

a local response to global environmental issues

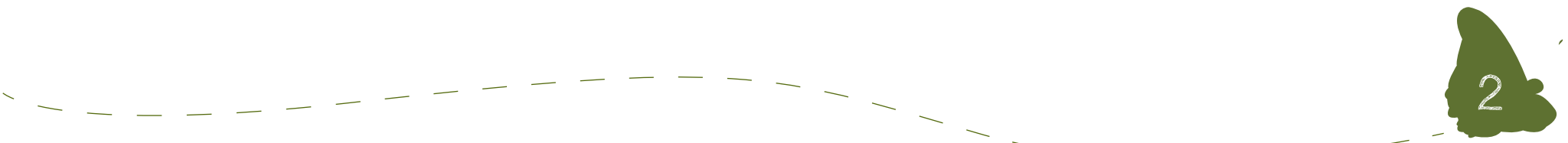


# The Big Nature Centre





“When I was a boy, walking home from school, I could pick a bunch of wildflowers for my mother and she would have known the name of every species. Indeed she new the names of all the wild flowers, all the butterflies. Basic knowledge about our local environment is now no longer common place and this is something that should concern us all, because such ignorance is ultimately very damaging.”  
Professor David Bellamy 2011.



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"We are in the midst of a civilizational change. We are moving from an era in which the environment and sustainability were mere concepts in public consciousness, to an era in which they will be deeply ingrained as global ethical imperatives that will guide countless actors.....Our decisions now, will dictate the pace of that transition and the character of the world it will create." Tom Jacob, (March 2011)

An evolutionary perspective on Sustainable Development Governance, Stakeholder Forum

Chalkhill Blue (*Polyommatus coridon*)

# Reconnecting with Nature

## What is Biodiversity

Biological diversity or biodiversity as it has become known, is the rich variety of living things found on the Earth but when we use the term biodiversity it begs the question, what level of biological diversity are **we** looking at?

- **Ecosystems** vary one from another, the diversity of life that makes up a wildflower meadow is obviously very different to that which forms a tropical forest or a coral reef. So obviously at the habitat or ecosystem level there is considerable biological diversity.
- **Species** are the common currency of biodiversity: birds; mammals; amphibians; reptiles; invertebrates; flowering plants; fungi etc., the list is almost inexhaustible. Species show an almost infinite amount of diversity in form and function.
- **Genetic diversity**, the endlessly varied chains of DNA, which are made up complex sequences of genes, are responsible for the programming behind the protein synthesis that makes cells, organisms, species and ecosystems possible.

Oxeye daisy (*Leucanthemum vulgare*) - roadsides, hedgebanks, grassy waste places. Ubiquitous\*



# Why is Biodiversity important?

Each individual life form has the potential to play multiple roles and so as their life cycles turn season on season, year on year, like cogs in some great biological mechanism, they each make their contribution to the functioning ecosystems they inhabit. However, unlike ancient clockwork devices designed to calculate precise outcomes, the results of interactions between species within ecosystems is very much harder to predict. It is the complexity of these interactions that leads to the emergent properties that scientists call ecosystem services.

Human beings rely on a host of invisible services that ecosystems provide. For example:

- They provide foods, medicines and fuels;
- They regulate climate, waste disposal, the purification of clean air and water, crop pollination, pest and disease control and they lock up carbon;
- They support seed dispersal, nutrient recycling and dispersal, and the process of photosynthesis that ultimately provides the mechanism for all the primary production within ecosystems;
- They preserve genetic diversity and provide recreation for all of us.
- This is in addition to the opportunities for scientific discovery, cultural, intellectual and spiritual inspiration.

With human population increase comes the over exploitation of natural resources and greater habitat fragmentation, with detrimental consequences for biodiversity. Biodiversity losses are irreversible and damage the life support systems we rely on, making life for future generations more uncertain than those that preceded them. This presents a challenge, one that calls for a new approach to solving problems and a new vision of the future.

Common Knapweed (*C. nigra*) - Grassland, field edges, roadsides, waste land etc. Ubiquitous



Drawing wild flowers



Tree beating



Examining pond invertebrates



# The Big Nature Centre

"Big Nature" is in many senses a synonym for biodiversity, which used in its broadest sense, includes the almost infinite variety found in life at the ecosystem, species and genetic levels. The Big Nature Centre is designed both to nourish the experts and to introduce members of the public to the diversity of life found in their local environment. From the eight year old child to the octogenarian, the Centre will raise bio-literacy and bio-numeracy skills, helping people to gain confidence about their understanding of the world around them.

