

Ecosystem Services & The Urban Environment

Gary Grant & Dusty Gedge

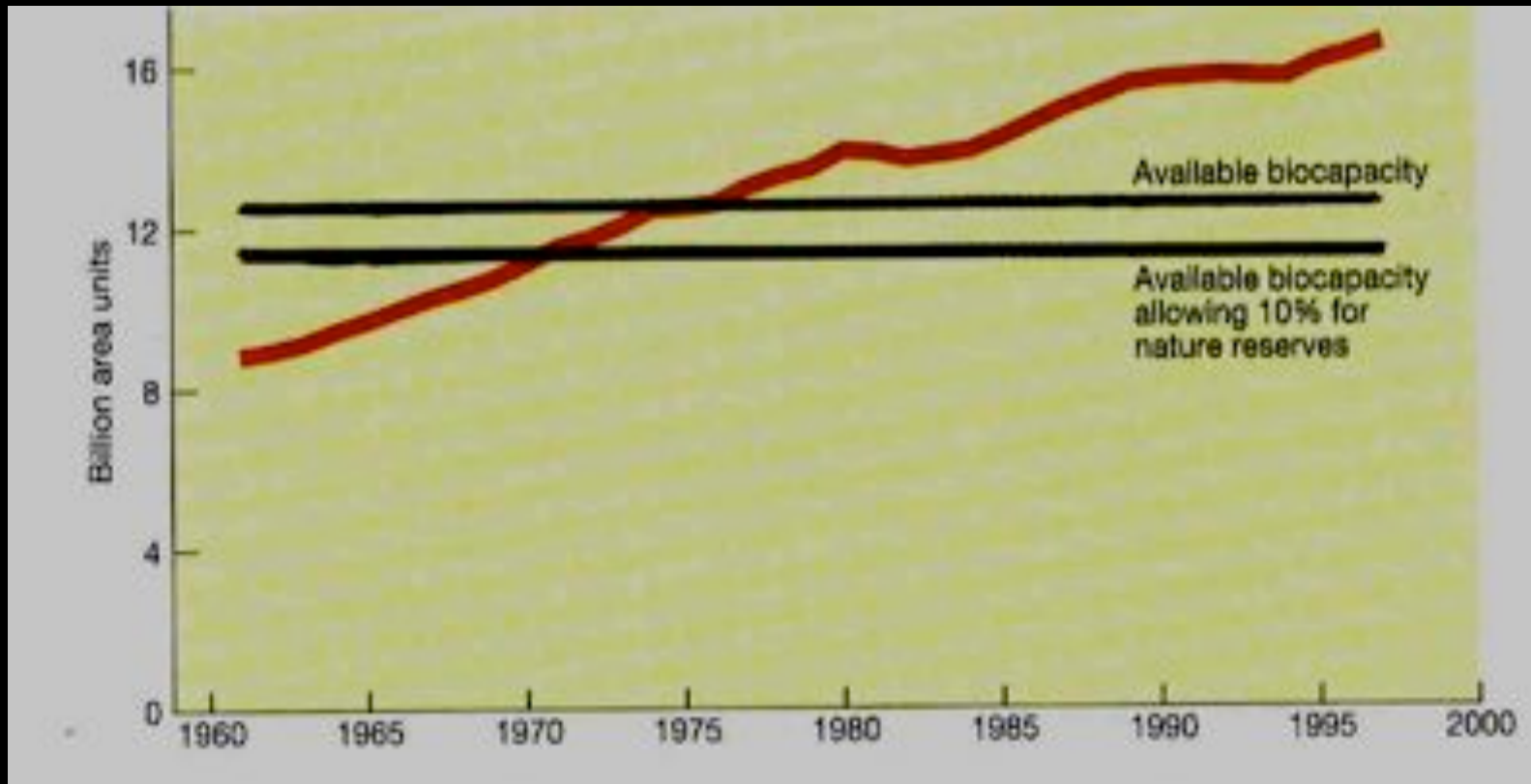
14 October 2010

Manchester

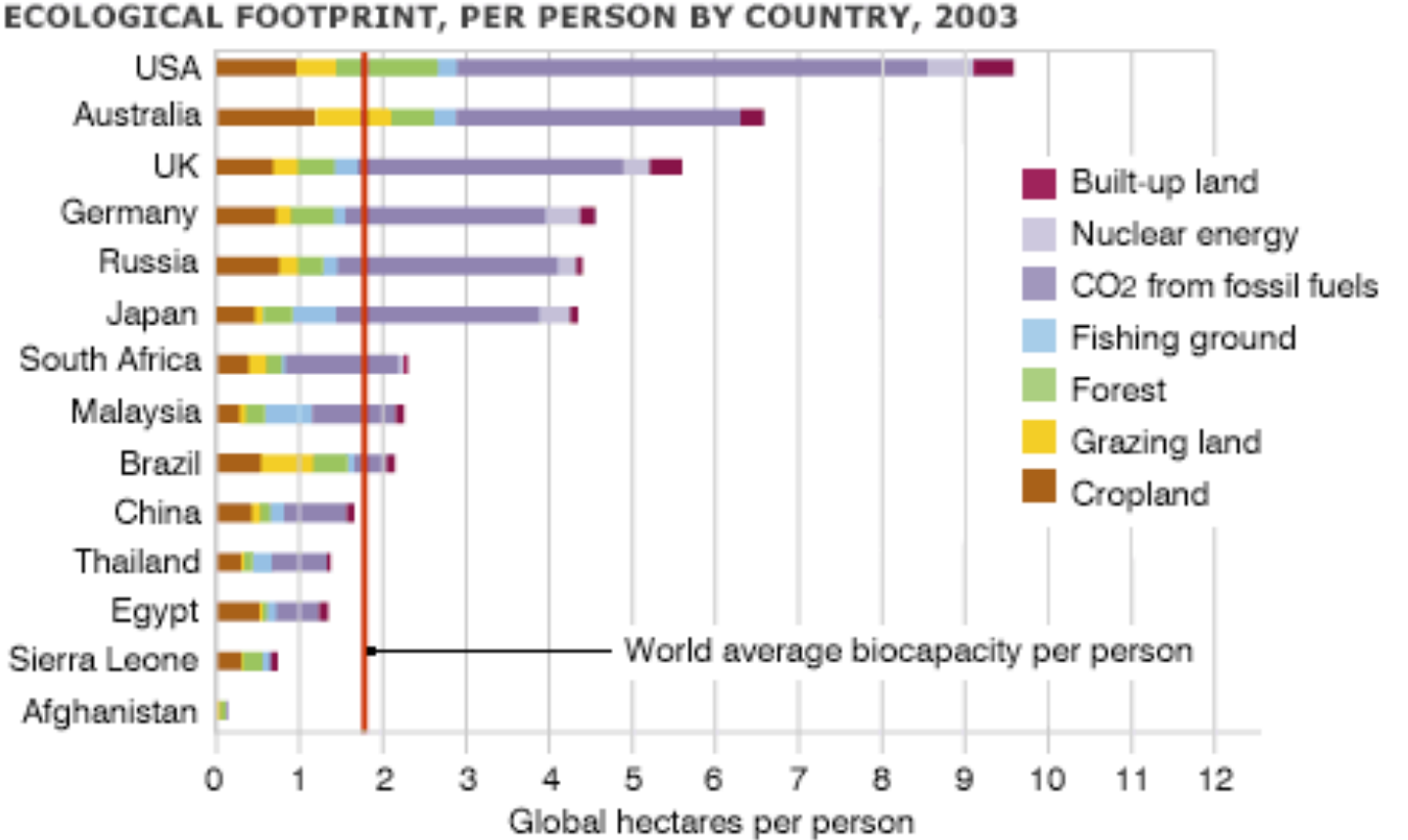
Global Context

By 1975 humans were using more of the earth's ecological capacity than it could sustain.

Ecological capacity = biologically productive land and sea area needed to regenerate the resources a human population consumes and to absorb and render harmless the corresponding waste



Ecological Footprints



SOURCE: WWF

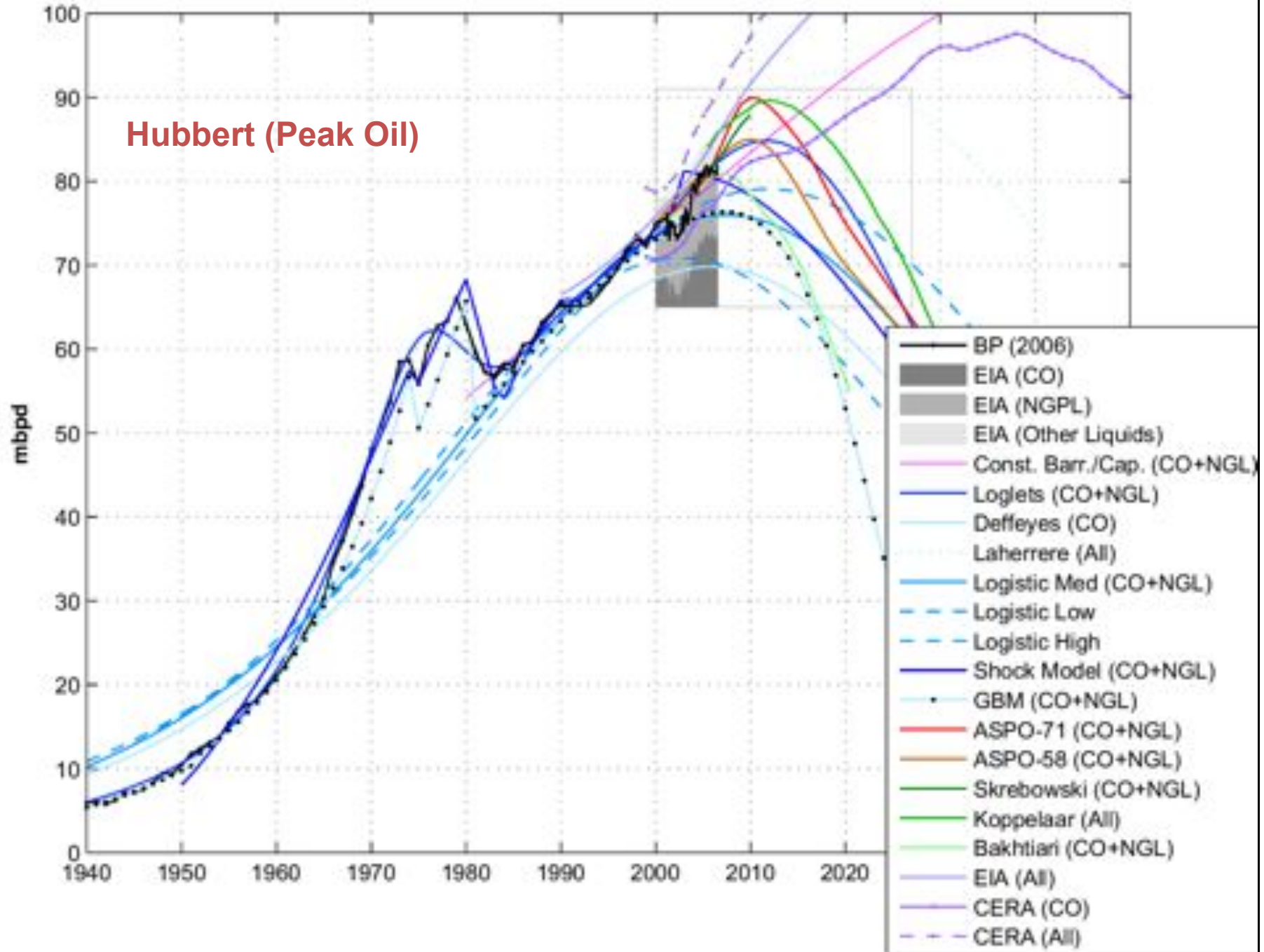
Every year Londoners...

