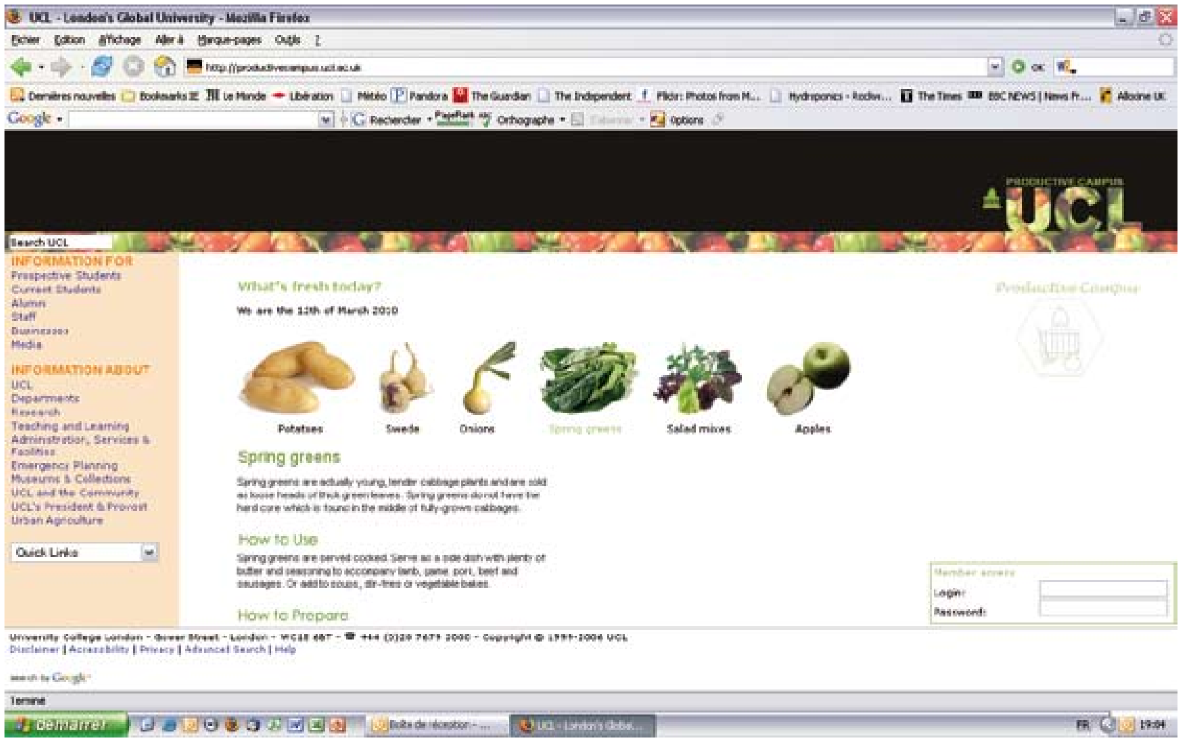
- Practical information about the markets and shops managed by the co-op (the Main Quad market, the Campus Organic pick-your-own shop) as well as other events (like harvesting festivals, etc.).

- Information about fruits and vegetables seasonality: the aim is to inform students and staff about the schedule of crops growth and promote season products in order to "educate" them and dissuade them from buying off-season food imported from distant countries.

- Submission forms to become member of the UCLU society or the co-op. An informative e-letter is also proposed. Donations are of course encouraged...

- Technical resources, as well as shared recipes that everyone can post!