The Big Nature Centre will be used as an inclusive facility, since everyone shares the biosphere, we are all stakeholders, with a vested interests in maintaining a healthy environment. By raising an understanding of why our local environment is important, the aim is to promote bio-empathy - an individual's emotional connection with the natural world, so that we may all learn the true value of our natural heritage.

There are 7 billion people alive today and we all share the same piece of real estate. Each local community needs to develop a global view to be able to influence how we deal with changing environmental issues. To enable this gives everyone a stake in the future and motivates new ideas and solutions. We cannot change the world but we can change our part of the world and with modern technology, reach out across the globe with our ideas. The Big Nature Centre will be Brighton and Hove's base for this kind of initiative.



Surveying for different bee species

## The Centre as part of the Biosphere Reserve

The communities of Brighton & Hove and Lewes are working towards designation as a UNESCO Biosphere Reserve. This aims to integrate the natural environment with these conurbations, breaking down the artificial divide between urban and rural areas, urban and rural living, enriching the lives of the people in the process. The Big Nature Centre is an integral part of this objective, demonstrating how the goals of the Biosphere Reserve can turn into positive action. Providing a central focus, as well as visitors centre for the reserve.



Pond dipping

Clustered Bellflower (*Campanula glomerata*) - chalk grassland, confined to and locally frequent on the Downs\*



# The Kingdoms of chalk

Environmental education is not just about the study of bugs, birds and wildflowers, it's also about the "spirit of place" or the unique and cherished aspects of our local environment. The underlying chalk geology of the South Downs is one of the unexpected but essential ingredients that make our "Kingdoms of Chalk" the most botanically diverse habitats in the UK, with as many as 40 species of plants in a square meter. Unfortunately, it represents less than 1-2% of permanent semi natural lowland grassland in England and Wales. Estimates put this at between 27,000 to 40,000 Hectares. Much of this grassland has become increasingly fragmented, making it difficult for rare plants and animals to maintain viable populations.

The chalk hills of the South Downs outline the setting for our city. They define the scenic value of the area, dictate the nature of farming and underpin a whole host of ecosystem services. In turn these features provide enjoyment, enrichment and the promotion of our health. We need to identify with the great wealth that our local natural environment supplies; indeed we should be singing songs about its beauty, about the awe and wonder it provides!

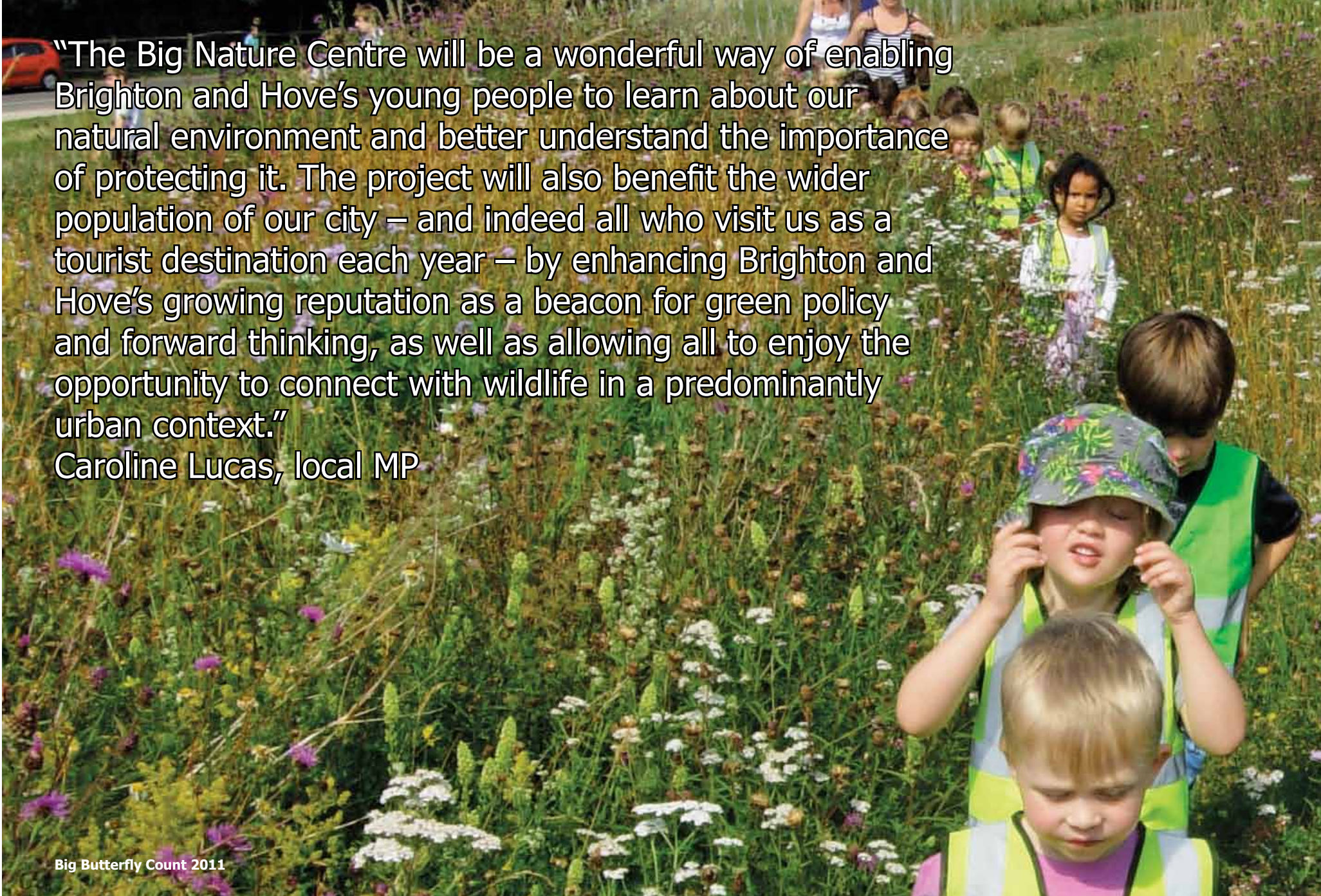
"We love living in Brighton – as well as being a vibrant and culturally exciting city, it's also close to remarkable downland countryside and the sea. The strong community awareness of green and sustainability issues is one of the factors that drew us here fifteen years ago with our young children. Since then, the city has gone from strength to strength. The Big Nature Centre will be a fantastic resource for the people of Brighton, and its impact will be felt through many generations."