- 1. consume 100 TWh of energy - the equivalent of 100 years of the output of Greece
- 2. use 100 billion litres of water - enough to fill the Channel more than twice
- 3. use 10 million tonnes of materials - enough to fill a road a million lorries
- 4. produce 10 million tonnes of waste - enough to fill a lorry and a half million bin lorries
- 5. eat 10 million tonnes of food - enough to fill 10 million shopping containers

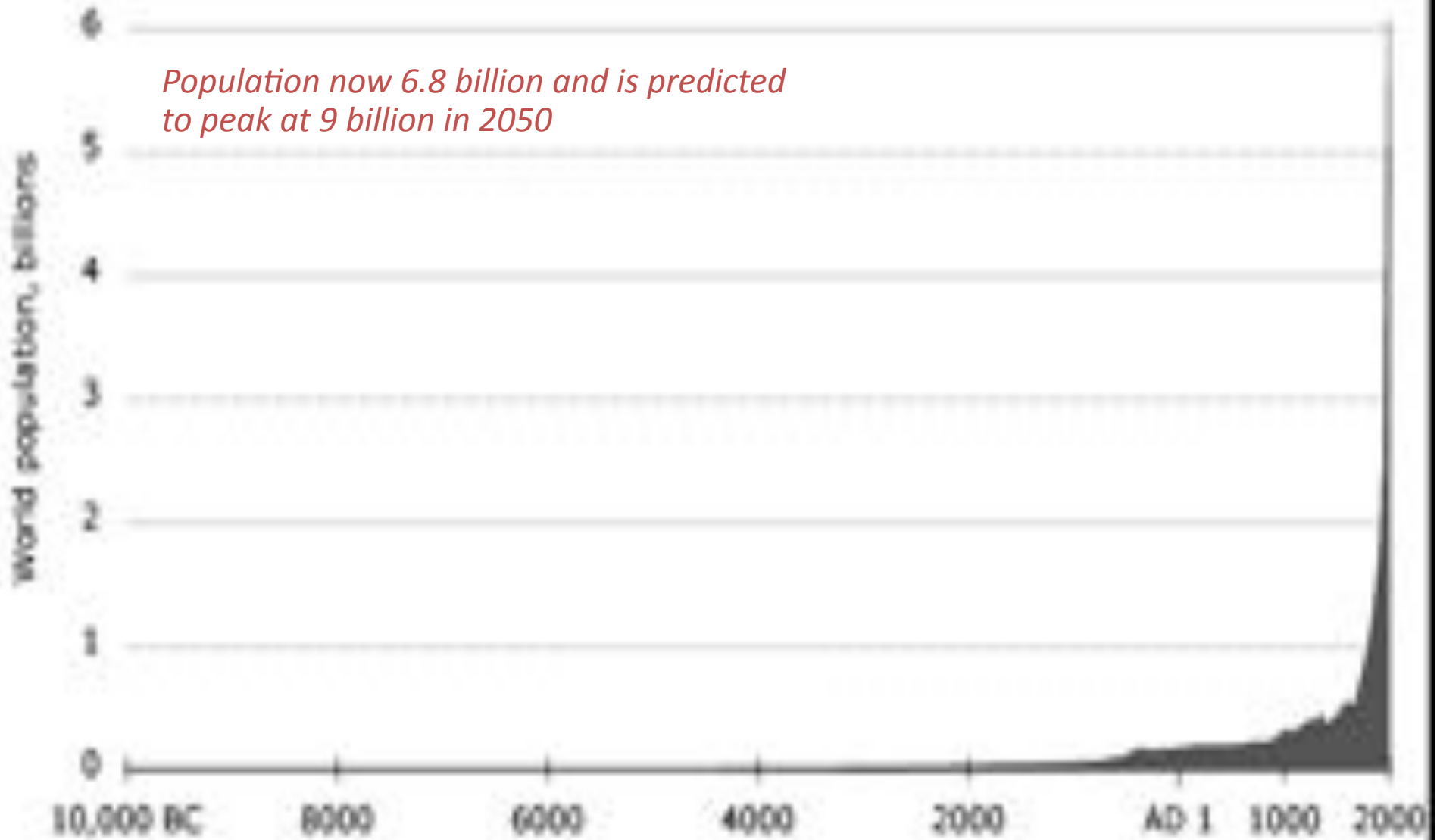
London's ecological footprint



World Production



Population now 6.8 billion and is predicted to peak at 9 billion in 2050

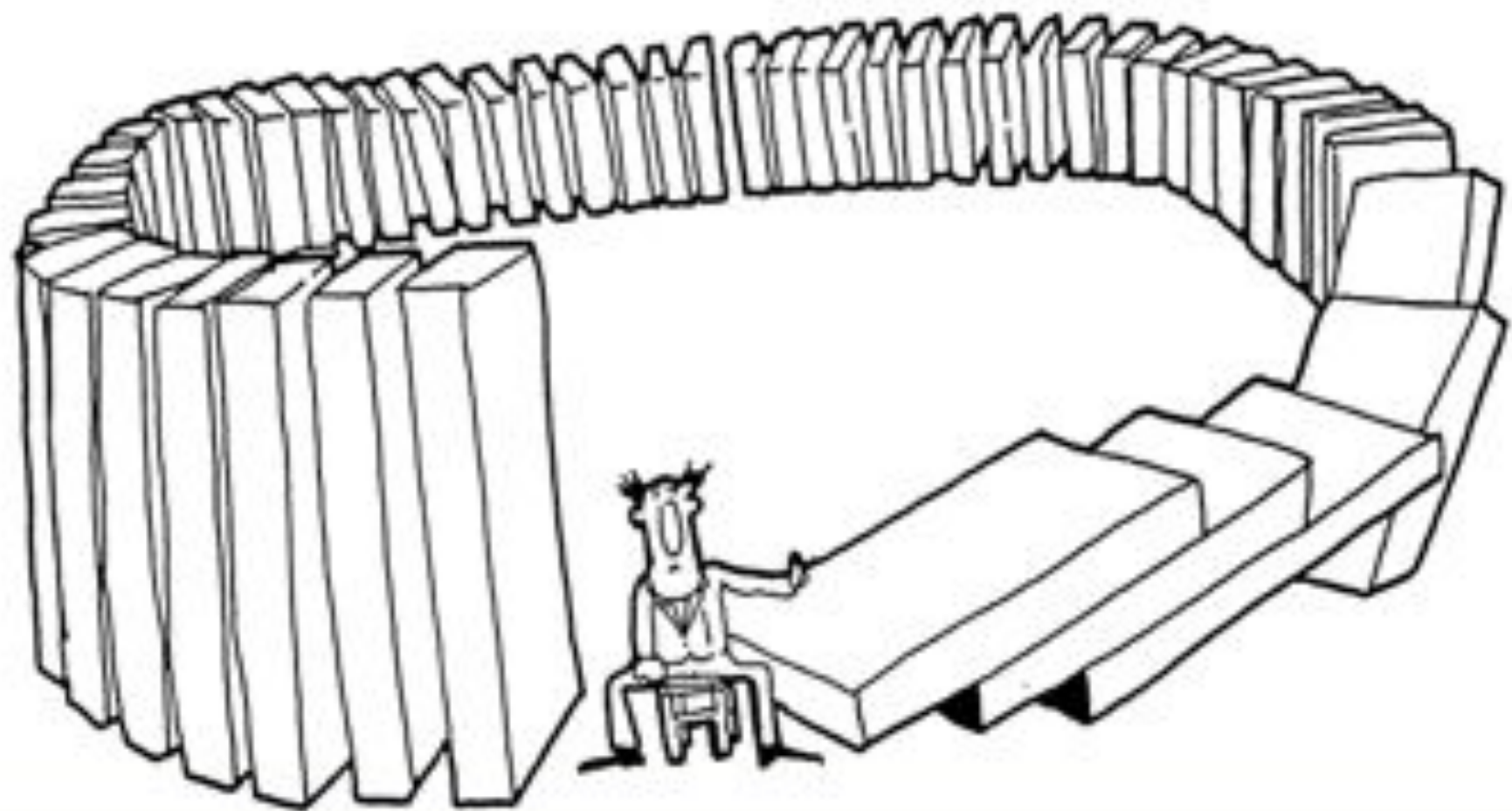


- In 2006 half of the world's population (>3 billion) was already living in cities
- By 2030, 4.89 billion people will live in cities
- Therefore an additional 1.89 billion extra people will require city dwellings by 2030 in 23 years time. This is equivalent to 270 new cities the size of London. Worldwide, that's 12 London sized cities to be built a year every year for 23 years..
- London's population is currently growing at 70,000 per year

CITY CHALLENGES

- Hot
- Dry
- Pollution (Air, Water, Light)
- Traffic
- Noise
- Disease
- Crime
- Governance
- Unemployment
- Housing
- Food





'Human needs and a healthy environment are not opposing claims that must be balanced; instead, they are inexorably linked by chains of cause and effect. We need a healthy environment because we need clean water, clean air, wood, and food.'

Jared Diamond

'The first rule of sustainability is to align with natural forces, or at least not try to defy them'

Paul Hawken

1. Global climate regulation reproduction of crops & other plants
Maintaining atmospheric gases and sequestering greenhouse gases

2. Local climate regulation
Regulating local temperature and humidity

3. Air and water cleansing

4. Water supply and regulation Storing and providing water within watersheds and aquifers

5. Erosion and sediment control
Retaining soil & preventing damage from erosion and siltation

6. Hazard mitigation
Reducing vulnerability to damage from flooding, wildfire, and drought

7. Pollination
Providing pollinator species for

8. Habitat
Providing biodiversity

9. Waste decomposition and treatment

10. Human health and well-being benefits

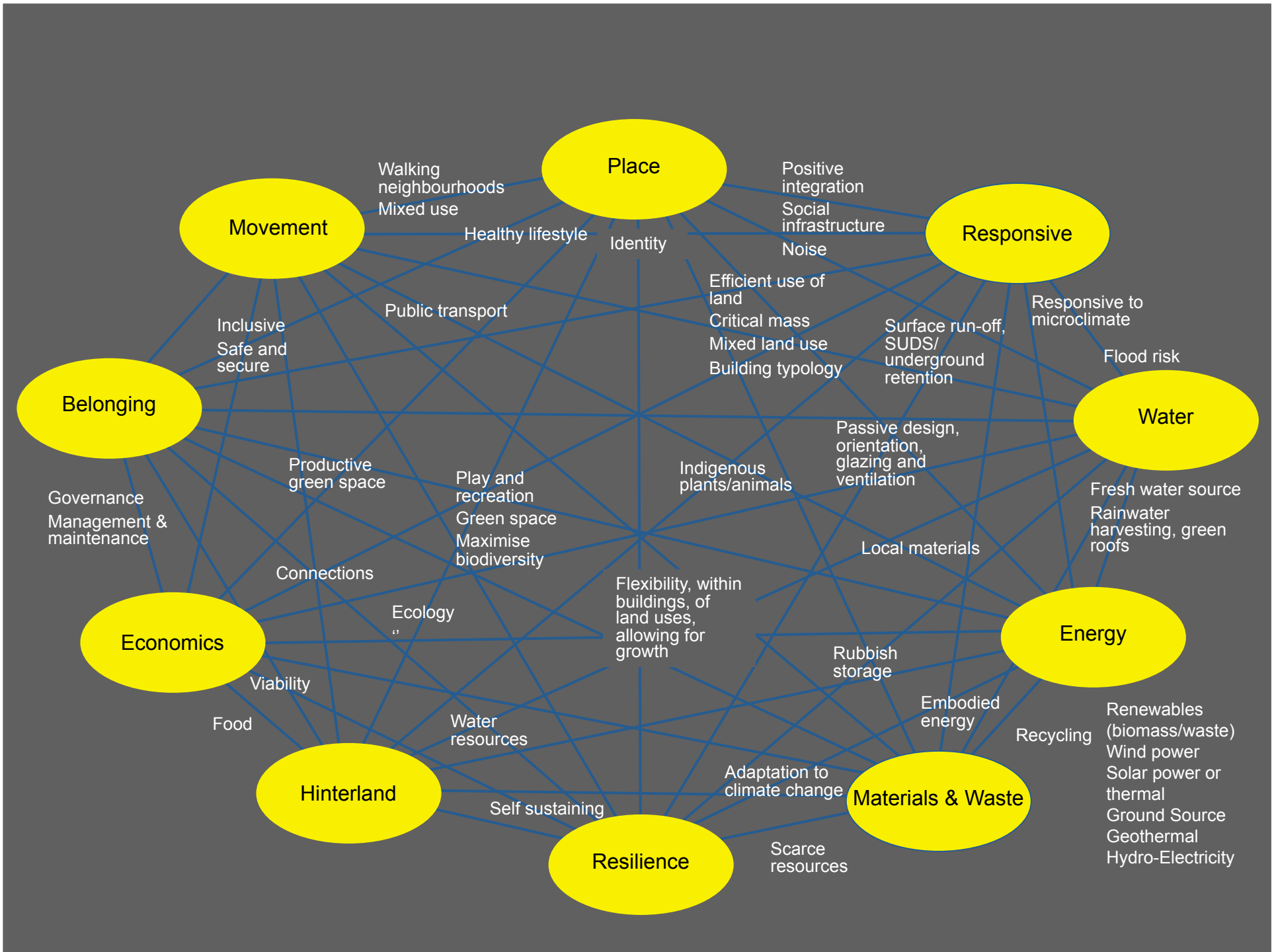
Enhancing physical, mental, and social wellbeing