IV. 6 The new Department of Urban Agriculture

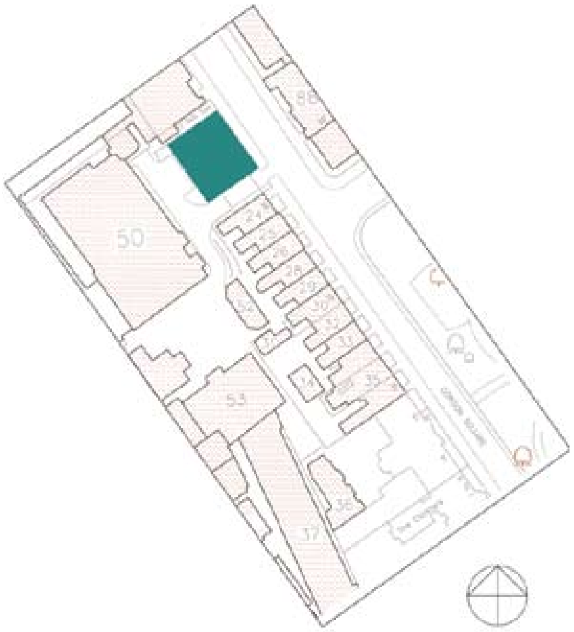
Urban agriculture relies for a large part on the use of high tech and innovative techniques that originally come from research.

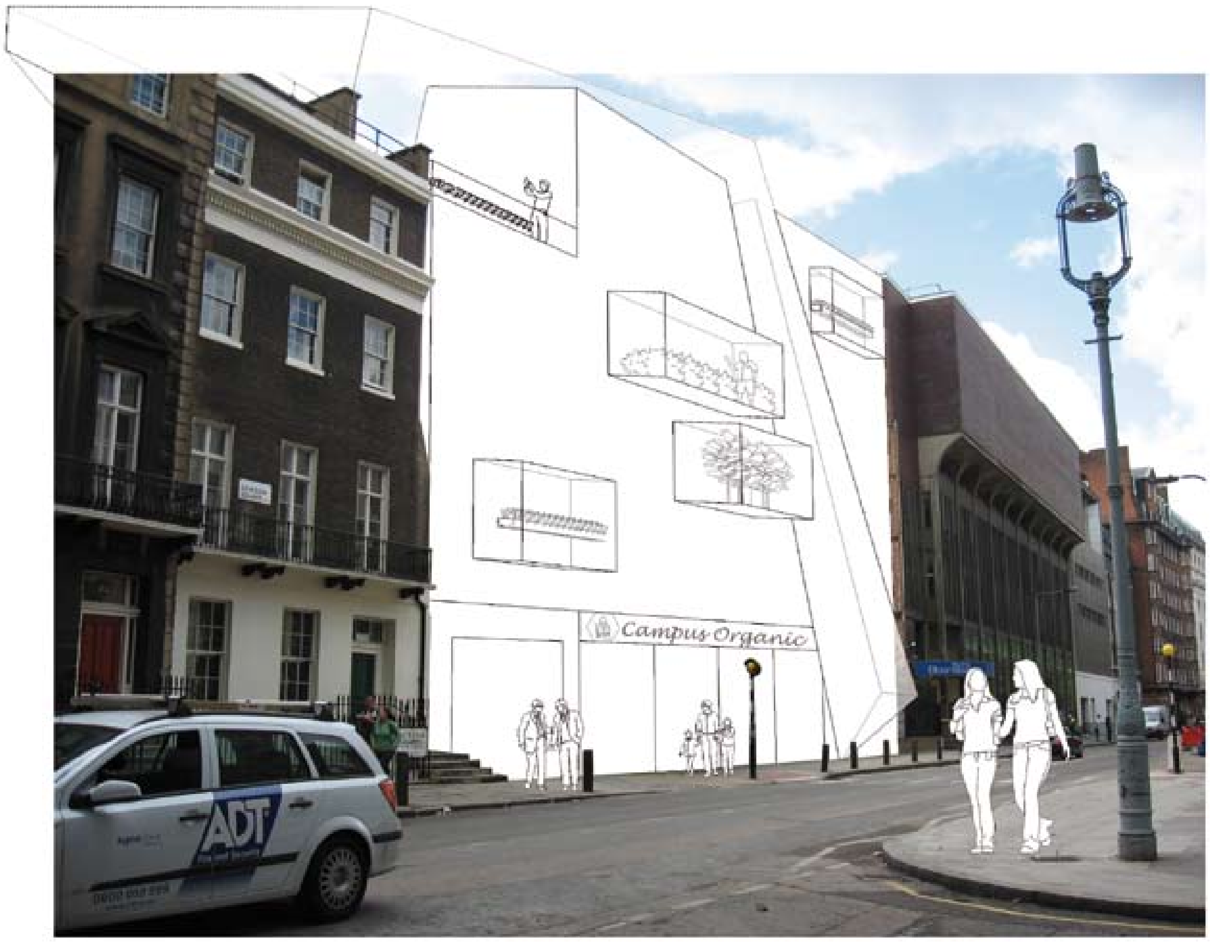
In order to maintain UCL at the forefront of research on sustainability, a new academic department is created in order to specifically teach and research the field of Urban Agriculture. There is no agronomy department today at UCL nor at any London university.