Tim & Julia Crouch (local actor & author respectively)



Pyramidal Orchid (*Anacamptis pyramidalis*) - Calcareous grassland. Common on the downs, rare elsewhere\*





"The Big Nature Centre will be a wonderful way of enabling Brighton and Hove's young people to learn about our natural environment and better understand the importance of protecting it. The project will also benefit the wider population of our city – and indeed all who visit us as a tourist destination each year – by enhancing Brighton and Hove's growing reputation as a beacon for green policy and forward thinking, as well as allowing all to enjoy the opportunity to connect with wildlife in a predominantly urban context."

Caroline Lucas, local MP

Big Butterfly Count 2011

## A new type of World Class Civic Amenity

The construction of The Big Nature Centre will provide a world class facility to inspire the teaching of ecology to young people, provide training for teachers, give research opportunities for students and general access for the citizens of Brighton & Hove.

It will by design and intent be a completely new form of civic amenity, where all visitors are curators of the open environment. In part a library, in part an outdoor museum and teaching and learning environment, both in the laboratory and in the lecture theatre. The Centre staff will be able to make full use of the rich environmental resources found on the site, including an urban woodland, chalk grassland and aquatic habitats.

If you know next to nothing about wildlife this will be your first gateway into that world. Its function will be to both enhance teaching and learning, by encouraging the joy of discovery. The thrust will be a seamless integration between humanity and our local environment in the 21st century.