11. Food and renewable non-food products
Producing food, fuel, energy, medicine.

12. Cultural benefits
Enhancing cultural, educational, aesthetic experiences

Ecosystem Services





Ecosystems Approach Action Plan & Introductory Guide (Dec 2007)



www.defra.gov.uk

Securing a healthy natural environment:

An action plan for embedding an ecosystems approach



www.defra.gov.uk

An introductory guide to valuing ecosystem services



THE SUSTAINABLE SITES INITIATIVE™



GUIDELINES AND PERFORMANCE BENCHMARKS

DRAFT 2008

American Society of Landscape Architects
Lady Bird Johnson Wildflower Center, University of Texas at
Austin
United States Botanic Garden



2 AN ECOSYSTEM SERVICES PRIMER

In the late 1990s, work by noted scientists such as Paul Ehrlich, Gretchen Daily, Donald Kennedy, Pamela Matson, and Robert Costanza created awareness in the general public that healthy ecosystems provide goods and services of benefit to humans and other organisms.²

A few years later, the United Nations commissioned a global study called the Millennium Ecosystem Assessment, which was carried out by an international consortium of governments, non-profit groups, universities, and businesses. The group's report, published in 2005, established that "ecosystems are critical to human well-being—to our health, our prosperity, our security, and to our social and cultural identity."³ The link between environmental well-being, human well-being, and economic prosperity continues to gain traction in mainstream political conversation.⁴

Human needs and a healthy environment are not opposing claims that must be balanced; instead, they are inexorably linked by chains of cause and effect. We need a healthy environment because we need clean water, clean air, wood, and food.

—Isabel Diamond, *Isisgate*, 2001⁵

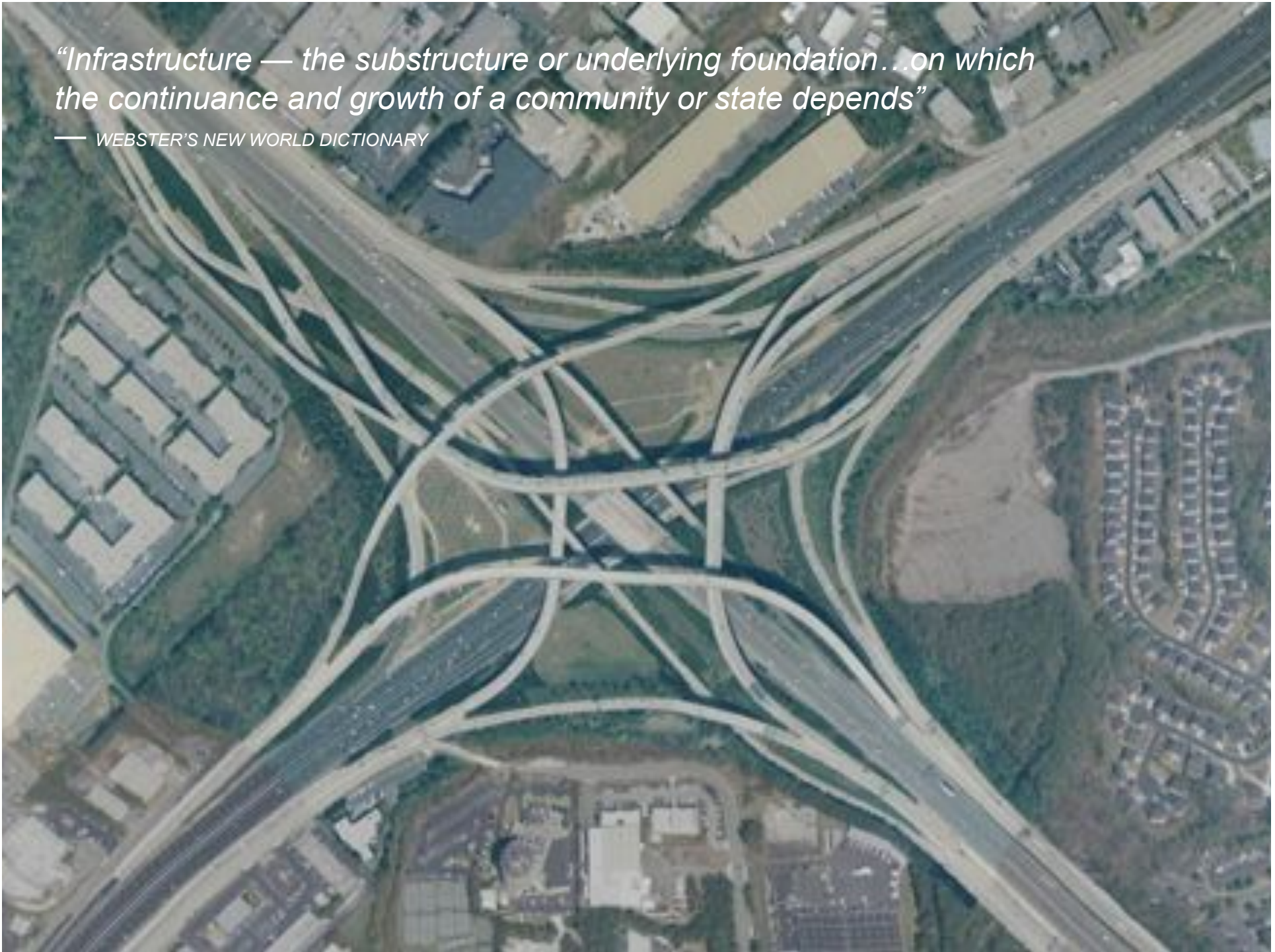


STEWARDSHIP



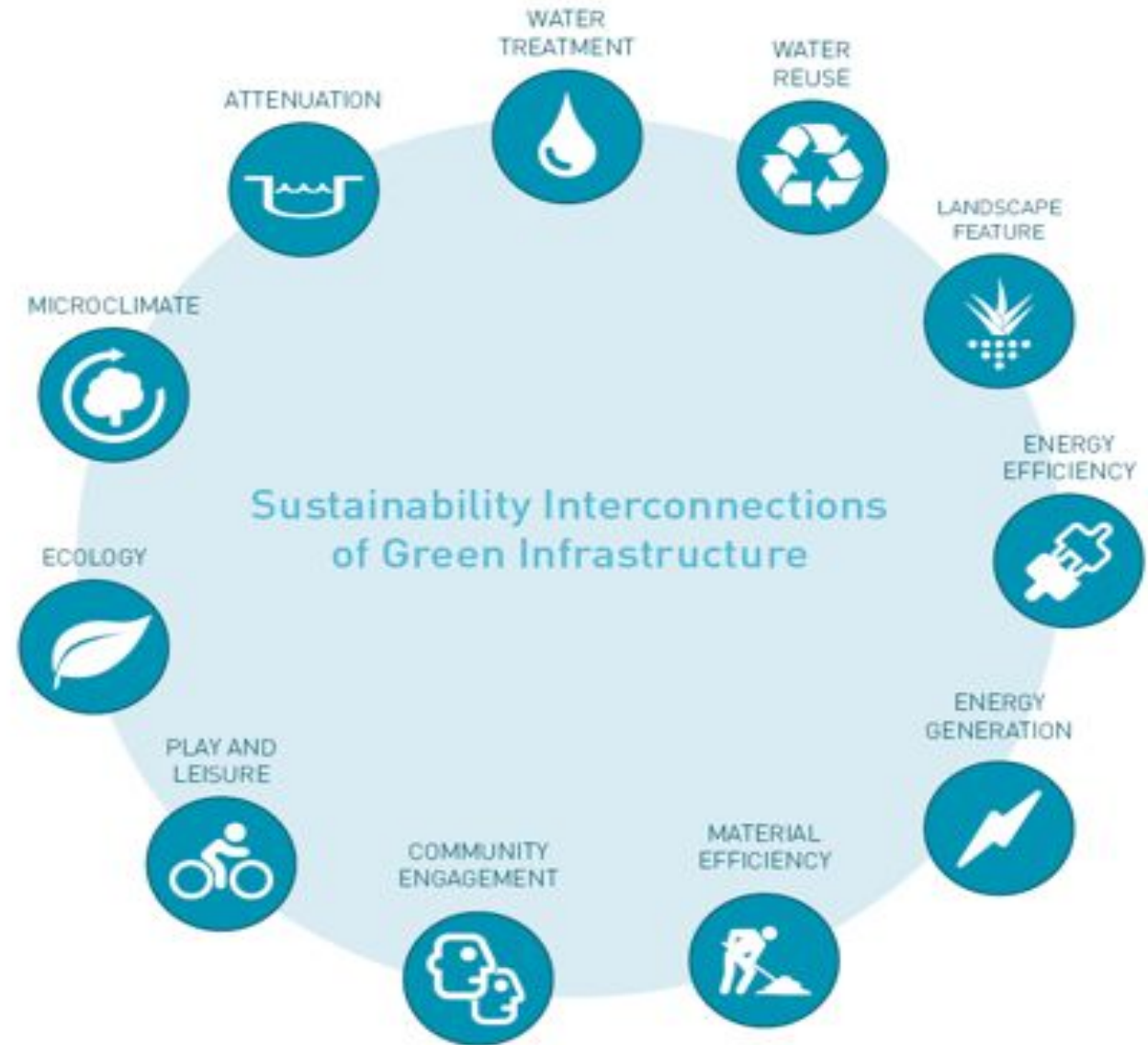
“Infrastructure — the substructure or underlying foundation...on which the continuance and growth of a community or state depends”

— WEBSTER'S NEW WORLD DICTIONARY



How best to plan and deliver ecosystem services?

By identifying and planning multi-functional ecological and green infrastructure networks



Ecosystem Services are provided by Green Infrastructure:

A green infrastructure approach repositions the role of nature in and around the city from optional amenity to valued purveyor of **ecosystem services** and platform for more biodiverse, comfortable, pleasant, permeable, compact, vibrant, sustainable communities.