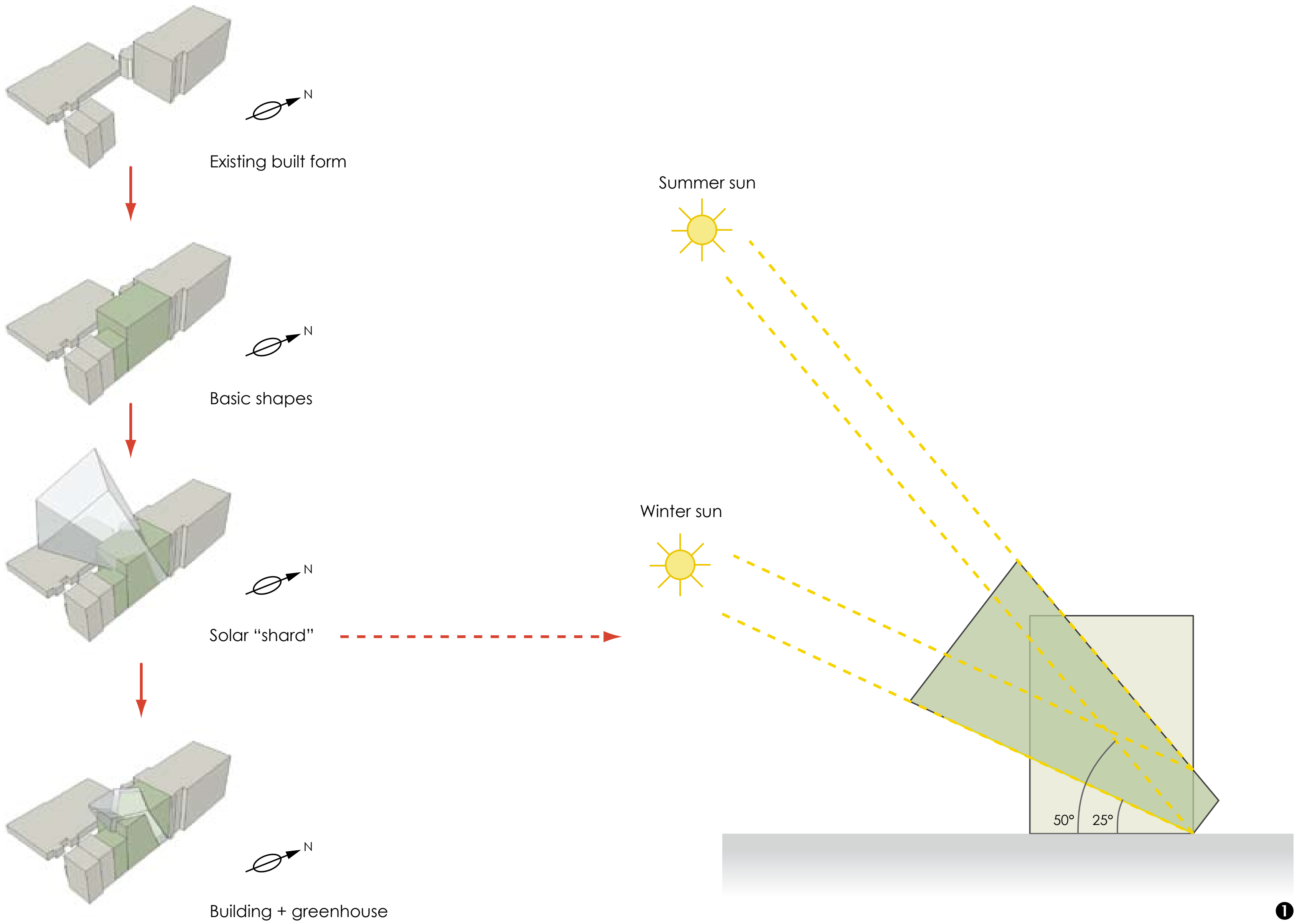
The new department is mainly technical and is part of the Faculty of Engineering Sciences, but partnerships are set with other academic departments of UCL that contribute to explore specific or side aspects of urban agriculture: the Bartlett for the architecture and planning of productive surfaces, the Faculty of Clinical Sciences for the therapeutic function of gardening, the Department of Pharmacology for the pharmaceutical use of some crops, the Environment Institute for a general assessment of the environmental benefits of urban agriculture or the Department of Economics for the study of its place within the food industry…

