

THE GROWING CITY

FROM BROWNFIELD TOWARDS A PRODUCTIVE
NEIGHBOURHOOD IN SOUTH-EAST LONDON

RICHARD ALMENIUS
MASTER DEGREE PROJECT
SUSTAINABLE URBAN DESIGN 2016

CONTENTS

Examiner: Peter Sjöström, assoc. Professor,
Director of SUDes, LTH

Supervisor: Louise Lövenstjerne, Architect,
Teacher SUDes, LTH

Sustainable Urban Design,
School of Architecture
Lund University

INTRO	PAGE 3
THE UK	PAGE 6
LONDON	PAGE 18
CITY STRATEGY	PAGE 32
THE SITE	PAGE 42
PROPOSAL	PAGE 52
CONCLUSIONS	PAGE 80
SOURCES	PAGE 82

WE NEED TO RE-THINK

London is a large city, yet it's almost entirely dependent on food from outside the city. The city imports 80 percent of its food, and much of it from abroad. Food is being transported longer and longer distances and these food miles (from producer to consumer) comes with great concerns about local and global sustainability. Heavy road freight daily congests and pollute the inner city of London as well as the needs just get more for every day. The inner city people, and especially children, growing up in an urban environment loose the knowledge or never get it of from where and how crops grow.

London's population is growing fast and vacant land is hard to find, therefore ineffective built up areas or brownfield land need to be re-developed so the city can grow within it's borders. Greenwich peninsula, situated in south-east London, is today a scattered place with large brownfield areas and a motorway cutting the peninsula in two. However, it's also home to the Millennium dome, close contact to the Thames river and with public transport as the underground. The thesis investigate how this land can be transformed into a lively neighbourhood that solves more than just London's need for housing: Urban farming on rooftops and courtyards and a large scale food production in a converted former industrial building will work as a pilot project for a new sustainable way of living in London. The growing city will aim to be an including place with a strong community as well raise the general knowledge of how and what food comes from to Londoners mind.

How can urban design change peoples lifestyles when it comes to food habits, raise knowledge to an urban population about farming and support the benefits of ecological locally produced food?

Why and how should London plan to cut unnecessary food miles and how can freight handling be made in more sustainable way?

How can a brownfield area be redeveloped to become a neighbourhood with qualities in the everyday life for both visitors and people living in the neighbourhood?



THE UK

CHAPTER ONE

SO THIS IS THE UK

The United Kingdom of Great Britain and Northern Ireland, or just the UK, is located off the north-western coast of the European mainland and consist of the main island of Great Britain as well as the north-eastern part of the island of Ireland, in total it makes up an area of 243,000 km². Apart from the land border to Ireland, the UK is surrounded by the Atlantic Ocean, with the North Sea to its east, the English Channel to its south and the Celtic Sea to its south-southwest. The Irish Sea lies between Great Britain and Ireland.

The United Kingdom was the world's first industrialised country as well as the world's leading great power during the 19th and early 20th centuries. Today it's one of the top countries in global political- and economic relations and has the world's fifth-largest economy by nominal GDP and the tenth-largest economy by purchasing power parity. At 2015 64.716.000 people lived in the country making it the fifth most populated country in Europe (including Russia and Turkey which is not part of the European Union).

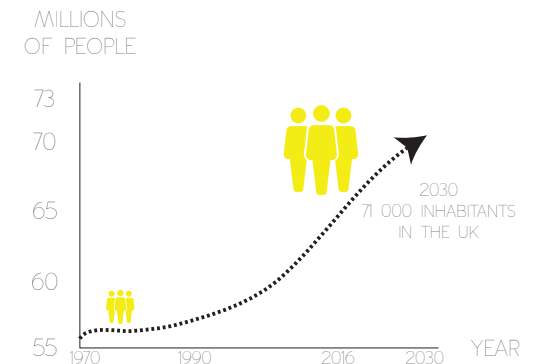
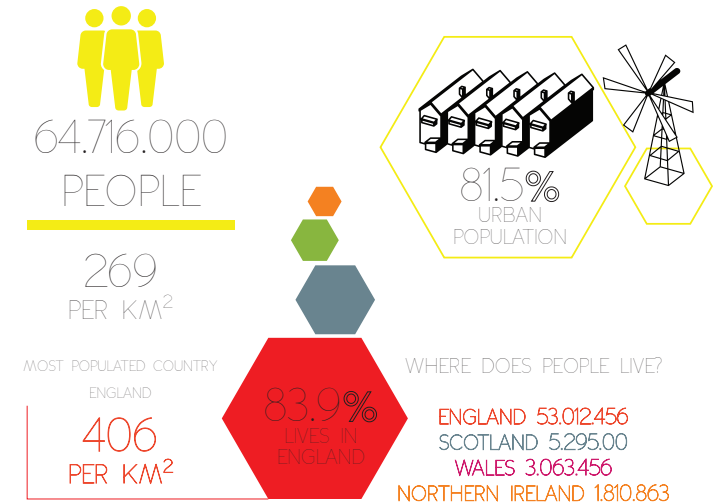
England accounts for just over half of the total area of the UK, covering 130,395 square kilometres. Most of the country is lowland terrain with mountainous terrain north-west making it suitable for both growing and building. The urban population is high with 81.5 percent living in a built-up context. England is the most densely populated country in the UK with 406 people resident per square kilometre in mid-2014, with a particular concentration in London and the south-east. However, there are five urban areas with more than a

million inhabitants and another eight urban areas with over half a million in the UK.

POPULATION GROWTH

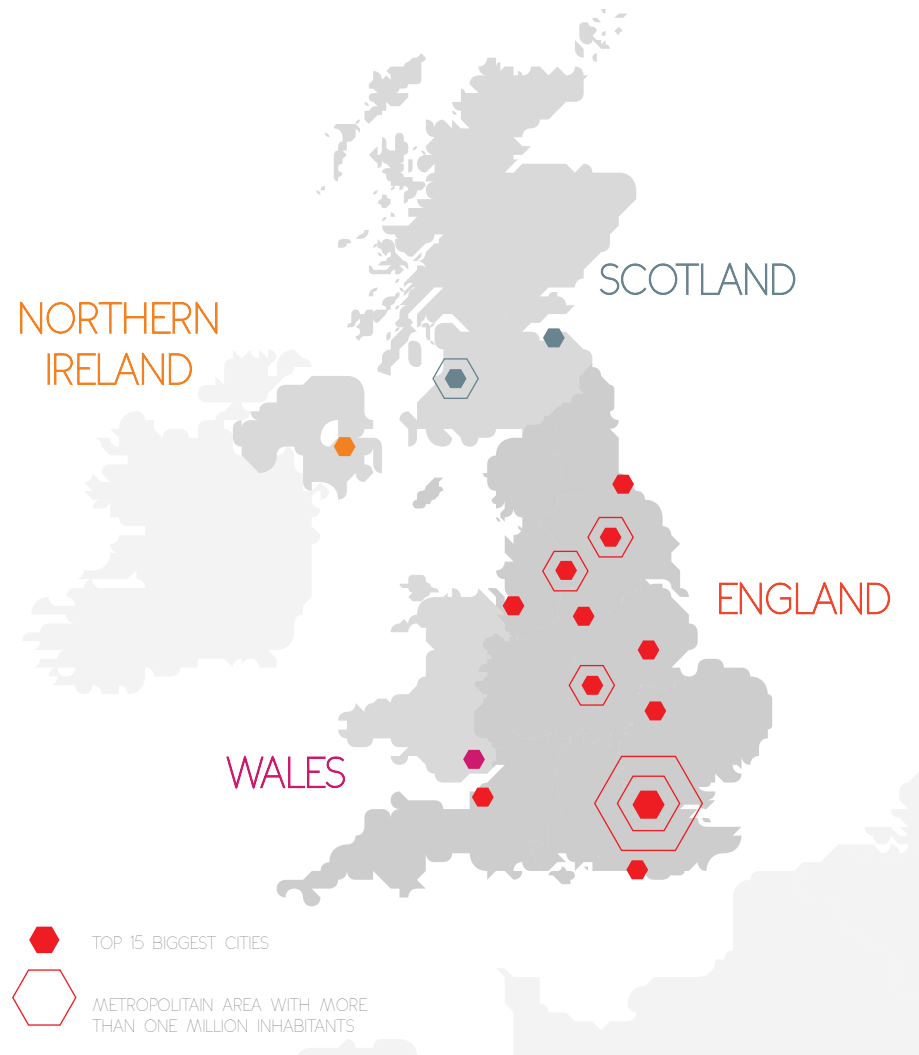
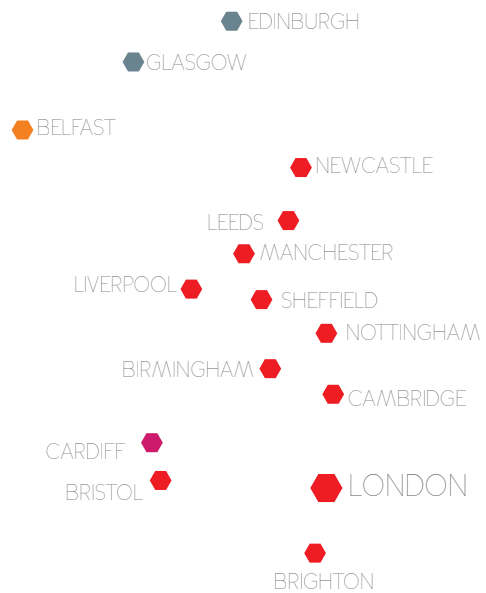
The UK population is expected to increase by 6.3 million over the next 15 years from an estimated 64.7 million in mid-2015 to 71 million in 2030. Fifty percent of the population increase is expected due to net migration.