### Big Nature Trust

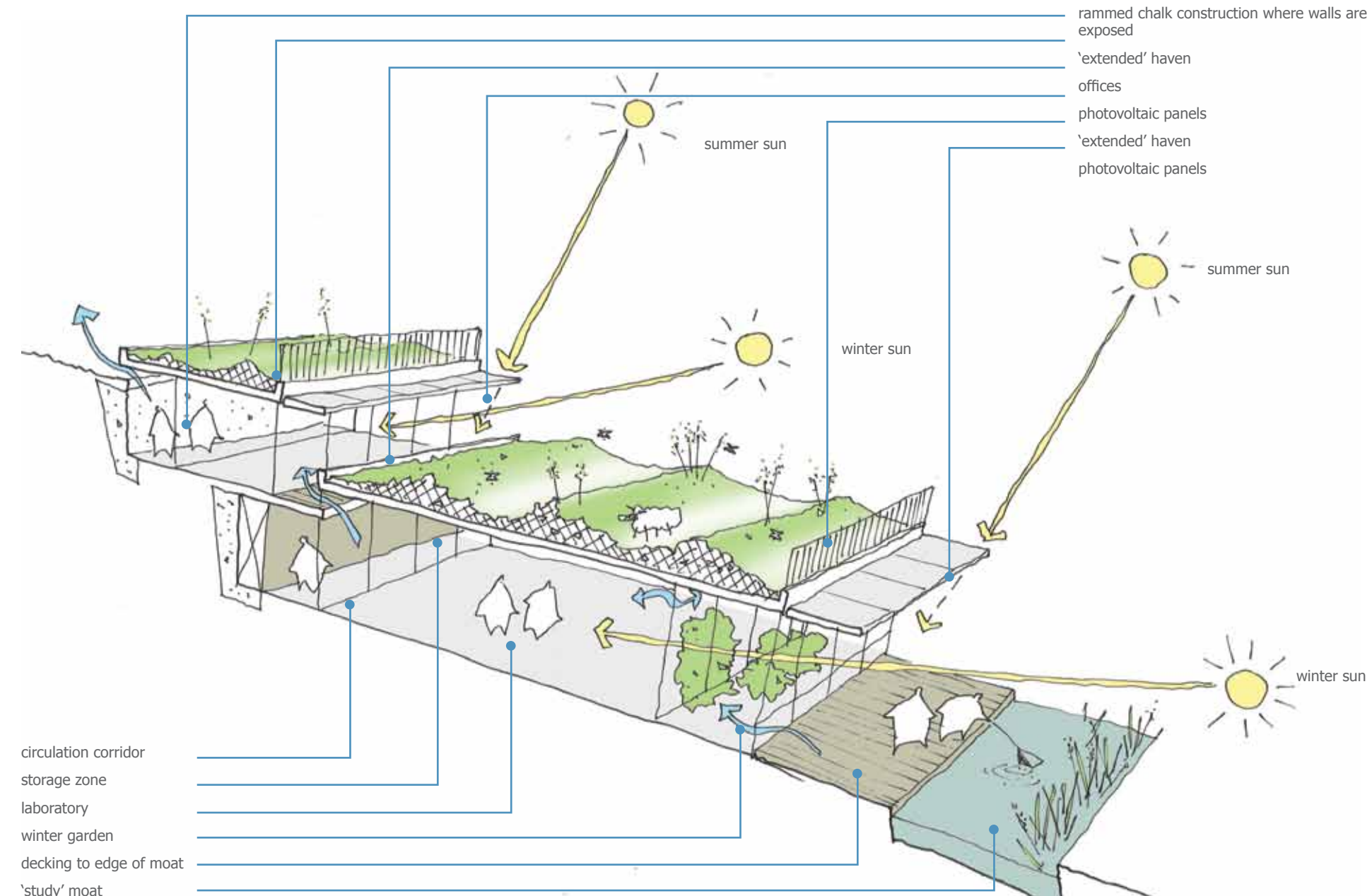
A non-for-profit Trust is to be formed to oversee and seek support for the project. The Trust will be supported by LCE Architects on the design of the building, co-designers of the fabulous Jubilee Library in the centre of Brighton and NorthGate Consultants on the Business Case. The project has the principle backing of Brighton & Hove City Council, The Sussex Wildlife trust and the Dorothy Stringer High School.

Quaking grass (Briza) - Grassland, especially on chalk. Very common on the downs\*



## The building as part of the natural environment

Diagram through offices and laboratories



## An ecological engineering approach to habitat restoration

This project utilises an ecological engineering approach to chalk grassland restoration to produce surrogate conditions for ancient chalk grassland. This approach has produced astonishingly successful results on adjacent land at the Butterfly Haven, which has received national media coverage.

The design incorporates the same approach, extended onto the roof of the building so that the roof will form a habitat rich in chalk downland flora & fauna. In this way the building will actually increase the biodiversity of a site and excess excavated chalk can be distributed around the Surrenden campus to create similar, new "local biodiversity hotspots".

The national charity Butterfly Conservation has already shown great interest in the potential that the creation of the Big Nature Centre has for producing good quality habitat for rare, early successional, chalk grassland butterflies.

Common Bird's-foot Trefoil (*Lotus corniculatus*) -  
Pastures, grassy places and roadsides. Ubiquitous.\*



# Design

The unique design takes advantage of the natural contours of an existing chalk slope; from most angles it will actually be a “non-building”, hidden beneath the chalk and only visible from the south. Its orientation also contributes to the building’s sustainability credentials. Sinking the building into the natural contours ensures a high degree of earth sheltering on three sides and tangibly demonstrates the “kingdom of chalk” to all visitors.

The south facing slope ensures a perfect orientation for the building, offering the combination of both passive solar gain and thermal shelter. Natural cross-ventilation and conservatories to the south with deciduous planting provide solar heat gain in winter and protection in summer for an attractive, healthy and comfortable environment for the occupants which is also energy efficient and easy to power with renewable energy.