A new building is built in the last empty plot of the main block of UCL in order to accommodate the new department. The design of this building is a unique fusion of opaque and transparent volumes: a "solar shard" of glass oriented so as to optimise solar gains tears the building apart and juts out from the main façade. The transparent volume of the shard is used as a greenhouse in which research is led and practical training classes take place. It also acts as a thermal buffer for the rest of the building, which includes offices and lecture rooms. ❶

In addition, the main façade alternates traditional windows and protruding glass boxes that host hydroponics or other kinds of cultures, making the function of the building clear to all passers-by. This can be seen like an outburst of the productive campus over the public realm.






N
Existing built form
N
Basic shapes
N
Solar "shard"
N
Building + greenhouse
Summer sun
Winter sun
50°
25°
❶

IV. 7 Pick-you-own store - Campus Organic

At the ground floor of the new building of the Department of Urban Agriculture, an original and new shopping experience is proposed to all Londoners: Campus Organic.

Referring to the growing success of pick-your-own farms at the edge of cities, [31] this new generation of food store allows clients to choose and pick their food directly on hydroponically-grown plants. It is managed by the UCL farming co-op.

Clients are charged according to the weight of the crops they picked. The products are sold at a slightly lower price than in neighbouring supermarkets, but the profit is still higher for the co-op as there are no transport costs and hardly any packaging and labour costs.

Pick-your-own farms [31]

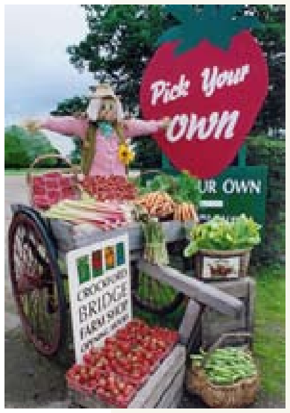
Pick-your-own farms and orchards have appeared over the years in the vicinity of towns. They are places where the customers themselves harvest fruits or vegetables.

They are generally large fields, subdivided into strips of various cultivation areas. As fruit trees and vegetables of all kinds mature following their own natural cycle, different crops are available over the year.

Clients make their own harvesting and pay according to the weight of products they collected. The prices are usually higher than what the producer would get from a broker, but lower that what the customer would find in a supermarket.

After the initial investment, the owners of "pick-your-own" farms need to care for the annual re-planting of plants and their sustenance.

Source: Wikipedia, Smallholding,
http://en.wikipedia.org/wiki/Smallholding



For further information
To see where you can find a pick-your-own farm near your place, check http://www.pickyourown.org/united-kingdom.htm (PYO Farms and Orchards in the United Kingdom