The growth of the UK population raises several issues, some positive and some negative. From an economic perspective, the population growth is generally good news. The growing population will increase the productive capacity of the economy, and help the UK avoid a demographic time bomb (number of people not working to number of people working) through improving tax revenues. However, a growing population will worsen existing problems, such as the housing crisis and shortage of supply. It will also put pressure on existing infrastructure and current transport network. To deal with a rising population and congestions, it may be an outcome of increased building on greenbelt land and a change in the whole of UK's landscape. That's why we need to confront these problems now and plan for the future into a sustainable direction... so how can we plan in a way without losing too much land for even bigger and more sprawled cities?



THE UK IS 243,000 KM²

ENGLAND ACCOUNTS FOR JUST OVER HALF OF THE TOTAL AREA OF THE UK, COVERING 130,395 SQUARE KILOMETRES



TRANSPORT TRENDS

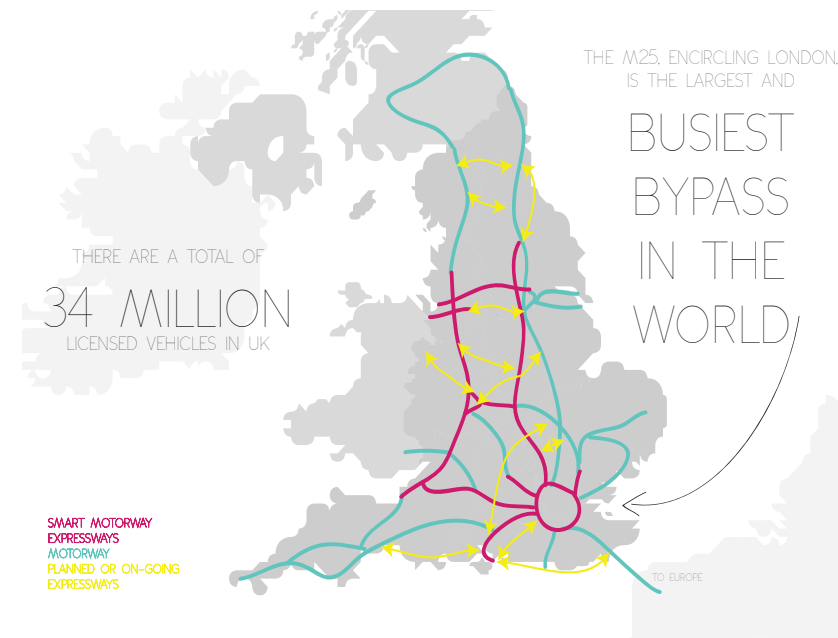
The UK is covered with infrastructure, a stretch-out road network across the country cover a total 46.904 km of main roads, 3.497 km of motorways and 344.000 km of paved roads. The motorway ring M25 circling London is the largest and busiest bypass in the world. In 2014 there were a total of 34 million licensed vehicles in the UK.

Like many others western countries, the United Kingdom saw a clear growth of car use in the 1950's, this later changed the way of getting around and the use of buses clearly declined as well as the railway use changed to grow more slowly. However, since the 1990's, rail has started increasing its modal split at the expense of cars, increasing from 5% to 10% of passenger-kilometres travelled. In 1952, 27% of distance travelled was by car or taxi, with 42% being by bus or coach and 18% by rail. A further 11% was by bicycle. By 2014 it looks quite different, 83% of distance travelled was by car or taxi; with 5% being by bus and 10% by rail. Air, bicycles and motorcycle can be seen as 1% each. In terms of journeys, in 2003 slightly over 1 billion were made by main line rail, 1 billion by light rail, 4.5 billion by bus, and 21 million on domestic air flights. Passenger transport has grown rapidly in modern time. Figures from the Department for Transport show that a total passenger travel inside the United Kingdom has risen from 403 billion passenger kilometres in 1970 to 788 billion in 2014.

The UK has a railway network of 16.209 km in Great Britain which carried 1.65 billion passengers in 2014-

15. There are also about 1000 freight trains on the tracks each day. The UK government is to spend £30 billion on a new high-speed railway line to be operational by 2026 that will connect London to Birmingham, which is further connected to the existing high-speed line to Europe that goes through the English Channel

The UK airports handle a total of 211.7 million passenger and the three largest airports are London Heathrow Airport (65.6 million passengers), Gatwick Airport (31.5 million passengers) and London Stansted Airport (18.9 million passengers).



FREIGHT HANDLING

Freight transport has experienced similar changes, increasing in volume and shifting from railways onto the road. In 1953, 89 billion tonne kilometres of goods were moved, rail transport stood for 42%, road 36% and water 22%. By 2010 the volume of freight moved had more than doubled to 222 billion tonne kilometres and only 9% was moved by rail, 19% by water, 5% by pipeline and 68% by road.

In 2008, the Department for Transport stated that traffic congestion is one of the most serious transport problems facing the UK. That's most because bottleneck roads are in serious danger of becoming so congested that it may damage the economy and stop the transport flows completely, making it both time-consuming and cost-inefficient.

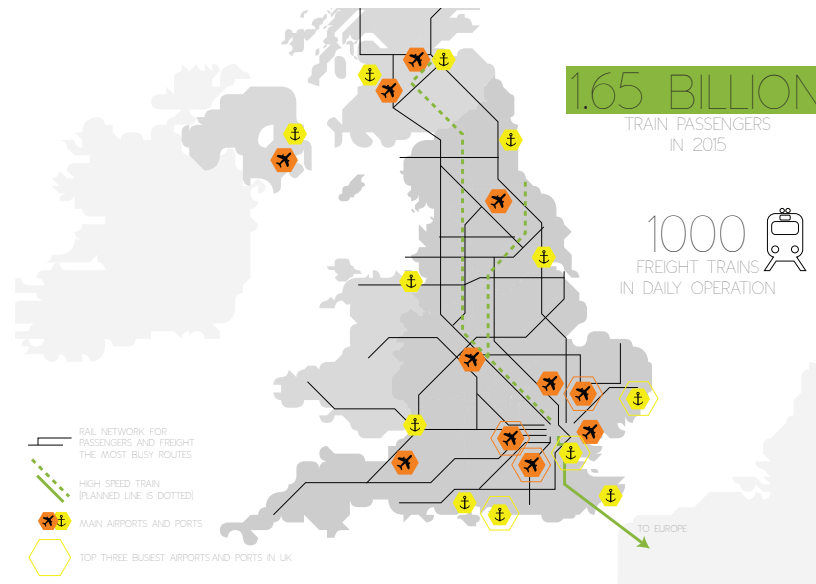
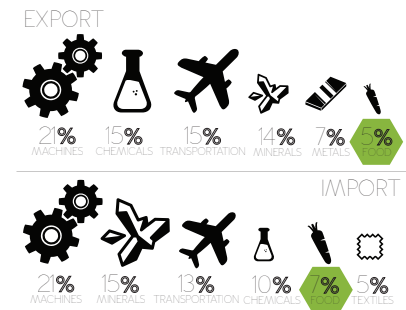
In recent years rail freight has undergone somewhat of a rebirth, even if it's just handle 9 percent of the the freight transport, it still increased by 60% since 1995 and are recovering successfully from the effects of the decline when lorries become the first choice. In 2014 alone rail moved 105 million tonnes of freight throughout the country.

Rail freight plays an important role in reducing the number of lorries and congestion on the roads. Due to the greater capability of rail, each freight train can typically replace around 50 Heavy Good Vehicles (HGVs). An interesting thought is that an additional 6.6 million lorry journeys would have been needed if the rail freight dealing were carried by road.

Moving goods by rail is the most cost-effective way of

transporting freight. Rail transport is more fuel efficient than road transport. Less fuel is needed to transport a tonne of goods by rail than by road, saving both money and greenhouse gas emissions.

The United Kingdom is the 11th largest export economy in the world and exported for £23bn. The UK is however the the 6th largest importer in the world and imported for £32bn 2014, resulting in a negative trade balance. See illustration for most exported/imported goods categories.



BRITISH FARMING

Agriculture uses 70% of the land area in the UK and employs 1.5% of the working people, roughly 476,000 people.

The UK produces less than 60% of the food it eats. Agricultural activity are located in mostly rural locations and is concentrated in East Anglia (crops) and the South West (livestock). Of the over 200,000 farm holdings, there is a variation in size from under 20 to over 100 hectares.

Despite skilled farmers, high technology, fertile soil and supports, which primarily come from the European Union, farm earnings are relatively low, mainly due to low prices at the farm gate (the net value of the product when it leaves the farm, after marketing costs have been subtracted). Low earnings, high land prices and a shortage to farmland make it very hard for young people joining the profession, which can be seen in the average age of the British farm holder which is set to 59.