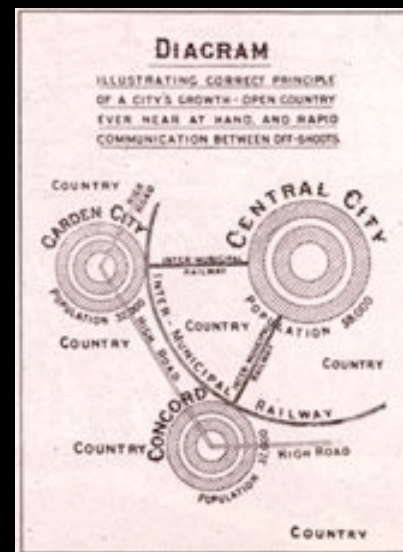
Green Infrastructure: Origins

1878 American Landscape Architects John and Frederick Olmstead advocated linking community parks together to surround residential neighbourhoods. Work commences on Boston's Emerald Necklace.



Boston's Emerald Necklace, USA

1899 The Garden city movement is conceived as an approach to urban planning founded by Sir Ebenezer Howard in the United Kingdom. Garden cities were intended to be planned, self-contained, communities surrounded by greenbelts, containing carefully balanced areas of residences, industry, and agriculture.



Principles of the Garden City, UK

Green Infrastructure: Origins

1944 Leslie Patrick Abercrombie's
London Plan Open space system

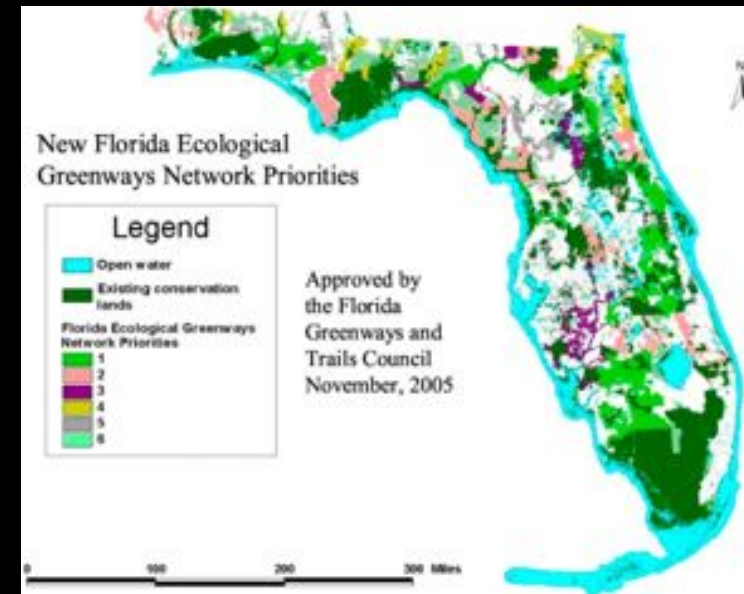
“Adequate open space for both
recreation and rest is a vital factor
in maintaining and improving the
health of the people” Abercrombie
Plan’



Green Infrastructure: Origins

1980s Landscape Ecology & Conservation Biology emerge as new fields in U.S. *-focus is on linking natural systems to retain ecological function, benefit biodiversity, & counter habitat fragmentation*

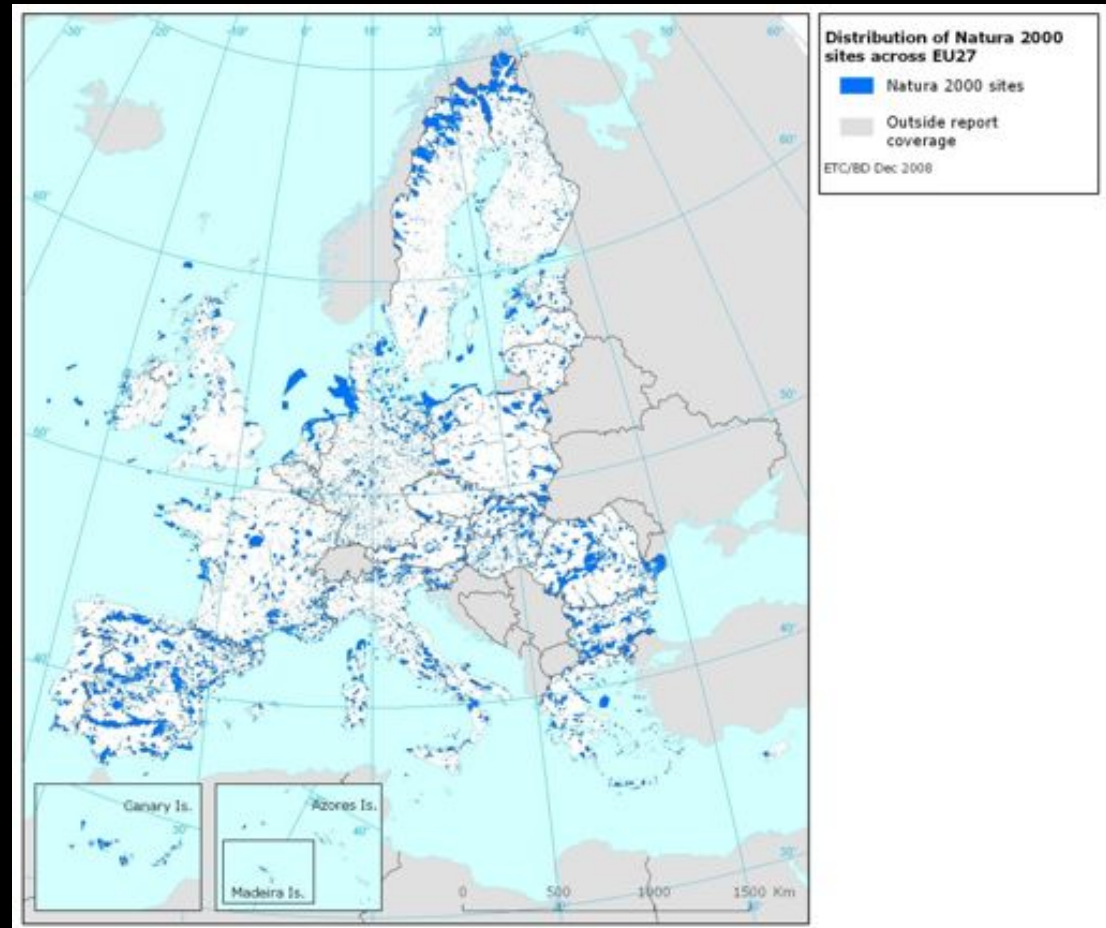
1990s The US States of Florida and Maryland become the first states to design and implement modern green infrastructure plans *- Plans based on the identification of natural areas and linkages. humans & sustainable development are considered to be a component of the system.*



Florida Green infrastructure Strategy, USA

Green Infrastructure: Origins

2000 - The development of Green infrastructure strategies spreads from the US to Europe and many other developed countries



Natura 2000 Network

Urban GI

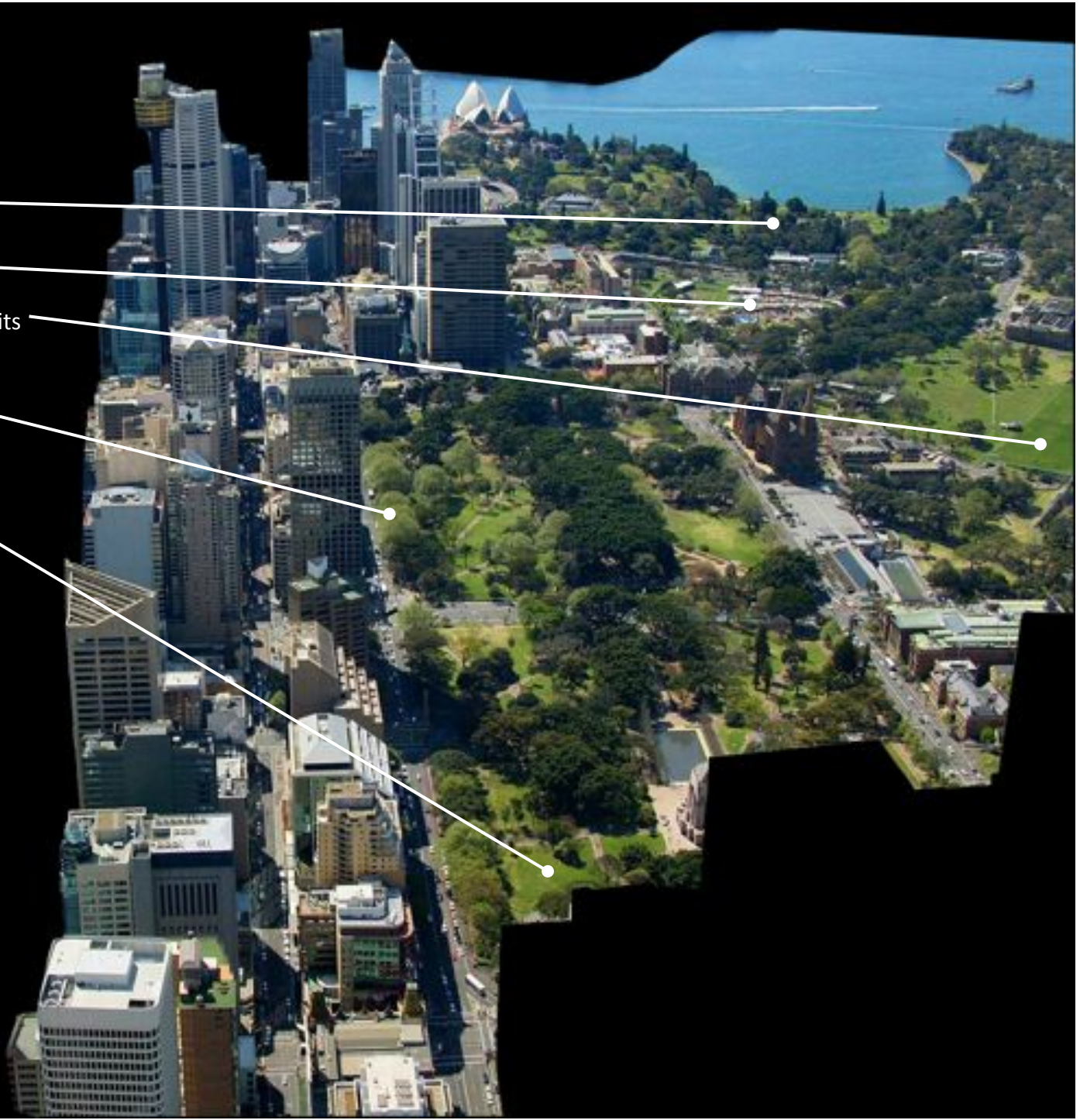
Local climate regulation

Cultural benefits

Human health and well-being benefits

Air and water cleansing

Run off mitigation



Green Infrastructure : Value – eg Pollination Services



1 Bee = 6000 Blueberries

In one year, a single native south-eastern blueberry bee visits about 50,000 blueberry flowers, assisting in the production of more than 6,000 marketable blueberries.

It is estimated that bees provide \$3B worth of pollination services in the US.