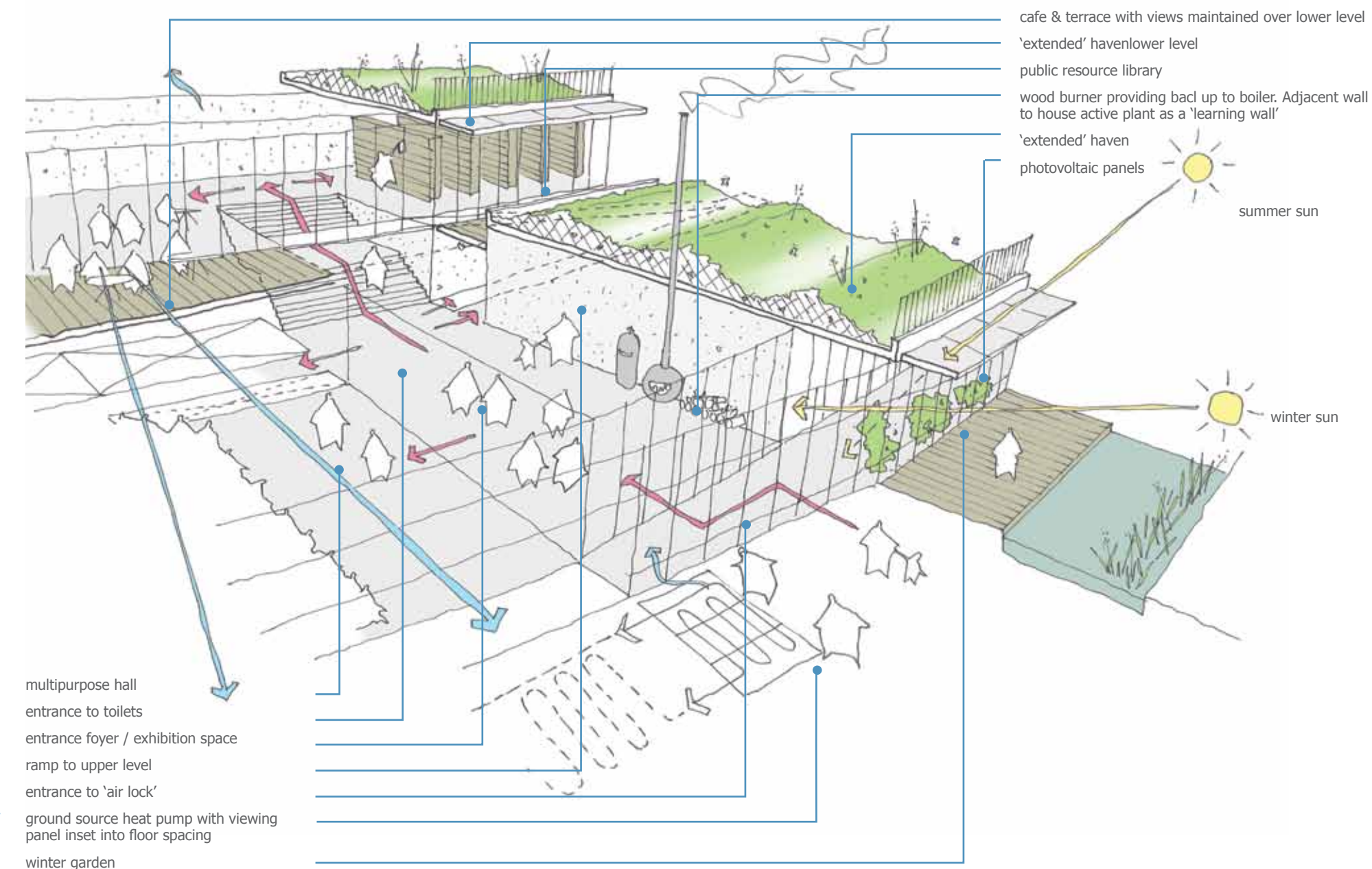
Again resonating its downland setting, the majority of the internal walls will be constructed from rammed chalk lifted from the construction site.

Harebell (*Campanula rotundifolia*) - Dry grasslands and heathy places, Common on chalk, occasional elsewhere\*

The Centre will be carbon zero, achieved by its design and in the use of renewable energy, and the techniques used will be on permanent display as part of the educational experience. It will house a lecture theatre for 150 seats, a library, 4 teaching and research laboratories, a cafe & shop, offices as well as preparation and display areas.