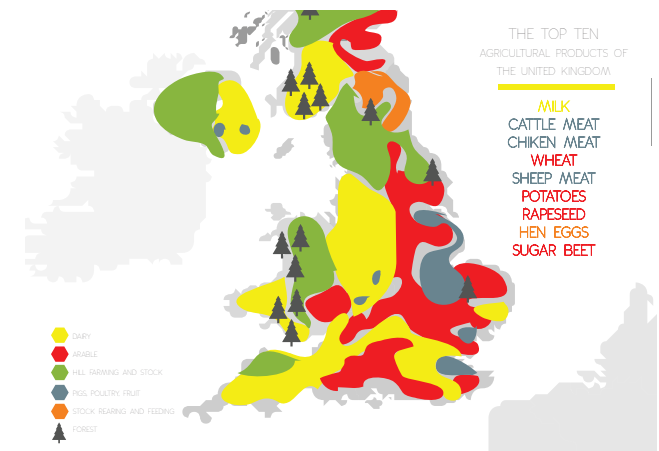
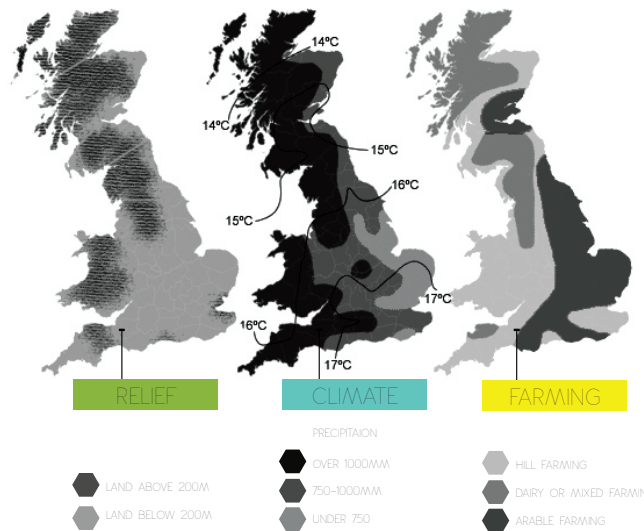
At the Agriculture in the United Kingdom Seminar 2010, it was thought that subventions and supports would decrease, and that the number of farms and farmers would also continue to decline. However, between 1979 and 2010, productivity grew by 49%, output volumes by 25% and input volumes fell by 16%. Total income from farming in the United Kingdom was £5.38 billion in 2014, representing about 0.7% of the British national value added in that year. This is a fall of 4.4% in real terms since 2014 and this was the best performance in UK agriculture since the 1990's. 83% of

the UK's agricultural income originated from England, 9% from Scotland, 4% from Northern Ireland and 3% from Wales.

While there is little difference between farming practices in England, Scotland, Wales and Northern Ireland in places where the terrain is similar, the geography and the quality of the farmland does have an impact. In Wales, 80% of the farmland is designated as a "Less Favoured Area", and in Scotland the figure is 84%. "Less Favoured Area" means land that produces a lower agricultural yield, typically upland moors and hill

farms, which explains the trend to focus on sheep and sometimes dairy farming. In England, the eastern and southern areas where the fields are flatter, larger and more open tend to concentrate on cereal crops, while the hillier northern and western areas with smaller, more enclosed fields tend to concentrate on livestock farming.

The British farming is intensive and highly mechanical, but due to the fact that the country is so heavily populated it cannot supply its own food needs. In 2014, it exported £14 billion worth of food, feed and drink, and imported for £32.5 billion.





OF THE FRUIT COMES FROM ABROAD AND HALF OF THE VEGETABLES ARE IMPORTED.



IT IS HARD TO RECRUIT YOUNG PEOPLE INTO FARMING. THE AVERAGE FARM HOLDER IS 59 YEARS OLD.



THE UK PRODUCES LESS THAN 60 PERCENT OF THE FOOD IT EATS



TRANSPORTED BY LORRY AROUND THE UK ARE FOODSTUFFS



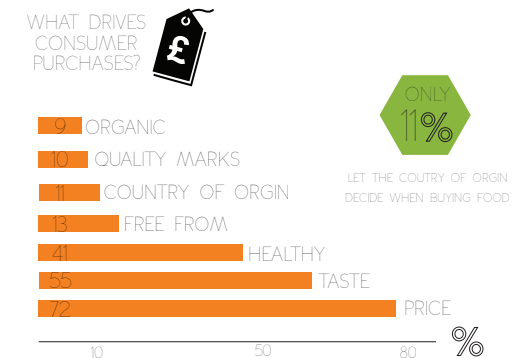
SINCE 1992, THE AMOUNT OF FOOD FLOWN BY PLANE HAS RISEN BY 140 PERCENT

LIFESTYLES AND FOOD

The somewhat of reputation British people have that they live on processed food and crisps, cannot cook proper dinners and often eat in front of the TV is not completely misplaced. The contrast between domestic food trends and diets now and in 1942, when trustworthy records began, is certainly different and in many cases worse in many ways. Wartime families ate both more vegetables and fish and about half as many biscuits as a modern British person would do. Even since the 1970s Britons have cut back drastically on green vegetables and have turned to pre-ready meals, especially meaty ones, and salty snacks. This is common for both wealthy as well as deprived families. Fruit consumption among the most deprived one-fifth of households is down by 12% since 2010.

The growing numbers who live alone, now 29% of all households, often eat by themselves and every second meal is pre-done for these households. Proper mealtimes are no longer established or clearly defined and today people eat often and quickly. That means both more products consumed and more package waste.

fossil fuel energy makes intensive agriculture and long-distance transportation economically possible, and has allowed food production and distribution to become a global industry. Prices in shops do not reflect the full cradle-to-grave environmental and social costs, it can't be seen as a sustainable way of handling fresh food to countries that have the possibility to grow it themselves.



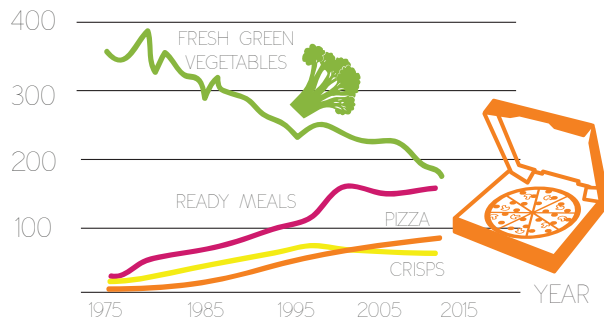
WHAT A SNACK

Britons eat out much more than they used to, the average Briton eats just three grams of green vegetables in a restaurant each week and dines out on 44 grams of chips and 75 grams of meat.

FOOD MILES

Today food is being transported longer and longer distances, the expression 'food miles' (a phrase created by Tim Lang, professor of food policy at London's City University) can be read as the time and length of getting products to the consumer. In the UK, comparatively little of the food that consume comes from local producers and much of the products that can be found in the local grocery store have been transported over great distances – such as apples from the New Zealand and green beans from Kenya. Cheap non-renewable

The foremost common method of transporting food once it's reached the country of destination is by lorry. These journeys account for 25% of CO2 emissions. It has been stated that if all the Britons attempted to buy food originating from within a 20km radius from their home the country would save over two billion pounds in congestion and environmental costs.



Thousands of children think ketchup comes from STRAWBERRIES

TOMATO may be a fruit, but it seems thousands of children actually believe ketchup comes from strawberries.

By JAYMI MCCANN

PUBLISHED: 18:30, Sat, May 23, 2015 | UPDATED: 11:15, Mon, May 25, 2015

SHARE      20



HEADLINES WITH A MESSAGE

UK will need to import over half of its food within a generation, farmers warn

Rising population will hit UK's self sufficiency if government continues to ignore British food production, say NFU



News > UK > UK Politics

Britain's food self-sufficiency at risk from reliance on overseas imports of fruit and vegetables that could be produced at home

Oliver Wright | @oliver_wright | Tuesday 1 July 2014 | 0 comments

   4 shares



High numbers of children do not understand where their vegetables come from. A survey of 2,000 UK parents and children show that one in three children are actually frightened of vegetables. 72 percent of the children say they'd be more likely to eat veggies if they grew them themselves. Furthermore, more than three in five feel that growing or picking would help them to understand the health benefits of fruit and vegetables.

So how does it look today? Let's take an example, an apple which has been grown in Chile, being treated with chemicals and then shipped 9,000 km to the UK is likely to be cheaper than locally grown organic apples. However the environmental and social costs in terms of soil, water and air pollution in Chile, work-related exposure to hazardous chemicals and environmental damage from the use of fossil fuel, are obviously not taken in consideration for the price of the apple. These costs are paid by people in Chile and by the environmental in general. It's been stated once consumers are geographically separated from food production, they are getting more ignorant of many mistreatments of the environment, farm workers and farm animals which most likely wouldn't been tolerated if they were occurring in the neighbouring meadow.