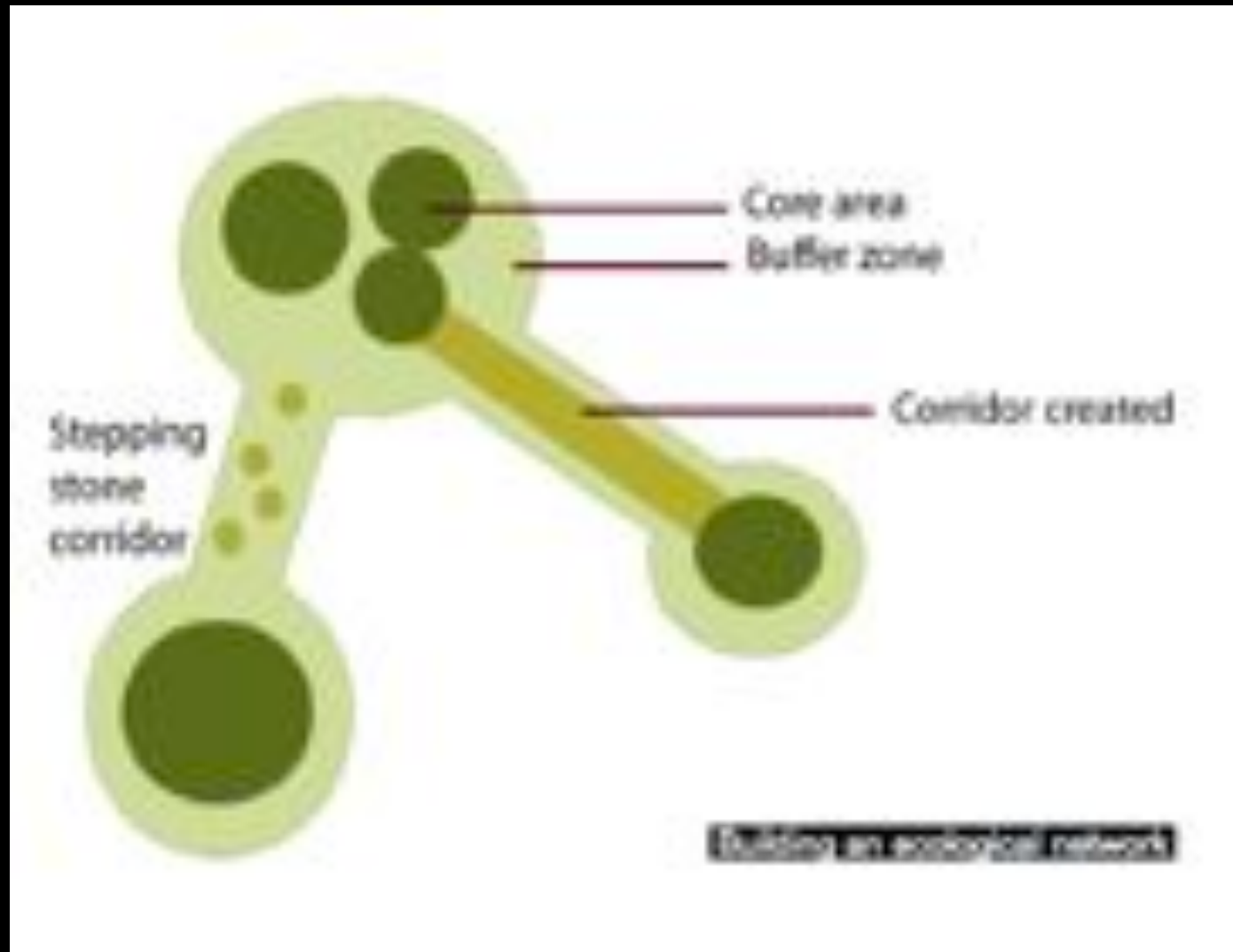
Green Infrastructure : Value – eg Water Supply

Estimated cost to New York City to buy watershed lands to protect upstate drinking water supplies: \$1.5 billion

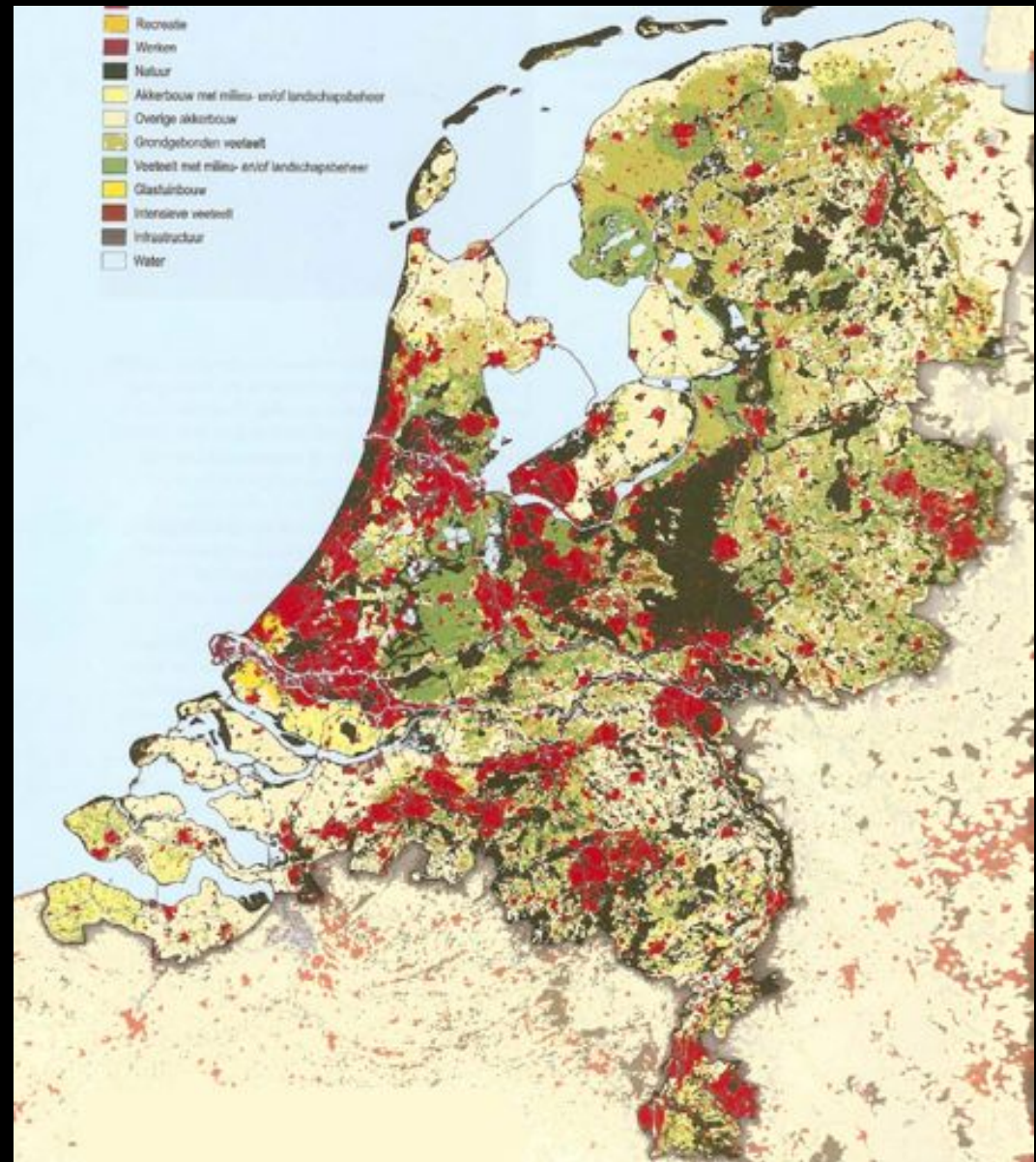
Estimated cost to New York City to build a filtration plant if upstate watershed lands are developed: \$6 billion to \$8 billion