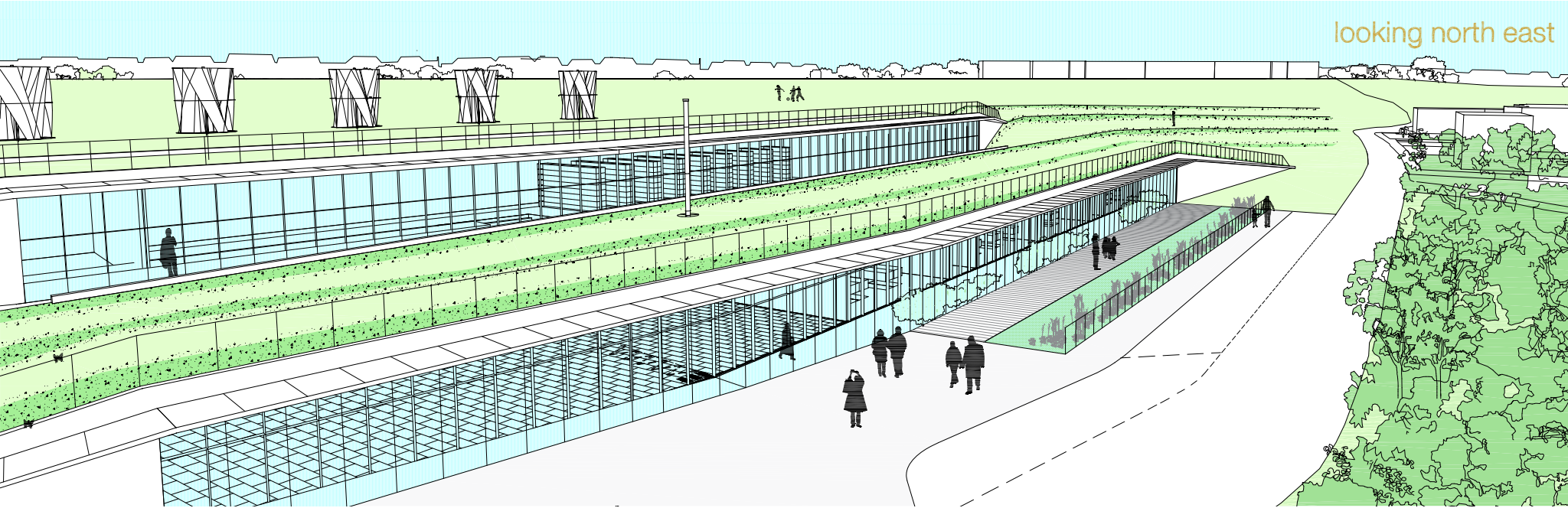
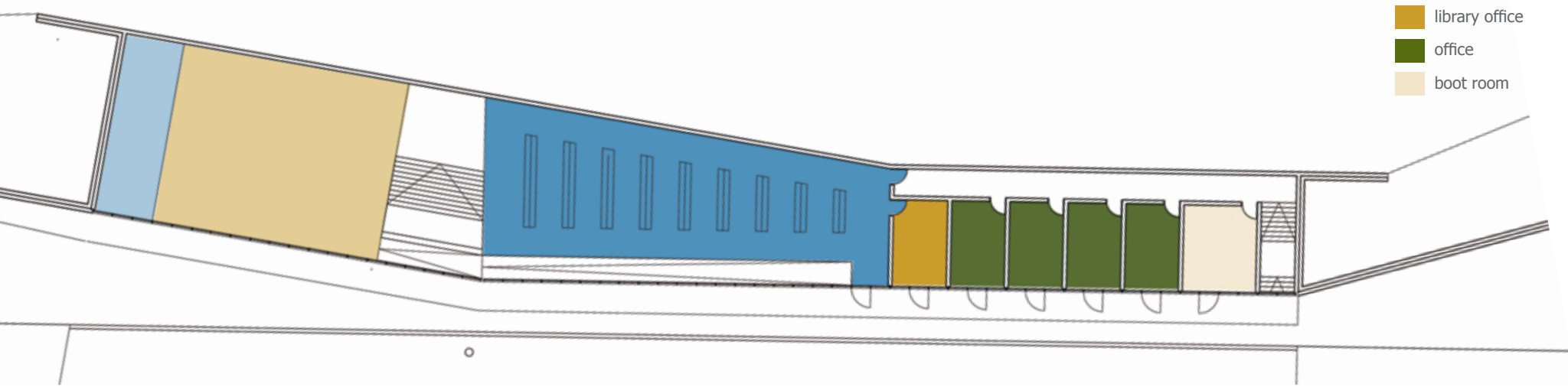
## The building as part of the natural environment