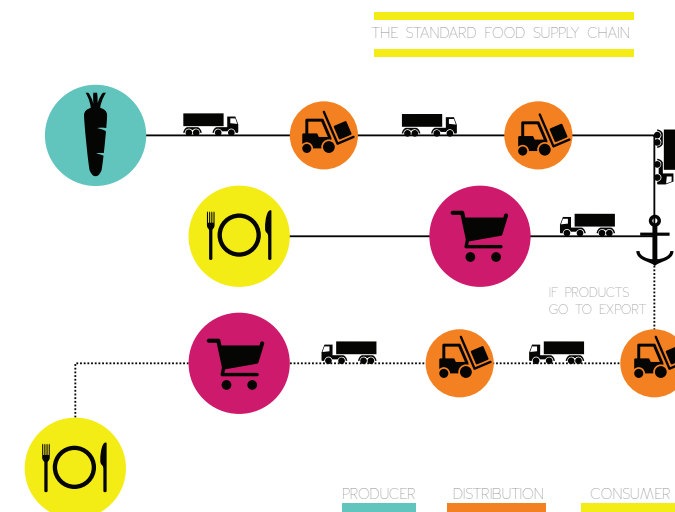
MORE OF A WASTE

Agriculture is seen as an industry, no different from any other. When agriculture replaces farm workers with machinery to cut costs, uses chemicals to increase yields and reduce imperfections, and is sadly powered by 'hidden' quantities of fossil fuel, a necessary way to increase 'efficiency' and stay competitive in the national and international competition.

Transported food is obviously being preserved in a heavier extent than groceries at the local market, just to prevent leakage and freshness - it's packaged for a long life during transportation, storage and at the actual shelf at the grocery store. Sometimes preservation itself leads to foods being transported across the country. One major supermarket in the UK sourcing fish in Scotland, send it down to Cornwall to be smoked, then back up again for sale in Scottish stores. Almost three quarters of the food items in the UK has been industrially processed or manufactured in some way. Manufacture of processed foods from raw ingredients is an energy intensive procedure using up to ten times the energy necessary to grow the crop in the first place. The end product is almost certainly of lower nutritional value than less processed foods as a result of added flavourings and preservatives as well as loss of nutrients in storage and processing. A large proportion of the ingredients in processed foods are saturated fats, refined sugars and carbohydrates. So consumers are paying more to receive less. Many goods are also being shipped across the globe not to meet needs but rather give another variation on an existing product.

A quarter of household waste is from food packaging. A lot of the purpose of packaging is to preserve the product during long transports. Reducing the amount of packaging used is the most sustainable option. However, long distance

goods need to be protected and/or preserved in transportation and storage. A procedure that can be reduced if the consumers choose more locally produced products, it's not all about the actual miles food but rather the whole way of transporting and dealing with food.





LONDON

CHAPTER TWO

THIS IS LONDON

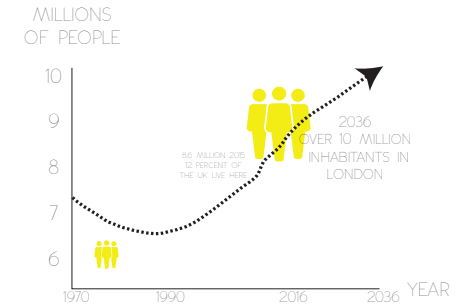
London is a city with a history that stretches over 2000 years, millions of people have formed the city throughout the times to what it is today. What is define as greater London covers around 157,800 hectares and is home to over 8 million people – roughly 12% of Britain's population. What London is depends on who defines it, and why. The Greater London administrative area, for instance, is constrained by the Metropolitan Green Belt and comprises the 33 London boroughs. Leaving out large parts of Essex, Hertfordshire, Kent and Surrey - if these areas would count as London, it would be a city 130% bigger than the Greater London area and home to 15% more people. The functional urban region is joined together by commuting workers and other kinds of dependency and is a massive area with over 13 million people. In excess of all the Londoners and commuters from nearby towns, the city each year get over ten million tourists that come for business and leisure

BOOM, NEW LONDONERS

London's population is growing like never before. By the 2020's there are likely to be more Londoners than at any time in the city's history. The changes to London's population since 1971 are shown in the figure, the city's population grew just before the Second World War. By 1939, London's population reached its peak at that time - 8.6 million, following a period of large-scale development on unbuilt land– the part of which is now making up north-west London grew rapidly by around

800,000 in the 1930s. This period was also the start of policies to oblige London's physical growth such as the surrounding Green Belt (protected areas with valuable green land), but also encourage new development in other parts of the country and reduce the density at which Londoners lived. The post-war years saw the start of new towns and garden cities around London. As a result, London's population started to fall for a long time, reaching a low of 6.7 million in the late 1980's. Back in modern times, London's population has grown every year since 1988; even during the quite severe economic downturn of the early 1990's. The population has accelerated again, and to an extent much greater than was anticipated in the general 2011 London Plan. 9.20 million in 2021. New mesures show that London most likely will grow by 9.54 million in 2026, 9.84 million in 2031 and 10.11 million in 2036.

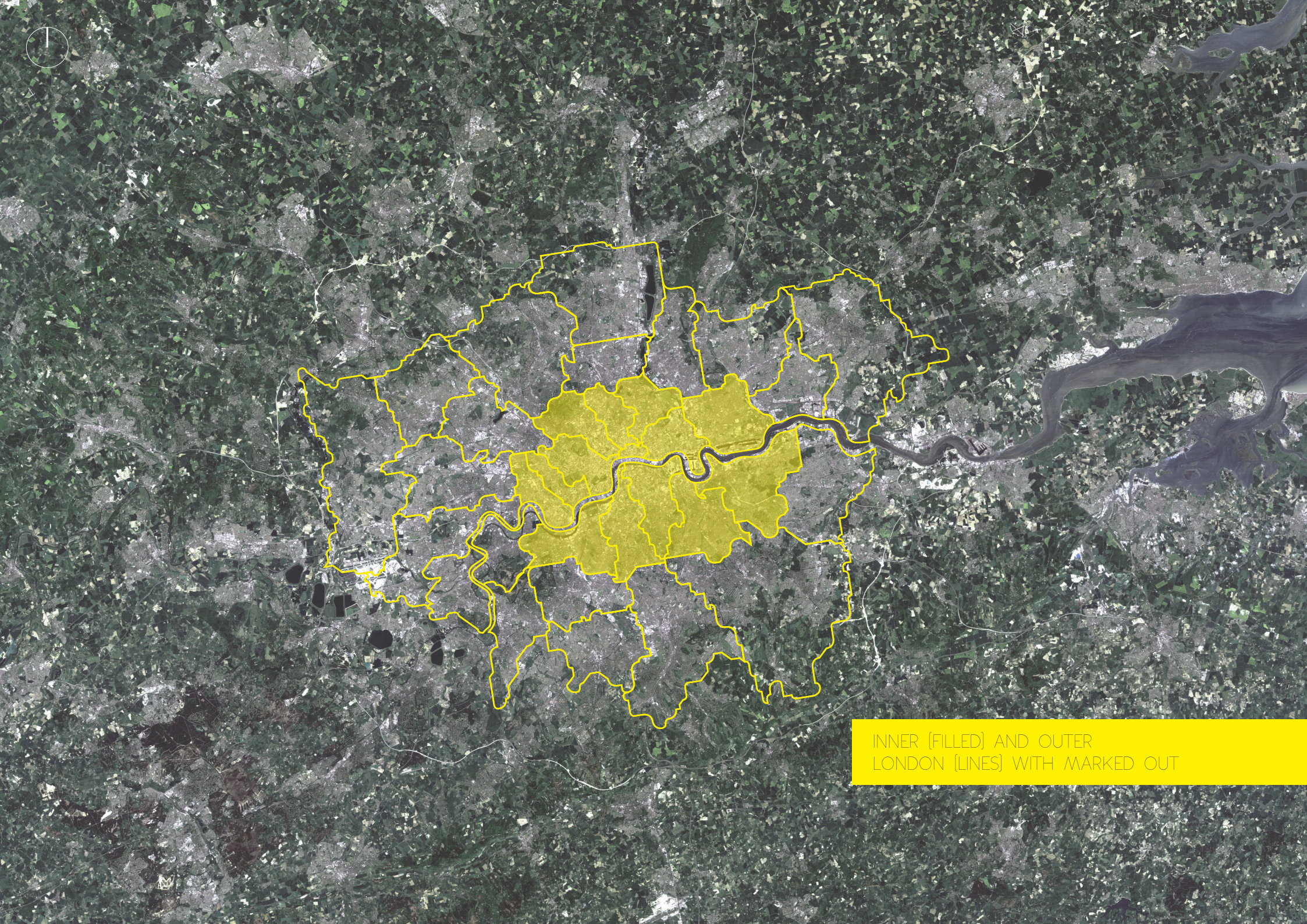
London's population will also change in structure. It will probably continue to be younger than elsewhere in England and Wales – there will be 17% more school age Londoners in 2036 and 28% more aged 35–64. At the same time, the number of people over 64 is projected to increase by 64 per cent (nearly 580,000) to reach 1.49 million by 2036. London will therefore have to plan for schools and other facilities needed by more young people, while also focusing of the needs an ageing population might have



DENSITY AND HOMES

Density has become a key policy issue in London. After the decades of decline, the city is now growing rapidly. The London Plan, signed of by the Mayor has decided to accommodate this growth within London's existing boundaries and boroughs. A growing population comprised within the same footprint means higher residential densities. The future population, which is changing structure will be younger, more ethnically diverse and composed of more single parent families than the typical family household with two parents and two children – and that will generate in new types of housing situations.