Building Ecological Networks

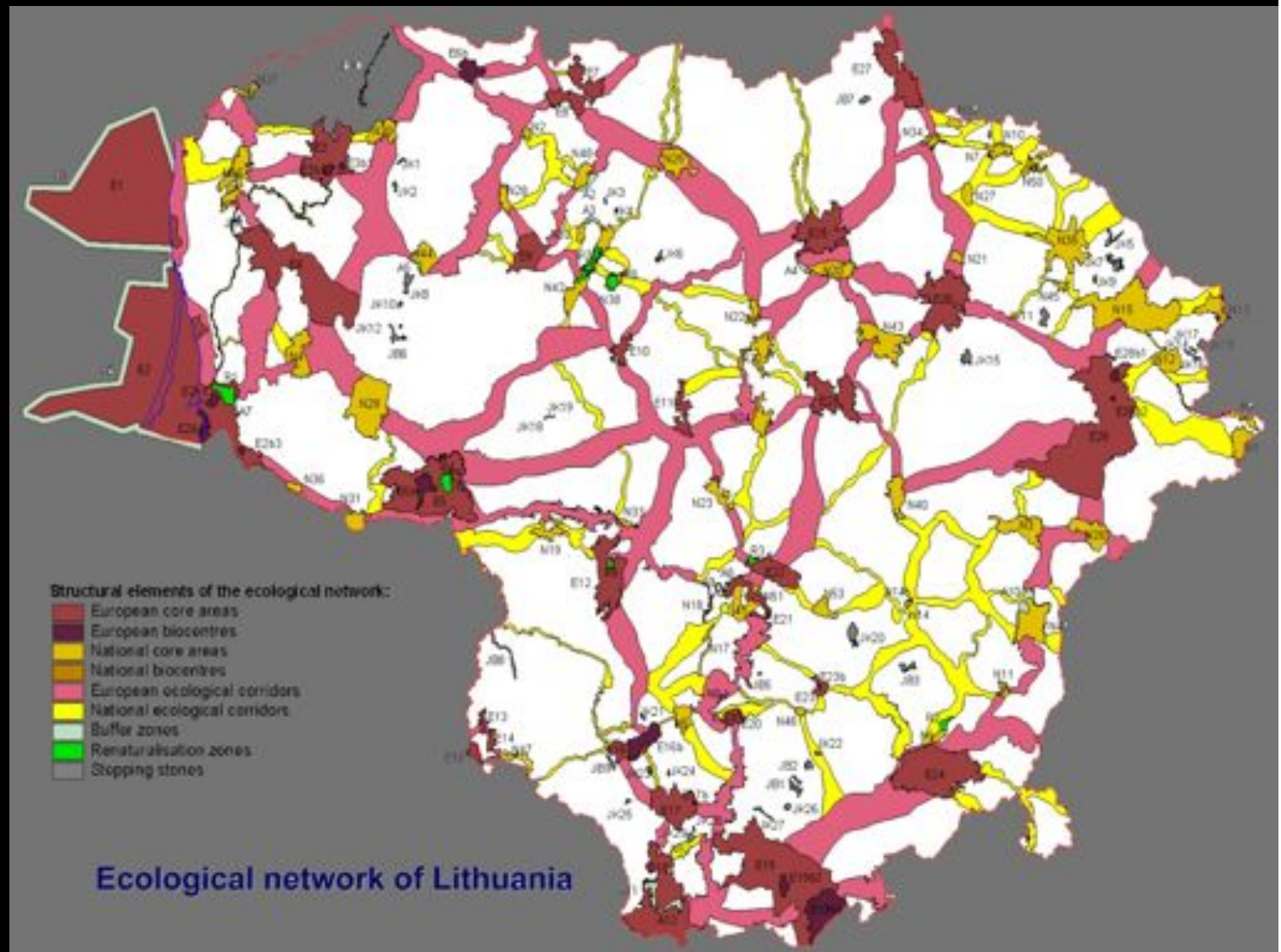


Green Infrastructure: Ecological Networks



Dutch Ecological Network

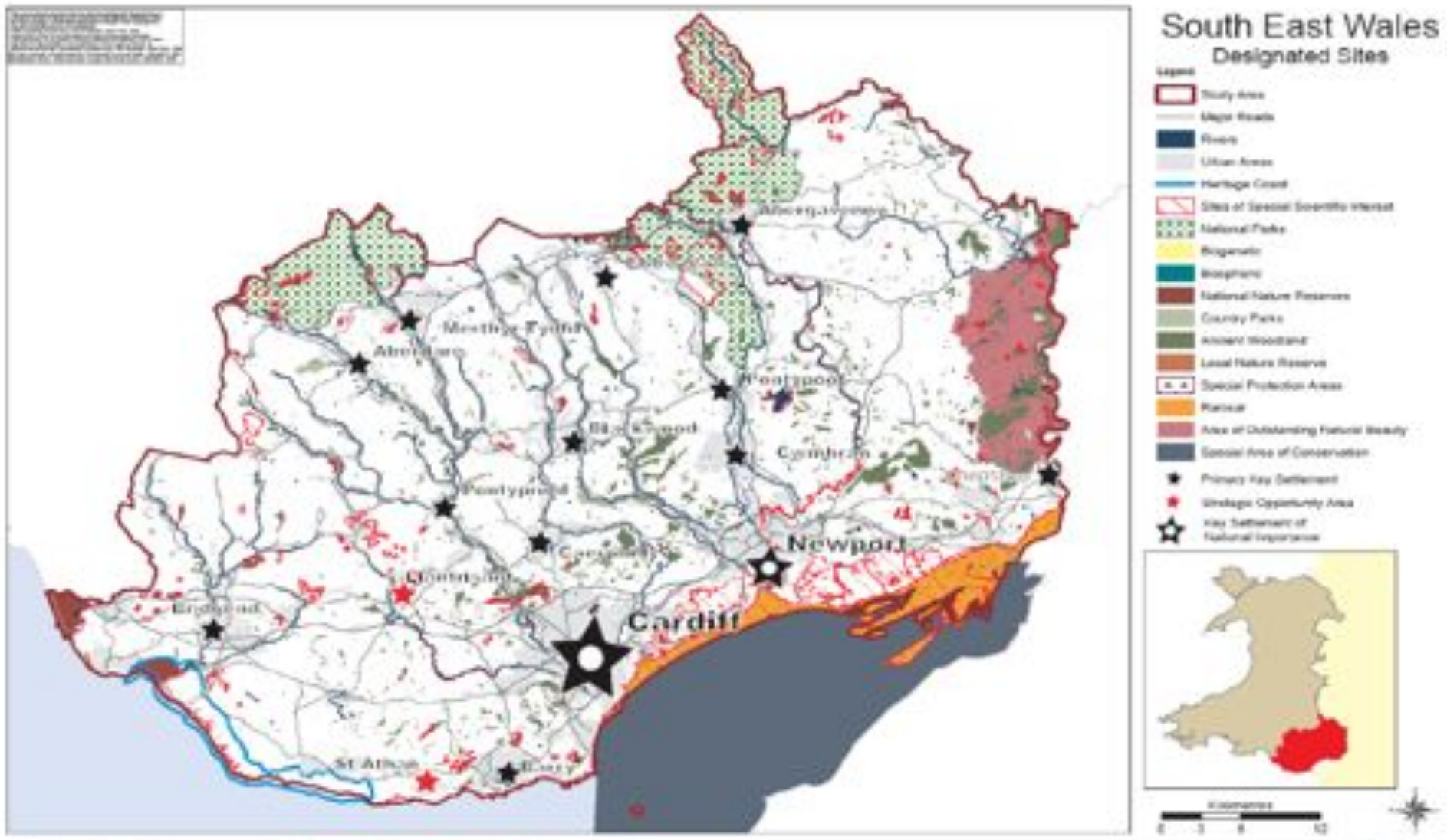
Green Infrastructure: Ecological Networks



Lithuanian Ecological Network

Building Ecological Networks: SE Wales

Framework for South East Wales Networked Environmental Region



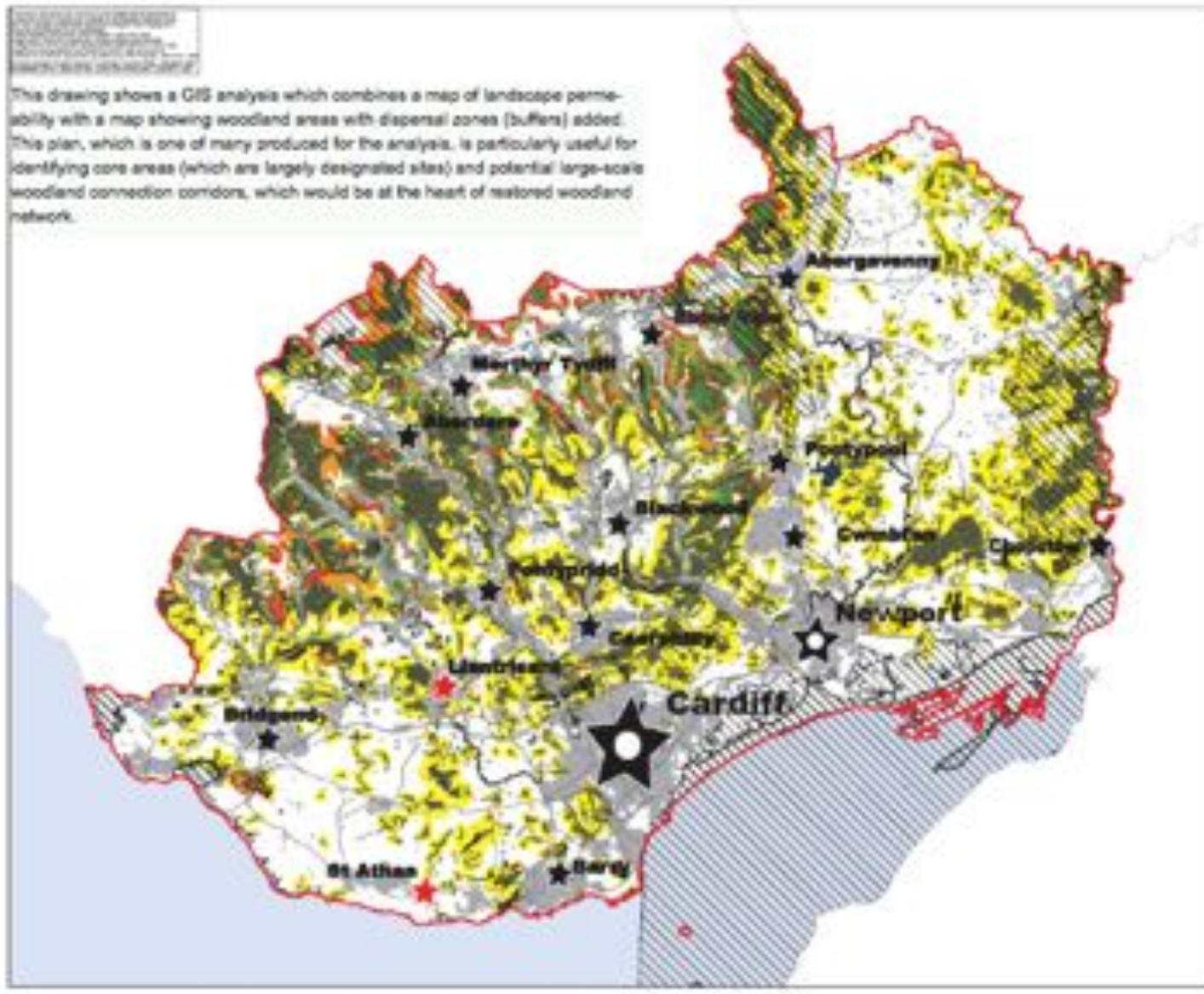
Data Sources: OSNI, Ordnance Survey, Welsh Assembly Government, CCW and NRW

Building Ecological Networks: SE Wales

Framework for South East Wales Networked Environmental Region

SOUTH EAST WALES
 NETWORKED ENVIRONMENTAL REGION
 FRAMEWORK FOR IDENTIFICATION OF CORE AREAS - WOODLAND

This drawing shows a GIS analysis which combines a map of landscape permeability with a map showing woodland areas with dispersal zones (buffers) added. This plan, which is one of many produced for the analysis, is particularly useful for identifying core areas (which are largely designated sites) and potential large-scale woodland connection corridors, which would be at the heart of restored woodland network.



South East Wales

Identification of Core Areas - Woodland

Legend

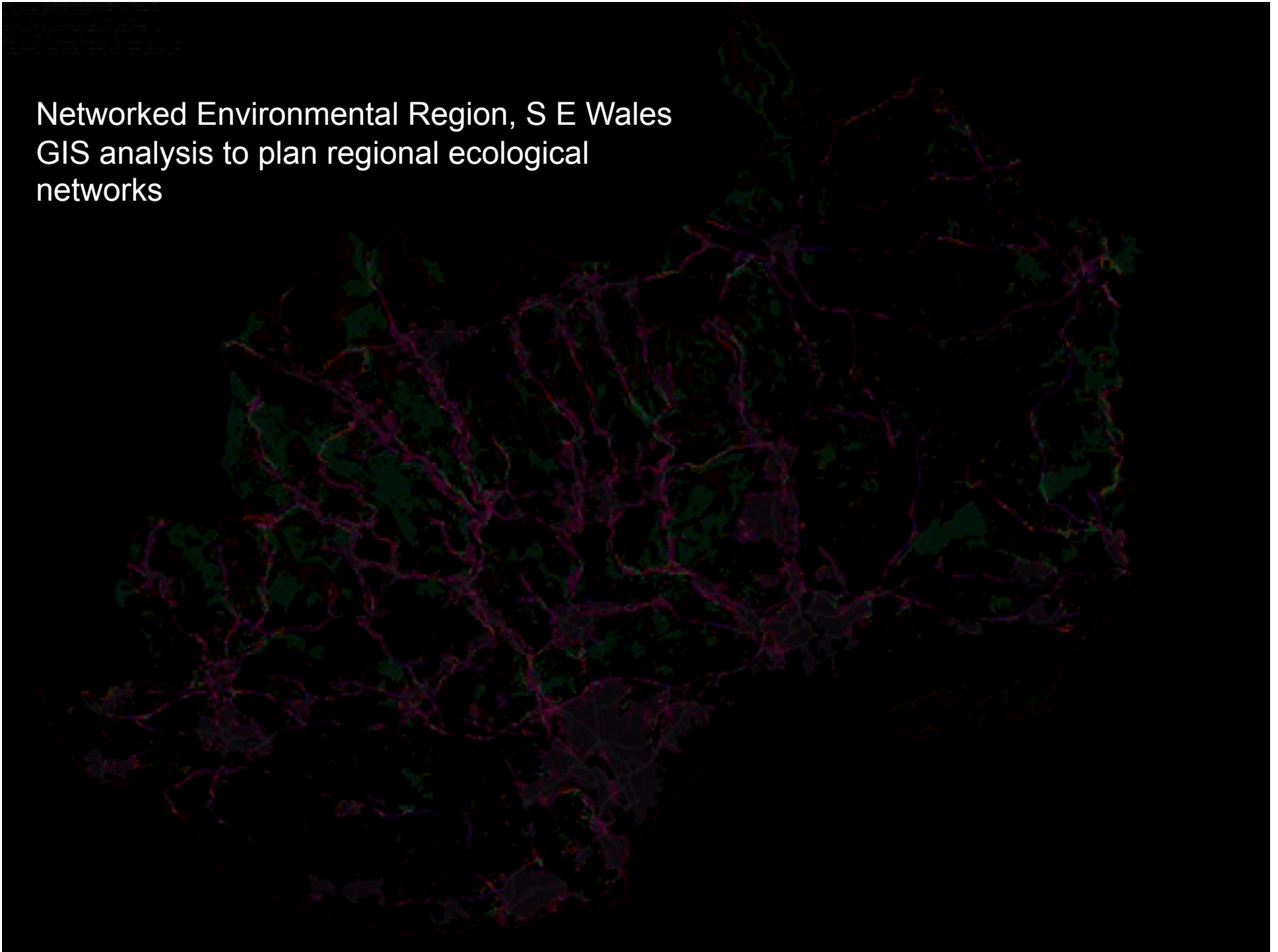
- ★ Primary Key Settlement
 - ★ Strategic Opportunity Area
 - ★ Key Settlement of National Importance
 - Study Area
 - Major Roads
 - Urban Areas
 - Designated Sites
 - Absent Woodland
 - Rivers
 - Woodland
- Permeability of Buffers
- | | | |
|---|------------------|-------------------|
| 1 | ↑ Most Permeable | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | ↓ Least Permeable |
| 6 | | |
| 0 | | |