Diagram through entrance lobby

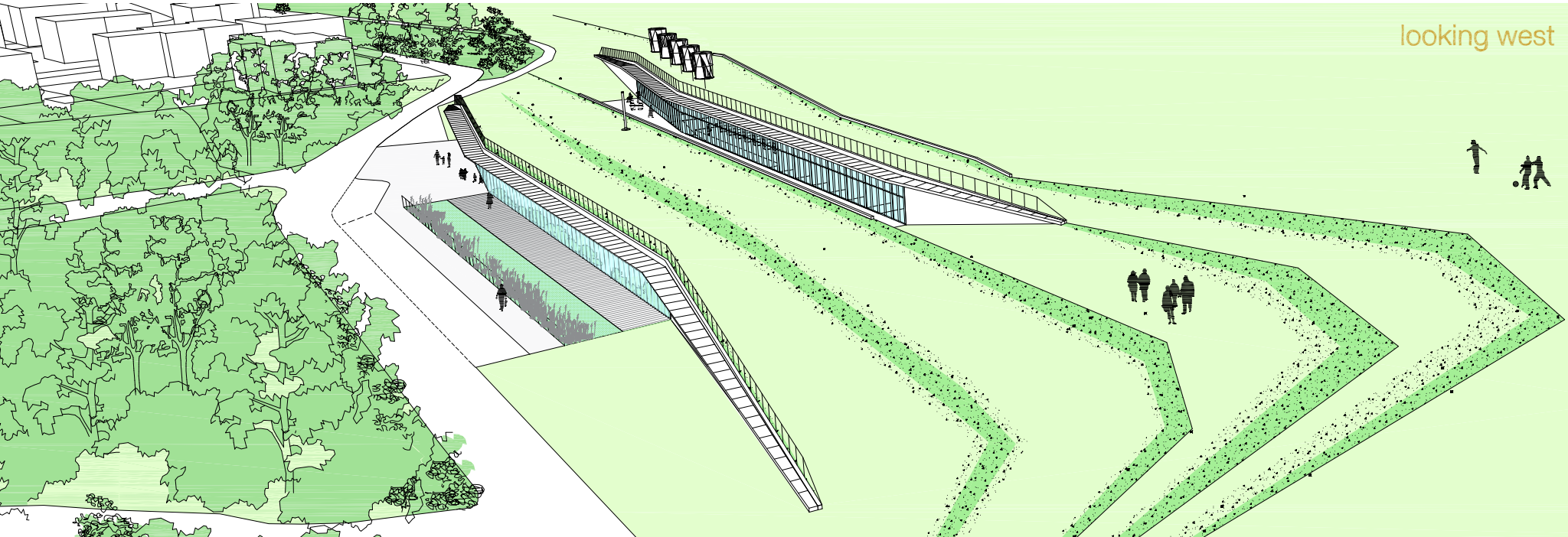
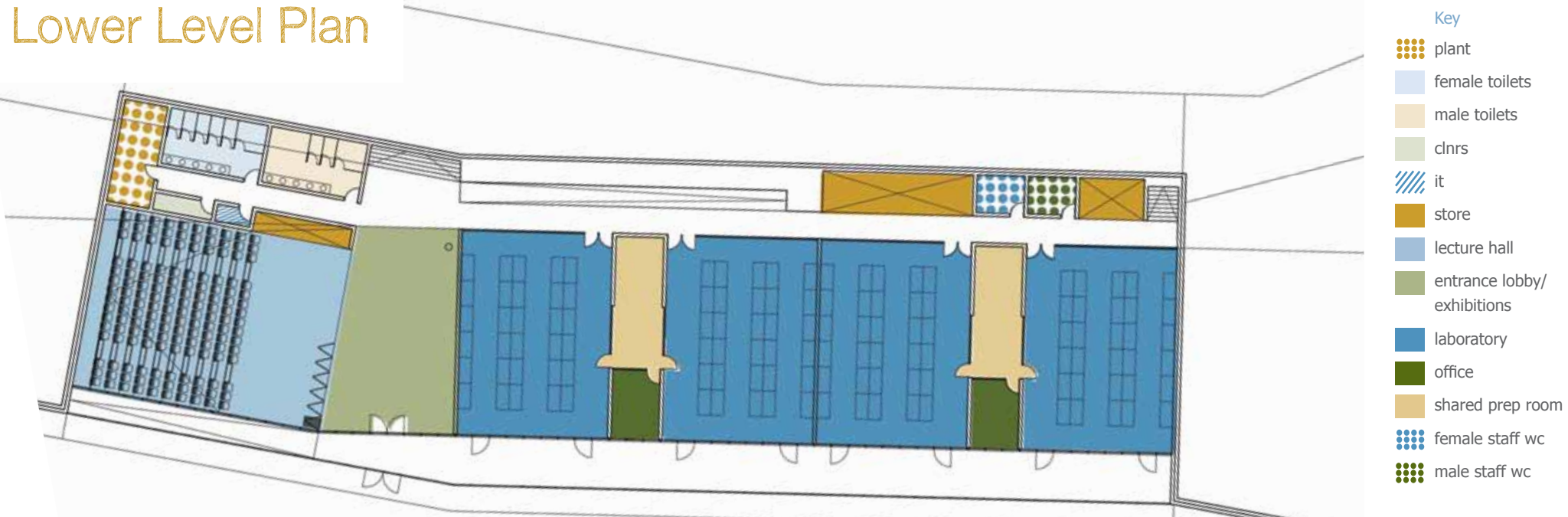




# Upper Level Plan



# Lower Level Plan











# Location

The centre will be built on the 28 hectare Surrenden Campus, with good access to/from both the City and the surrounding countryside, shared with seven other educational institutions including a sixth form college, two secondary schools, an infant and junior school, a crèche and a special needs college.