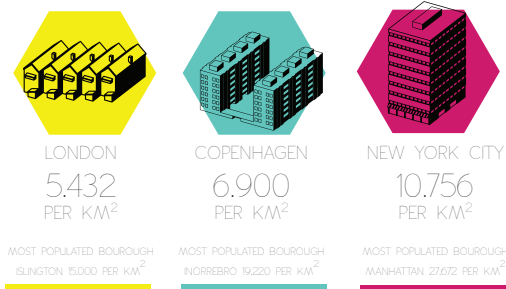
Even though London is stated to be a dense city, being the densest area in the UK, it's not as dense as it could be due to low buildings. Compared to other cities London's density is relative low, see figure. The



INNER (FILLED) AND OUTER
LONDON (LINES) WITH MARKED OUT

WHERE TO BUILD

outer boroughs can be seen as organized sprawl with townhouses that stretches over large areas with less than 2499 people per square kilometer. This is quite chocking when London is on of the world's most expensive cities when it comes to both land price and rent. People tend to live in compact inner boroughs, shared households and small flats which make the density number much higher in some parts of the city. Together with new need for housing, projections in the London Plan suggest that the total number of jobs in London could increase from 4.9 million in 2011 to 5.8 million by 2036 – an additional 861,000 jobs over the period as a whole. Manufacturing is projected to continue to decline, from 129,000 jobs in 2011 to 34,000 by 2036, while employment in 'professional, real estate, scientific and technical activities' could grow from 670,000 in 2011 to 1.09 million in 2036, representing 49% of the net new job growth projected over the period. Today the average household income is 16% higher than anywhere else in the UK but the unemployment rate at 8.1% is 2% higher than the national average.



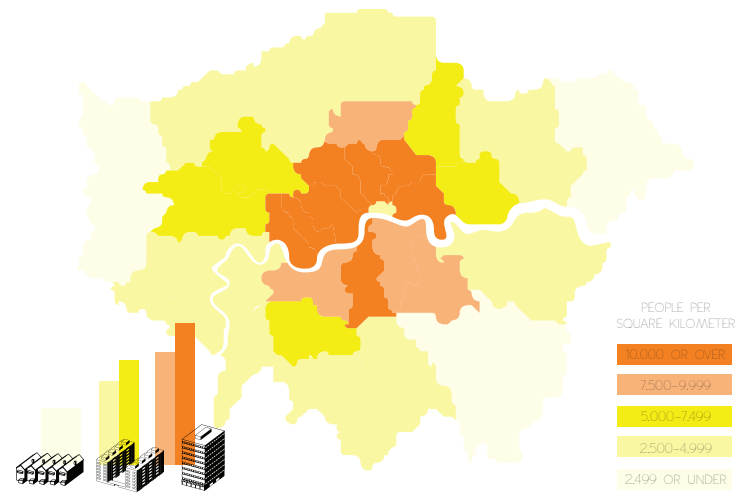
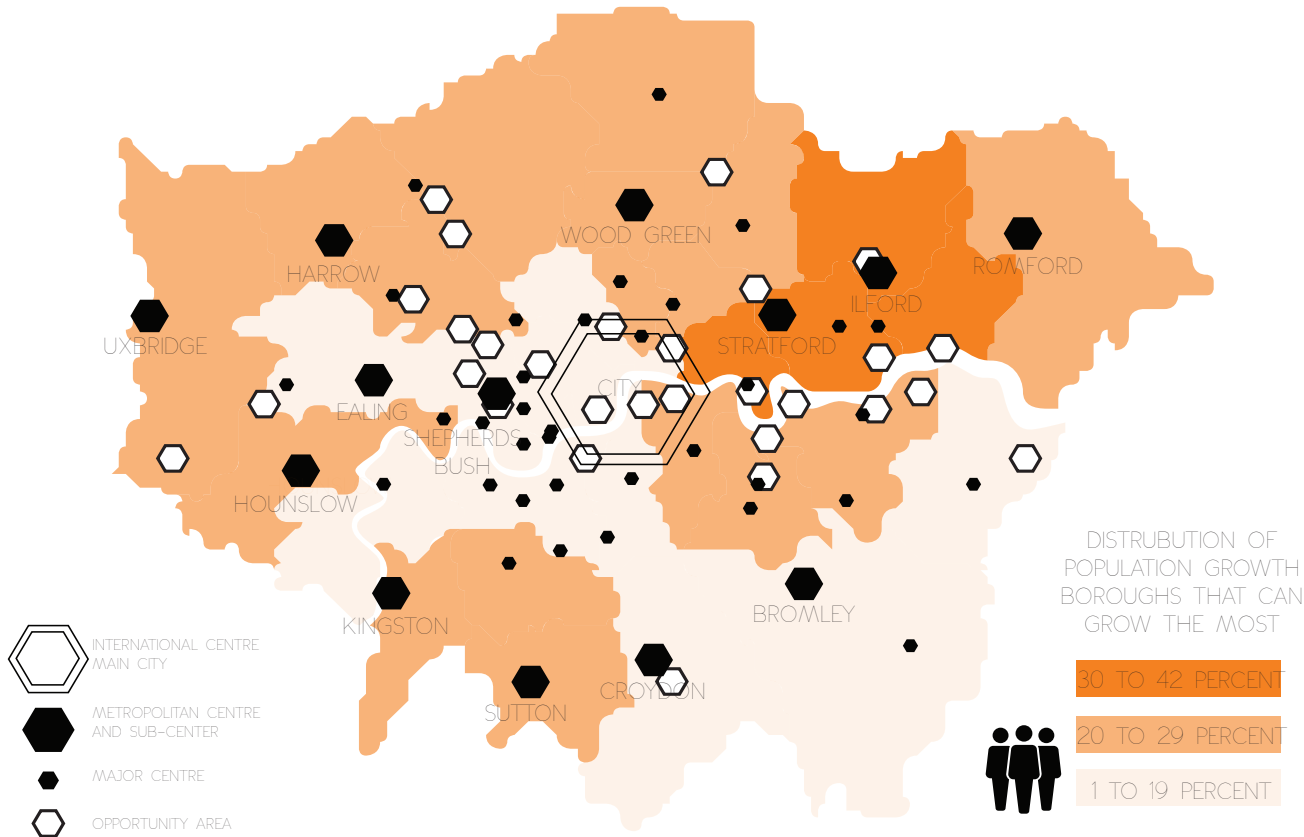
MORE THAN ONE CENTRE

The Central Activities Zone, or just the 'City' is London's economic and administrative core. It brings together the largest concentration of London's financial and globally-oriented business. Almost a third of all London jobs are placed here and together with Canary Wharf, the business district, it has so far experienced the highest proportion of growth in London. Around this core and mostly in the outer boroughs major town centres and neighbourhoods play a vital role in the life and wealth of the capital. It is where 60 percent of Londoners live and 40 percent where the jobs are. These outer boroughs is likely to experience considerable population growth over the period to 2036. A range of town centres varied in size across London complements the role of 'City' and supports the poly-centric structure London got and need to have, see map. Due to London's size it's crucial for the metropolitan area and greater London to have more than one major centre. In both outer and inner London, town centres are the most accessible locations on the public transport system and it's the centres of their communities. The centres are key locations for a varied range of activities, including retail, leisure and office space as well as housing, social infrastructure and public open space. They are also major nodes for more effective land use and transport integration, allowing already easy-accessible places to live and work. It need to be more than one place where people tend to go as a first choice when it comes to all of this. It may be suitable to designate new or heavily extend

town centres when opportunity areas sit close or within a town centre. This to ensure the higher population a good way of living and fill the needs on an everyday basis.

NEW OPPORTUNITIES

The opportunity areas shown on the map are bigger plots of brownfield land with significant capability to accommodate new housing, commercial and other development linked to existing public transport and infrastructure. The opportunity areas varying in size from 3,900 hectares to 25 hectares, in general they would be able to house at least 5,000 jobs or 2,500 new homes or a combination of the two together with other supporting facilities and infrastructure. It's vital that these areas develop in the right way so the land maximizes for good housing opportunities as well together with other functions. They need to become dense areas within London so today's distances and the physical size of London can stay the same. It's great opportunities of re-shaping the city, mostly when it comes to density. The places should be clear markers for sustainable living. Making the whole city, the town centres and the local neighbourhood greener and more efficient.



GETTING THINGS AROUND

Transport is an essential part of life in London, that's what make this major city diverse and easy to read even if it stretches for miles. Therefore London is very much defined by its organized transport system. Every day around 24 million journeys are made across the TFL (Transport for London) network that consist of London's buses, the Tube network, Docklands Light Railway, Overground, Tram and even rental cycles as well as transportation on the Thames. Together with that commuter trains, domestic trains and coaches, private cars and cabs and cyclists make up ways of getting around in London. The year 2014-15 saw clear increases. More than 1.3 billion passenger journeys were made on the Tube, an increase of 3.2% on the previous year and nearly 2.4 billion passenger journeys were made on London's busses (more than half of all bus journeys taken in England).

CARS ARE BAD

However, people still use the car in a big extent even if the public transport system is up-to-date and extensive in the city. There are 2.6 million cars registered in London and 54 percent of the households in London have at least one car. These causes problems when most of the streets of central London were laid out before cars even were invented. With other words, London's road network is today often congested.