Kilometres
0 3 6 12

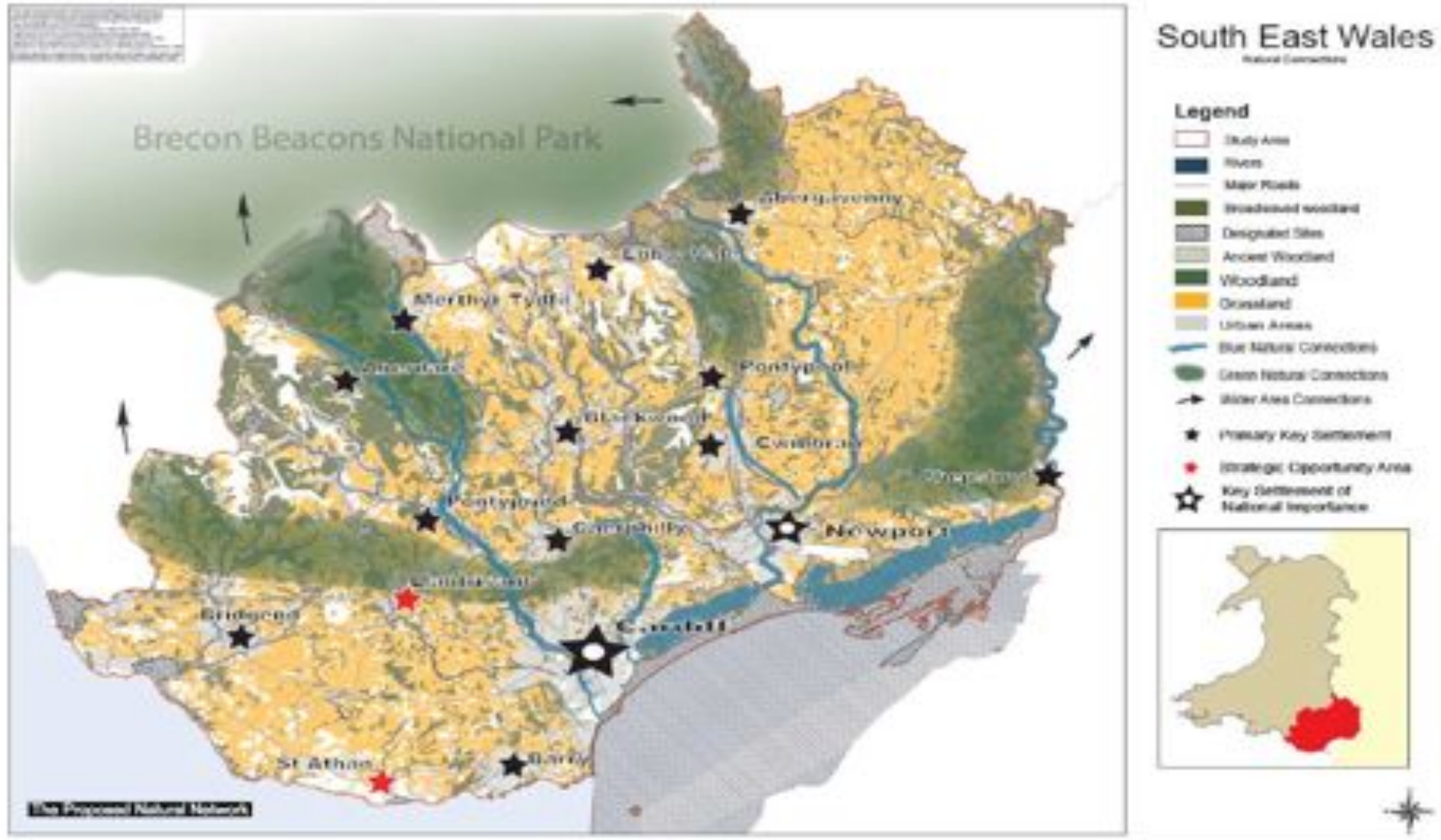


Networked Environmental Region, S E Wales
GIS analysis to plan regional ecological
networks



Building Ecological Networks: SE Wales

Framework for
South East Wales Networked Environmental Region





KEY
(Refer to Table A)

- District Boundary
- Settlements Over 2000
- Major Residential Housing Sites (>100)
- Additional Housing Sites (<100)
- Accessible Green Infrastructure (>2ha)
- Green Infrastructure (>2ha)
- Sub-Regional Strategy - New Green Corridor
- Sub-Regional Strategy - Existing Green Corridor Enhancement
- City Scale New Green Corridor - Create
- City Scale New Green Corridor - Enhance
- Cambridge District Recreational Routes
- Major New Green Infrastructure Site
- Dashed Bus Route
- Wetland Plan & Dog-Walking Countryside Project
- Proposed Open Space as part of LDF/ICDP
- Proposed Bridge Crossing

GREEN INFRASTRUCTURE STRATEGIES WITHOUT CAMPAIGNING NUMBER

- C1 Enhanced District Green Corridor
- C2 Northern-Fringe Enhanced Corridor
- C3 Southern-Fringe Enhanced Corridor
- C4 City of Cambridge - Improved Access to Green Spaces
- C5 Riverside Walk - Green Corridor
- C6 Riverside Walk
- C7 John Wilson Recreation Route
- C8 New Water Enhancement Project
- C9 River Cam Enhancement Project
- C10 East Valley - Cambridge to 25
- C11 Dotted Line River Green Corridor
- C12 Cambridge to 25 - Green Corridor
- C13 North-West Cambridge - Enhanced Walk
- C14 Cambridge to 25 - New Green Corridor
- C15 Cambridge - Millers - New and Historic of South
- C16 Cambridge to 25 - New Green Corridor
- C17 River Cam
- C18 River Cam

0 0.25 0.5 1.0 2.0 Kilometres

Cambridge Horizons
The Cambridge Partnership

Plan: Green Infrastructure Strategy for the Cambridge Sub-Region
Drawing: Proposed Cambridge Strategic Masterplan

Dwg No: 05046/20
Scale: 1:50,000 @ A3
Date: February 2008
Drawn: GF Checked: JB

North

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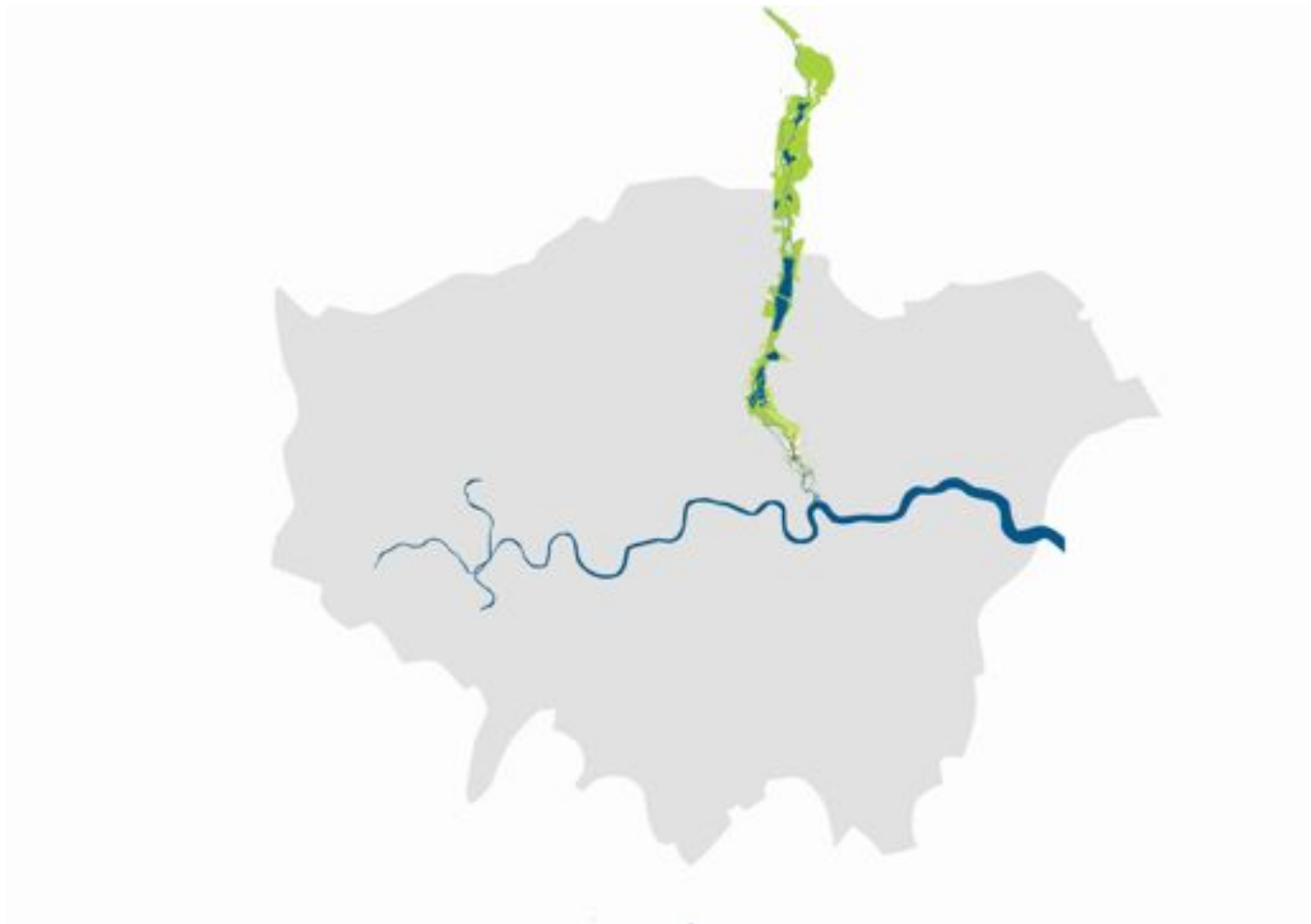
Green Infrastructure : Abercrombie Park System

The plan included details such as the contemporary ratio of open space per 1.000 persons (2,43 hectares in Woolwich, 0,04 in Shoreditch). Abercrombie proposed a 'standard of open space' of 1,62 per 1.000 people