Ariel photo from Google Earth

Small scabious (*Scabiosa columbaria*) - Chalk grassland, Common on the open downs, casual on introduced chalk elsewhere\*





# Sustainability

The proposed building will not only be exciting in its architecture, but also in the way it will work as a “living organism”, absorbing “clean” energy from its environment and producing zero carbon emissions. Passive measures such as earth sheltering, orientation, cross-ventilation, thermal mass, insulation etc. will be maximised to keep the energy load of the building to a minimum. Coupled with this are proposals for state of the art renewable or low carbon solutions to power the space heating, water heating, lighting and small power requirements including a ground source heat pump, a bio-mass boiler, photovoltaics and a unique ultra-efficient wind turbine currently being developed by LCE Architects and their partners.

Water conservation will also be a key element of the design. Rain will be harvested for non-potable uses such as wc flushing and irrigation, and low water use fittings will be used throughout the facility. Grey water will be treated with a low intensity plant based system; it will be fed through filters and then slowly travel through the grey water planter systems using a number of natural systems to clean the water, including transpiration, evaporation, oxygenation and rhizology (treatment through the bacteria that thrive around the plants root systems) and used for flushing in the lavatories.

“Harmony with land is like harmony with a friend; you cannot cherish his right hand and chop off his left.”  
Aldo Leopold



Chalk Hill Blue shows national declines  
of 26% and the Brown Hairstreak 40%  
between 1999 and 2009\*\*

# Educate, Encourage, Engage

## Provision for young people

For young people the Big Nature Centre will primarily be concerned with the teaching & learning of ecology and thus raising their Bio-literacy, -numeracy, -empathy skills, as well as issues relating to sustainable lifestyles, thus fulfilling current curriculum demands, but also pushing boundaries to engage young people with their local environment.

A primary goal will be to encourage young scientists/outdoor curators to carry out scientific work and the products of their findings will be stored and displayed in the Centre. This collected information about the local environment will enhance what we all know about our surroundings, as well as demonstrate our shared sense of value for it

Kidney Vetch (Anthyllis vulneraria) - Dry banks and downs, almost confined to and common on the chalk.  
Occasional elsewhere, usually as introductions with imported soils"



Nick Baker explains the life cycle of the Knapweed Gall to local primary pupils

"The 'Big Nature Centre' is the medicine needed to treat the growing disconnection of people from the natural world, a recognised physical and social ailment referred to as Nature Deficit Disorder by some." Nick Baker





Peacock



Pond dipping



Sweep netting



Marbled white

Peacock shows national declines  
of 24% and Marbled White 21%  
between 1999 and 2009\*\*

# Educate, Empower, Inspire

## Provision for Teachers, Academics and the Public

The Centre will train teachers in the science of ecology which will help foster a good understanding of why we need to live a sustainable lifestyle. The centre will be available for use by students from local colleges and universities a base for conducting research.

The local public will also have walk-in, free access to the facilities of the centre. The centre will create opportunities to house professionals from several local environmental organisations, allowing opportunities for free discourse between different agencies and giving the public access to these representatives under one roof.

Cowslip (*Primula veris*) - Hedgebanks and grassy places, Very common on chalk; frequent on clay and almost absent from the east\*



# In Summary

All too often people are aware that there are environmental difficulties but feel powerless to do anything about them. The proposed centre will be part of Brighton & Hove's response to global environmental problems, which have a direct impact on us at a local level. Many people that come to live in Brighton & Hove want an alternative way of life and so are open to new ideas, which is precisely what will be needed to prepare their children for the extraordinary environmental problems facing us. The next generation will not only need a good basic knowledge of ecology and why ecosystem services are essential components of the earth's life support system but they will also have to learn to care about nature. The Big Nature Centre will facilitate this, promoting new ideas and new ways of thinking through fresh, exciting and varied exposure to and familiarity with the natural world.

Adonis Blue shows national increases of 33% and Small Skipper shows national declines of 62% between 1999 and 2009\*\*



Tree beating



Small Skipper



Adonis blue



Butterfly Haven







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## Sources:

\* Records (1966-78) of the Sussex Flora Society

\*\* The source data for this information is Butterfly Conservation.