Throughout the years this have been a problem to be solved. In the late 19th and early 20th centuries wider

roads and boulevards were built in central London. In the 1920's and 1930's a series of new wider roads got built in the new suburban outskirts, thereafter the bypass M25 circulating the city making an effort to lead traffic around London. All necessary decisions for a growing city but a reduction of cars in inner London may still be the best way to solve the problem. The London congestion charge introduced 2003 is a toll system with a fee charged on most motor vehicles operating within the Congestion Charge Zone in Central London. In 2013, ten years after its implementation, TfL reported that the congestion charging scheme resulted in a 10% reduction in traffic volumes.

The still intense car-use make it hard to control and plan for green ways of moving around in the city which very much effect the pollution (read more about this on the next page).

GET ON THE BIKE

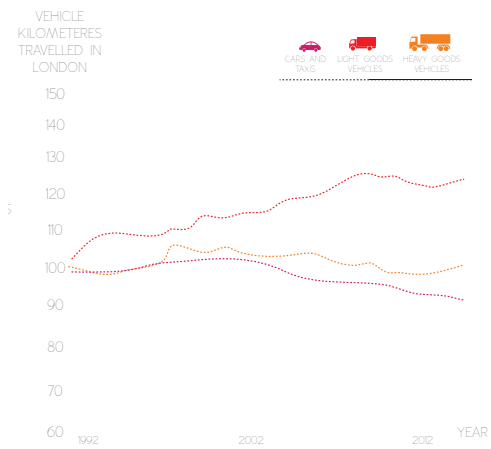
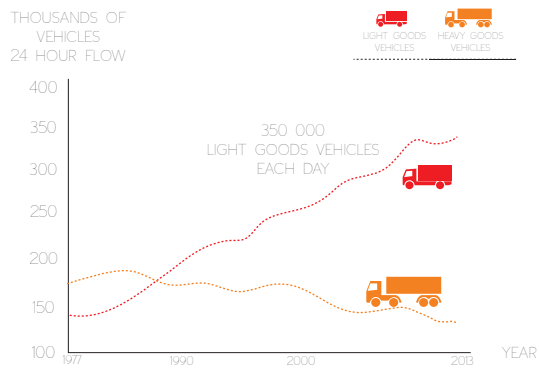
Cycling as a way of everyday transport within London began a slow regrowth in the 1970's. This continued until the beginning of the 21st century, when levels began to increase significantly - during the period from 2000 to 2012, the number of daily journeys made by bicycle in Greater London doubled to 580,000. The growth in cycling can partly be credited to the launch in 2010 by cycle hire system throughout the city's centre, which was attracting a monthly ridership of approximately 500,000, peaking at a million rides in the summer in the year of 2013.

A network of cycle route across London other than regular bike lanes on the street is the Cycle Superhighways and Quietways (cycle routes with low volumes of traffic next to it). These kind of initiatives will make it easier to transport people throughout London and release the pressure on other transportation modes.

FRIEGHT IS WORSE

The already congested roads in London is also the most dominant form for goods transport in London in terms of the weight of goods lifted. The next most important method is Port of London traffic on the river Thames within London, followed by rail and air. Light goods vehicles (LGV) and heavy goods vehicles (HGV) accounted for 13 percent and 4 percent respectively of all vehicle kilometres travelled on London's roads in 2012. Around 132 million tonnes of road freight carried on journeys by HGV had its origin and/or destination in London in 2014, see figure about different freight methods. The road freight carried on journeys to, from and within London represented approximately 9 percent by weight of the total freight lifted on all road freight journeys in the UK in 2014.

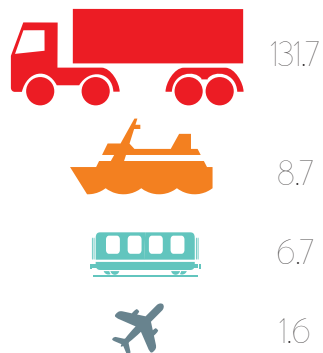
Other ways of moving freight to, from and within London makes up the less used alternatives of rail freight, shipping and air. The rail freight lifted on journeys to, from and within London in 2012 represented 7 percent by weight of the total rail freight lifted in the UK. London is also a net importer of freight by rail from other parts



AIR POLLUTION

of the country, meaning that almost four times as much by weight arriving as leaving. There are currently 50 safeguarded wharves on the Thames in London (at least half of them are used for freight transport and some of are not currently in use but could be. Cargo handled by wharves in London by weight has fallen from 25 per cent in 1995 to 18 per cent in 2012. The relatively small proportion of freight (by weight) being handled within London is because much of the volume and traffic is handled at the larger wharves in Kent and Essex. 80 percent of the country's air freight passed through the London airports of Heathrow, Gatwick, Stansted and Luton. Yearly air freight tonnages at London area airports have been relatively stable since 2000, following a period of constant growth. Heathrow is by far the most important airport in terms of the weight of freight lifted among the London airports. It accounted for 81 per cent of all air freight handled by weight at London area airports in 2012.

FREIGHT LIFTED TO FROM LONDON



MILLION TONNES

HEALTHIER STREETS PLEASE

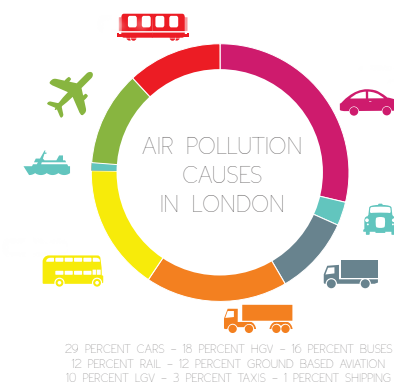
A survey made along Londoners found that pollution from traffic was the top environmental concern for the inhabitants. As recently as the 1950's London was infamous for its pollution. In December 1952 a dense fog covered Greater London for several days, leading to a sudden rise in mortality rates of thousands. While significant improvements and inventions have been made, air pollution still remains a real challenge for all cities, especially large cities where the sources of contaminants are more geographically concentrated combined with a bigger population exposed to them. Nearly 9500 people die early each year and shortens the average Londoners life expectancy by six months. The premature deaths are due to some key pollutants, fine particulates known as (PM10) / (PM2.5) and the toxic gas -nitrogen dioxide (NO2).

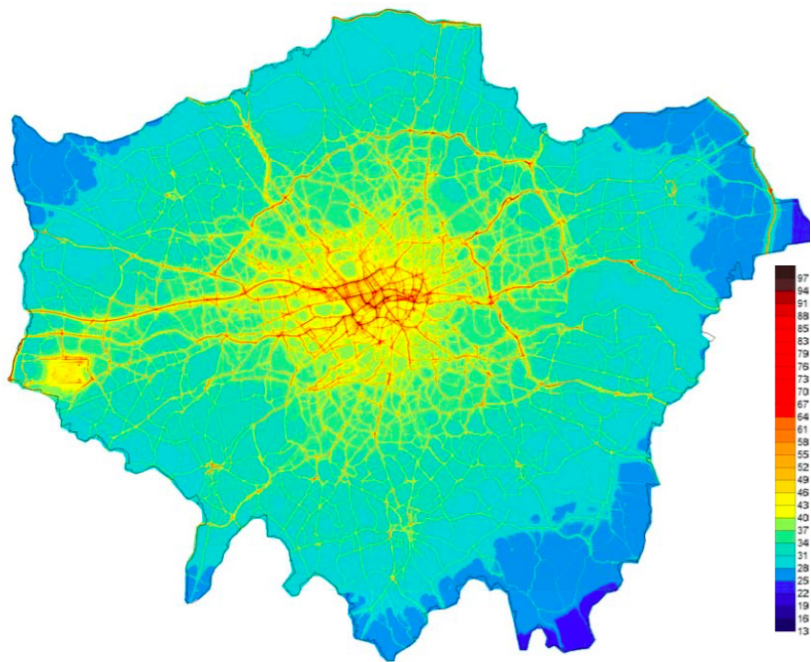
Levels of PM10 declined in the 1990's though the level of improvement has been slower in the last decade, a trend that has also been experienced throughout Europe. Similarly, levels of NO2 in London fell until 2002 but have been relatively unchanged ever since. Most pollution emitted in London is from road transport (63%) and from domestic and commercial heating systems. By reducing these emissions and deal with the source we can change the air quality.

The left map on next page shows the emissions of NO2 in 2013, areas that exceed the annual mean NO2 limit value set by EU are shaded yellow and red. It's clear it's

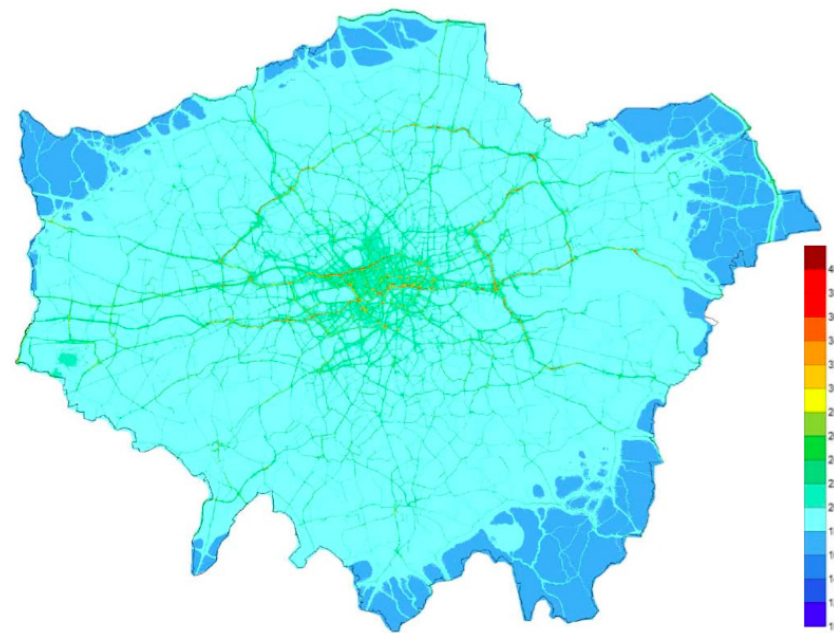
concentrated around the most busy roads. The right map shows PM10 emissions for the same year.