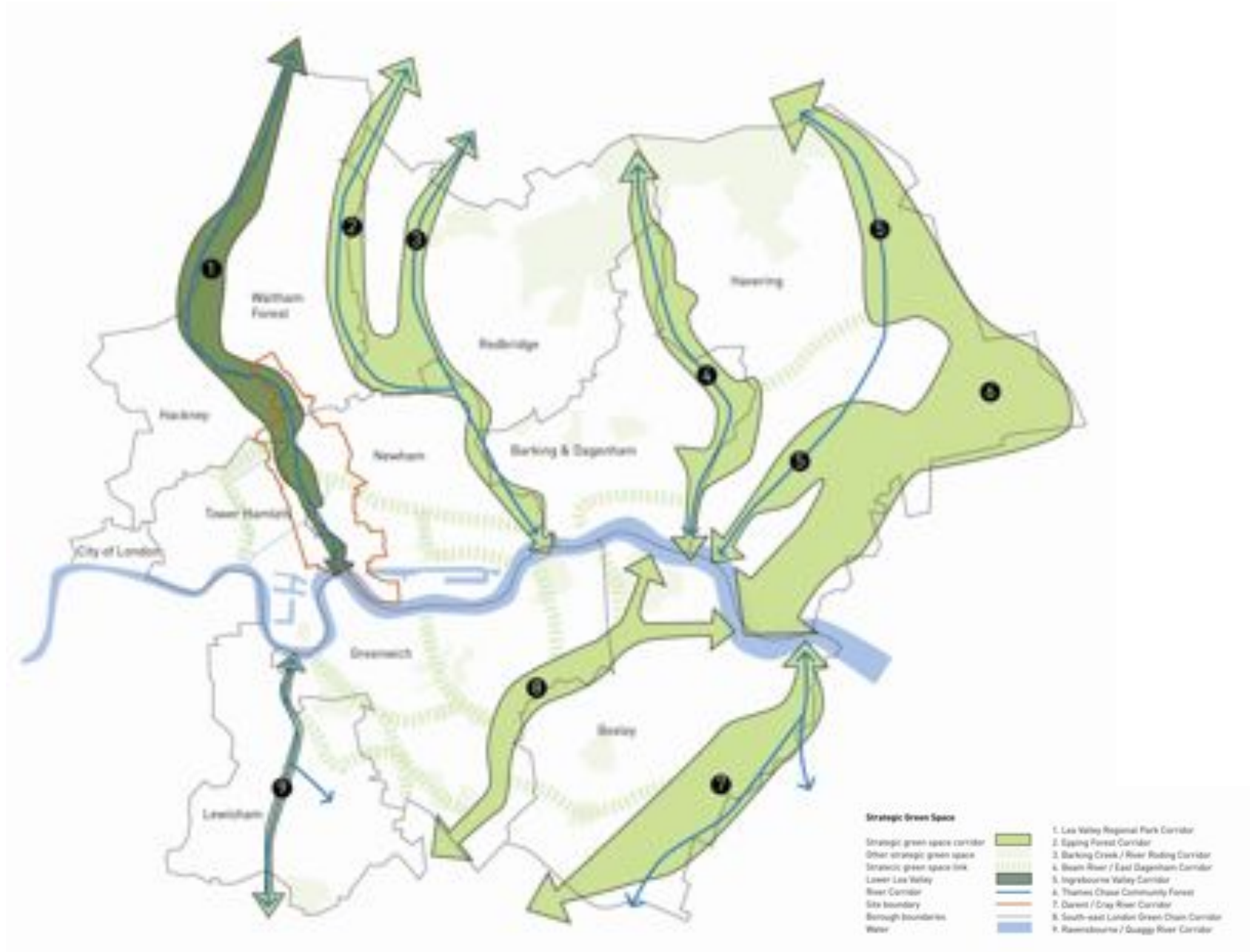


1944 Abercrombie Park System

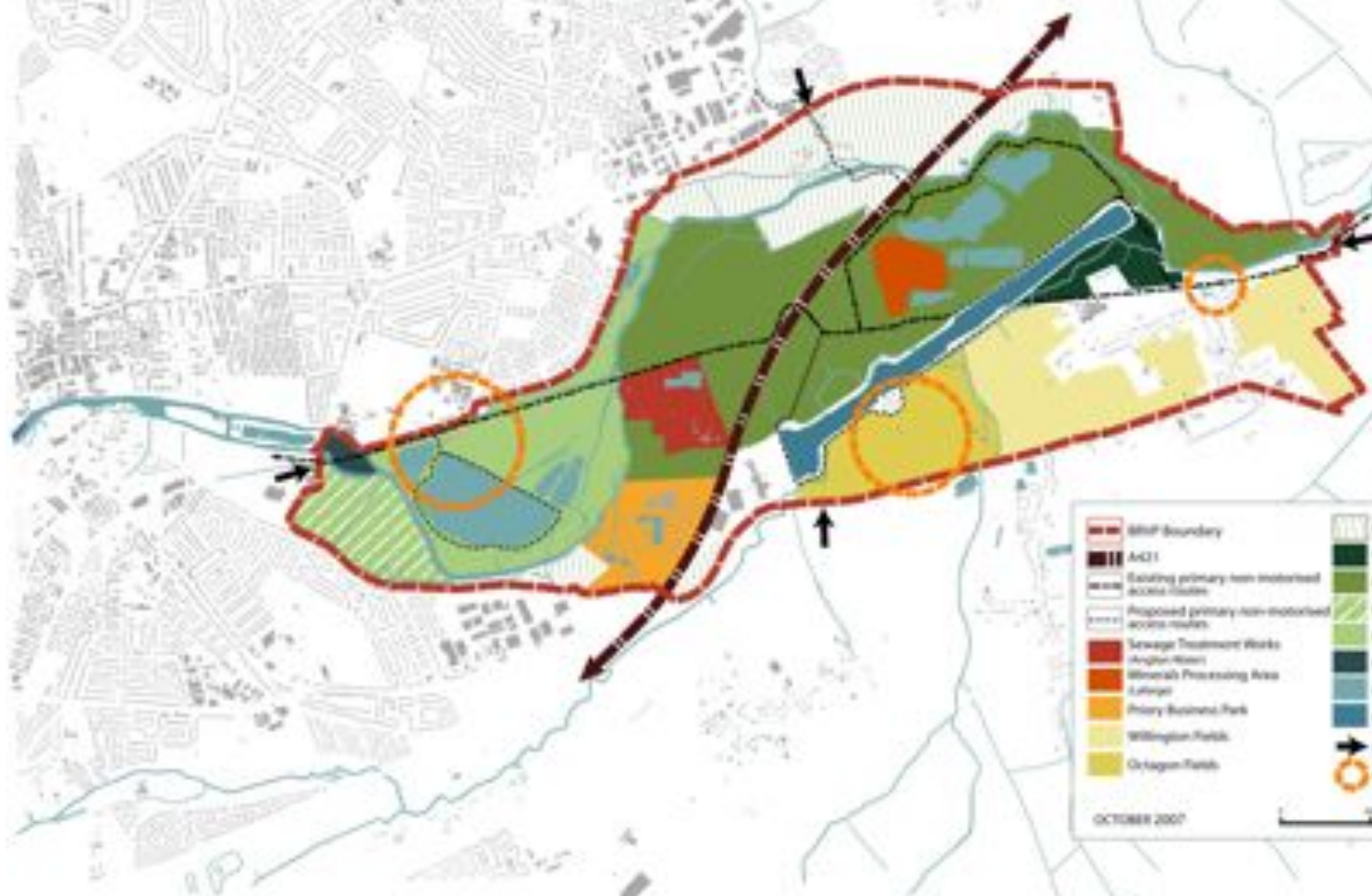
Green Infrastructure : Lee Valley Regional Park



Green Infrastructure : East London Green Grid



BEDFORD RIVER VALLEY PARK FRAMEWORK PLAN



BDFP Boundary	Willington Woods
A421	Floodplain Forests
Existing primary non-motorised access routes	Fertile Meadows
Proposed primary non-motorised access routes	Priory Country Park
Sewage Treatment Works (Angley Wood)	Farm Park
Minerals Processing Area (Lunger)	Rivers/Waterbodies
Primary Business Park	Proposed Rowing Lake
Willington Fields	Access Points
Oxhey Fields	Activity Hubs

OCTOBER 2007



New Kiruna, Sweden
High ecological connectivity

Woodcock, nightjar, common kestrel. As 12 of the UK's native reptiles and amphibians can be found in the area. The town is surrounded by a fantastic woodland and heathland landscape. There are important protected landscapes called Special Protection Areas (SPAs) and Special Areas of Conservation (SAC) to the north and south of the town. The Western Heathslands including Broadhead Common and Muzum Forest have designations of European standing.



The creation and protection of wildlife habitats will be a core component of the Green Town Plan.

You said...

- "Park for all - countryside feel, wheelchair access, cafe, walks, prospect"
- "Somewhere parents can go with the children to feed ducks"
- "Brand town as 'Gateway to South Downs' to attract visitors"
- "Retain woodland character"

What could 'Wildlife Corridors' mean?

The ecology corridors will have a biodiversity function first, and will link the protected landscapes to the north and south via a network of locally protected sites. We propose biodiversity by design! This means that green spaces, gardens and green roofs can also provide new habitats for wildlife.

EDAW's ecologists are working closely with UK Associates who have been commissioned by East Hampshire District Council to commence the Habitat Regulation Assessment process. Working with Natural England, RSPB and other wildlife groups, we are all committed to ensuring that wildlife is not just protected but enhanced!



Whitehill-Bordon
Eco Town

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Whitehill-Bordon
Eco Town



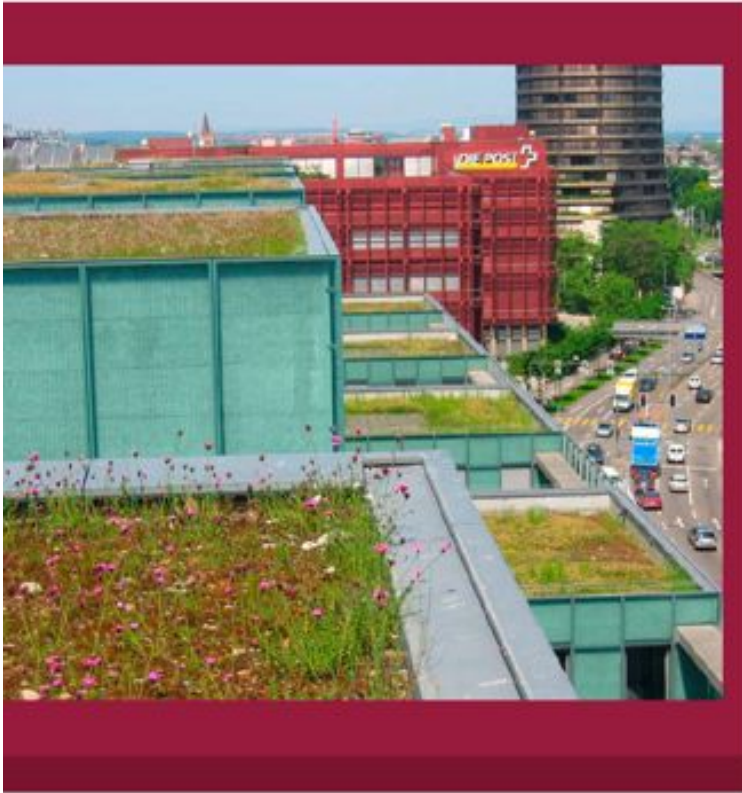
04 Masterplan

AL-SHAMAL-QATAR AZCOM



12 Boulevard perspective

AL SHAMAL-QATAR AZCOM



Greater Manchester Green Roof Guidance

August 2009

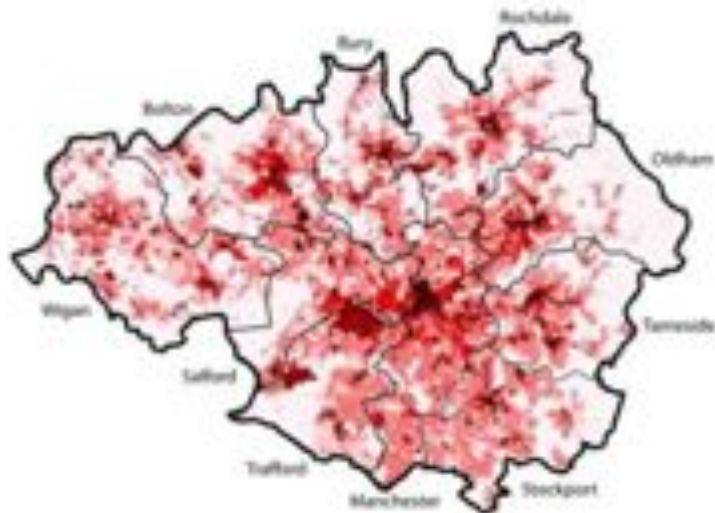


new
economy



Climate Change
Adaptation & Mitigation

Adaptation in Greater Manchester:
Concentrating on predicted urban heat island hot spots – funding for retrofitting green roofs through EU INTERREG grant to Red Rose Forest



Living Wall, Westfield, Shepherds Bush