A reduction of the heavy traffic and pollutant vehicles and a shift into more environmental-friendly vehicles would cut the high levels.





NITROGEN DIOXIDE-EMMISSION
IN LONDON 2013



PM10-EMMISSION
IN LONDON 2015

GREEN AND BLUE

With a total length of 380 km the Thames is the longest river in England. Its springhead is in Gloucestershire in south-west England and flows into the North Sea via the Thames Estuary. On its way, it passes through London, where it drains the whole of Greater London. Its tidal section includes most of the London stretch and depending on the time of year, the river tide rises and falls twice a day by up to 7 meters. Due to the need to overcome the outflow of fresh water from London and south England it takes longer to decrease (ebb) than it does to flow in. The river also supplies London with drinking water from large reservoirs in the west of London.

THANK THAMES BARRIER

The Thames Barrier, operated since 1982, is located downstream of central London and its purpose is to prevent the floodplain of all but the easternmost boroughs of Greater London from being flooded by extraordinarily high tides and storm surges moving up from the North Sea. When needed, it is closed (raised) during high tide; at low tide it can be opened to restore the river's flow towards the sea. The reason for constructing the barrier was that London is naturally vulnerable to flooding and from heavy tides closing in. A storm surge generated by low pressure in the Atlantic Ocean may be driven into the shallow waters of the North Sea. If the storm surge coincides with a spring tide, critically high water levels can occur in the Thames Estuary and causing flooding.

Last year 2014-2015 the barrier was used, or fully closed once. Thanks to the construction the city is no longer really at any bigger risk of being heavily flooded and it can be controlled.

WHAT POLLUTE THE MOST

Sewage influences on the Thames cause a great deal of problems and it is still the highest contributor of pollution. The sewage systems in London have greatly improved over time however they have not been designed for a large city and can not cope with the heavy use today.

In the 17-18th century, the Thames became very polluted. Dirty water from factories and the newly invented water closets poured straight down drains into the river killing all the wildlife. Londoners still drank river water and thousands died of cholera. In the 1960's, a big clean up began - sewage treatment was improved and factories had to reduce their polluting discharges. However, pollution does still enter the Thames in London through the drainage system. Surface water from roads and get into the drainage system and is put straight into to the river. It does not get cleaned first. This means that any dirt or oil on the roads gets washed straight into the river system. In much of London, the drainage and sewerage systems are combined, it means that a lot of the dirty water that goes down drains is taken to the sewage works where

it is cleaned before being returned to the river. When rain is heavy, the system gets too full and raw sewage overflows through storm drains into the river. The reason that London's sewerage and drainage system is failing today is due to it was built in Victorian times to serve a much smaller population. Even the aspect that's more of the land is covered in concrete, more rain water gets channelled down the drains.

In 2023 the Thames Tideway Tunnel will be a complement and new system along the old Victorian sewerage system. A new sewer will run beneath the River Thames in London. It will collect nearly all of the 18 million tonnes of sewage that pollutes the tidal River Thames in a typical year which means it will ensure a healthy river environment.



THAMES BARRIER IN SOUTH-EAST LONDON

A BRIGHT FUTURE

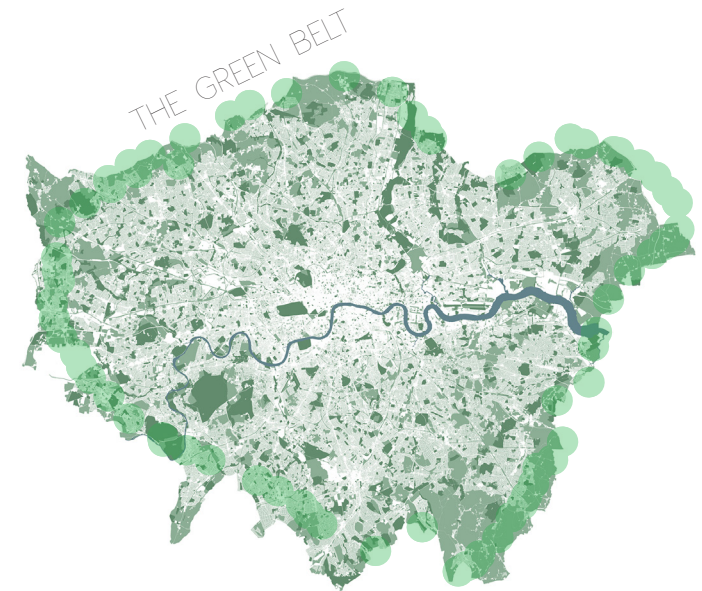
Even if it's still being polluted every day the river is already cleaner than it ever been in the industrialized London. It's seen a increase in the diversity of fish species. The Thames contains both sea water and fresh water and can attract both seawater and freshwater fish. Salmon, which inhabit both environments, have been reintroduced and a succession of fish ladders have been built. Today 125 species of fish swim beneath its surface while more than 400 species of invertebrates live in the mud, water and river banks. Ducks and other sea birds feed off from the water while seals, dolphins and even otters are regularly spotted between the river banks where it meanders through London. With a better system for sewage and actions for rainwater the river can be ecological in a whole new way. It's already changing to to better.

Believe it or not but London actually consist of around 45% what can be seen as green areas, such as parks, urban fringe and gardens. In a dense environment like London, with a shortage of land this network of green and open spaces has to be multi-functional and of good quality. That's not always the case with locked and private parks around the city.

A GREEN BELT

The green belt is a policy for controlling urban growth within the UK town planning. The idea is for a ring of countryside where urbanisation will be restricted, maintaining an area where agriculture, forestry and outdoor leisure can be expected to occur in the future. The fundamental aim of green belt policy is to prevent urban sprawl by keeping land open, and therefore the most important quality of green belts is their openness. The green belt around London was first proposed by the Greater London Regional Planning Committee in 1935. The Town and Country Planning Act 1947 then allowed local authorities to include green belt proposals in their development plans. So the green belt around London today (which a lot of people want to build on) makes up of 92% undeveloped land, but only 58% of the land is registered as being in agricultural use (compared with 70% of all land in England). There is however a high dominance of 'semi-urban' uses on the open land, such as kennel clubs, golf courses and pony paddocks. Almost 20% can be seen as forest.

Having the boundary of the green belt, which actually set the limit for London to not grow endlessly, is a good thing. However, that also set a higher pressure for what the inside must handle. More people need to fit in the same frame, density and land use therefore play a crucial role for the future. If London want to keep the green belt, as well as growing in population, a denser and multi-functional strategy need to be addressed.



FARMING IN LONDON

Each year Londoners eat 2.400.000 tonnes of food. Most of this is purchased from supermarkets - the four largest supermarkets account for almost 70% of all food purchased. In relation to this the city produces 883.000 tonnes of organic waste a year of which households contribute some 40% which could be composted, instead the majority go to landfills, creating polluting leachate and methane.

There is a remarkably large amount of land in and around London where food could be, or is being grown. Almost 10% of Greater London's area is farm land, mostly placed at the green belt. The proportion of land devoted to food growing has declined due to housing and other development pressures that are affecting farming as a whole. However, around half of London's households have gardens and the popularity of gardening is rising. There are also around 30.000 active allotment holders and an estimated and some 650,000 people go to London's city farms and community gardens each year.

THE CURRENT SITUATION

Commercial farm land

The 10 percent farm land in the Greater London area makes up to 13,566 hectares of which 500 hectares are under fruit and vegetable farming. Together they produce an estimated 8400 tonnes of fruit and vegetables, contribute £3 million to London's economy and provide around 3000 jobs. Overall, the area under

commercial cultivation is on a drop due to development and other pressures.

City Farms and Community Gardens

The City Farms movement started in the 1970's. There are now City Farms in most parts of the UK with 17 in London. There is usually some production going on with a mixture of individual allotment plots and communally kept beds. City Farms serve a mainly community and educational role, providing a day out for families and a range of educational activities for school groups. For many urban children, particularly those from the inner city, a visit to the City Farm can be the first time they come into contact with agricultural animals and food actually growing in the ground.

There are also 77 Community Gardens in London which is a gardening project set up for community benefit established with the local community. Community Gardens are located throughout the city, on housing estates, near railways, on temporarily available land and in community centres. In most instances community gardeners grow mainly flowers and ornamental plants although fruit trees, herbs and tomatoes are also common.

Private gardens

At least half of London's 3 million households have gardens. It has been estimated that put together, they comprise nearly 20% of the total area of Greater London around 30.455 hectares. It is impossible to say how much food is grown - 1950's research indicates that 14% of the garden area in London was allocated to

fruit and vegetable production but it is unlikely that the present day matches anything like this amount.

Allotments

There are roughly 30.000 or so active allotment holders gardening on 831 hectares of land, of which 111 hectares are in Inner London and 720 hectares in Outer London. In inner London only 4% of the total is vacant, and there are long waiting lists for plots - in the borough of Islington, for instance, there is a one year wait. In outer London, the figure stands at 18% perhaps reflecting the fact that many houses have large gardens. Traditionally, allotment gardening has been a hobby for lower income, elderly or retired men. In 1993 for instance, only 6% of plotters in the UK were under 35. This picture is still somewhat the case but is beginning to change as people from different ethnic backgrounds, younger people and families take an interest in allotment gardening. New entrants also tend to be younger and from higher occupational classes due to a more sustainable thinking in general.

Farmers' markets

Farmers' markets were originally developed in the 1970's in the US. The idea is simple; the products at the market must have come from within a certain radius of that market and the salesperson must be either the grower, or a relative or employee of the producer of the goods.

1997 saw the launch of the first UK farmers' market in Bath, two years later London got its first farmers' markets. A successful farmers' market is a good mix of

producers, organic and non organic, large and small, selling not only fruit and vegetables but other produce, such as cheese, mushrooms, wine and so on. Large suppliers who can ensure more regularity of supply in effect 'subsidise' smaller growers who may only be able to attend as and when they have enough to sell. This flexibility would be well suited to small scale urban food growers. In this way the consumer can rely on the market's continued existence, larger suppliers can improve their public profile, and smaller growers are given the opportunity to develop in a supportive environment.

Besides farmer's markets London have in most neighbourhood's street markets, borough markets or possibilities to sell products from stall near or at the local high-street.

HARVEST FEAST

It is not fully possible to see how much food London currently grow, but a rough estimate is that around 8400 tonnes of vegetables are produced commercially while London's allotments produce around 7460 tonnes. To these numbers an unquantified amount of growing food from back gardens. Although London currently makes only a small contribution to the UK's overall agricultural production. London is growing a varied variety of products from grapes, aubergines, potatoes, cauliflower and cabbage, the city also produces meat, milk, eggs and an approximate 27 tonnes of honey. Besides the framers' markets and borough markets around town there are no more well developed markets, or ways of selling the produced food items coming from the local urban agriculture in London. Allotment and community grown fruit and veggies is most likely eaten by the growers and their families or shared among friends.

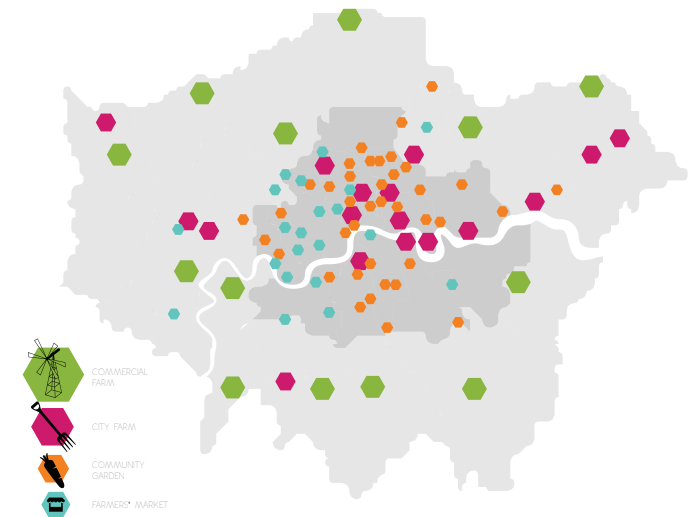
A GLIMPSE OF THE FUTURE

A new way of growing in London, only so far seen at a very few places in the city have been established the last years in the capital. It is aquaponics/hydroponics farms that make excellent use of limited space and is often suggested as the new urban agriculture (see next chapter for a deeper insight). To produce 1000 tonnes

of hydroponic tomatoes requires 14 to 21 times the amount of ecologically productive land than that required to produce 1000 tonnes of field tomatoes. In London this is still more of a pilot project but it may show a direction and interest along people for the future of growing simple and easy, even in the centre-of-the-city.



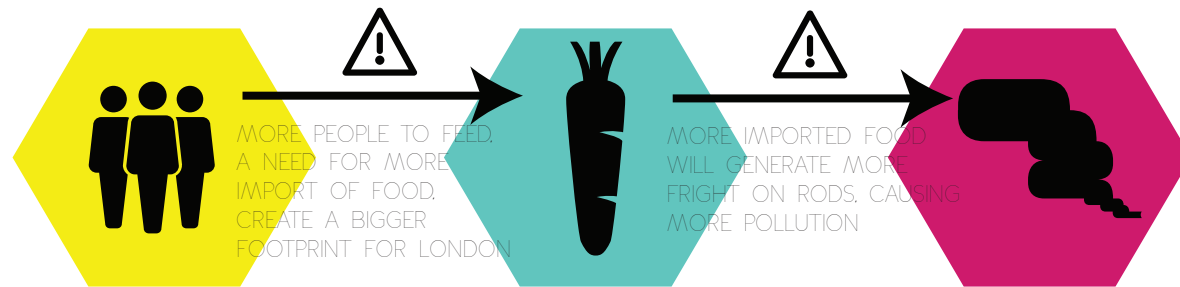
FARMERS' MARKET IN WEST HAMPSTEAD



CITY STRATEGY

CHAPTER THREE

THREE MAIN PROBLEMS IN LONDON



AN INCREASE NUMBER OF PEOPLE MOVING IN TO LONDON AND IT'S A LACK OF SPACE TO BUILD WITHIN LONDON

FOOD MILES AND FOOD HAVE TO TRAVEL LONG BEFORE IT REACH THE CONSUMERS IN LONDON AND PEOPLE GET DISTANCED FROM THE ORIGIN OF THEIR FOOD

HEAVY FRIGHT TRAFFIC ON THE ROADS TOGETHER WITH PRIVATE CARS CREATE POLLUTION IN INNER LONDON

HOW TO DEAL WITH IT



UPDATE BROWNFIELD AREAS WITH NEW NEIGHBOURHOODS WITH A HIGHER DENSITY LEVEL THAN LONDON HAVE TODAY. MORE PEOPLE ON THE SAME SPACE

START PRODUCE FOOD IN THE CITIES TO CUT FOOD MILES. CONTRIBUTE TO WHAT BEING CONSUMED ON PLACE AND RAISE KNOWLEDGE ABOUT GROWING CROPS AND FRUITS

CREATE OTHER ALTERNATIVES FOR MOVING GOODS. CUT THE LONG DISTANCES BEFORE IT REACH THE TARGET AND CONSUMER. ALSO CREATE AND ENCOURAGE PEOPLE TO COMMUTE AND GET TO DESTINATIONS IN OTHER WAYS THAN CAR

BEFORE WE GO FURTHER TO SORT OUT OF HOW LONDON CAN POSSIBLE DEAL WITH A STRATEGY ON THE ONGOING PROBLEMS, A LOOK AT HOW FOOD CAN BE GROWN IN THE CITY WILL HELP US UNDERSTAND HOW THE STRATEGY CAN BE SET UP.

GROWING IN THE CITY

So how can London get the tools to start growing and produce more food in the city. What is needed and what options are there to grow food in cities, both for personal use as well as more industrial and big scale?

Urban development unsurprisingly causes pressures on the availability and cost of land. Large growing cities should obviously plan for housing but not forget of the places that still need to be created, like house roofs, parkland and courtyards. These opportunities can be maximized and used in more ways than just house people and add as space between buildings for the sun to shine through. The time is over when rooftops in fast growing cities just can stay as a top of a building, courtyards that become a place for cars and weak parks. Productive rooftops and courtyards together with allotments all contribute to the health of the population. They serve in two ways; being able to produce fresh locally produced vegetables as well provide a place for people to meet, interact and share knowledge. The social benefits of community gardening have been studied through several studies and improved mental health, better overall nutrition, a sense of community cohesion and an increased physical health are all wind for a neighbourhood and a city as a whole.

COMPONENTS

There are many ways of how to grow crops and fruits but what they often all have in common is that the components needed are more or less the same. However,

there is more efficient ways of growing and making the most out of the given space as well as to coordinate it with other systems we have around us, such as water handling and waste.

...TO GROW

Planters

Planters are beds/containers with a bottom that are great for growing plots of crops and fruits. It can be made in laid out in a good structure, include drainage and serve as a barrier to pests. The bed keeps the garden soil on place from being eroded during heavy rains.

Rigid containers

Rigid containers are a more advanced version of the planters and can be self-watering and use less water, as much as half the water need, than traditional farming, the tap roots of the crops being planted in the containers can go all the way down to filled water reserve as at the same time a drip feeder system soak the soil. These are preferably being placed in greenhouses for easy maintenance.



Growwalls

Growing walls are being created with pockets for plants to grow in and can be very effective when the water given to the plants can travel through the different layers of plants, with irrigation and drainage in each pocket. The growwalls can maximise the potential of walls and flat surfaces.

Greenhouses

Greenhouses extend the growing season and protect sensitive plants for heavy weather. It make it possible to especially grow fruit in a more effective way. If the green houses should mainly be used during the winter months an east-west orientation is optional to maximize the sun radiation.

Rooftops can also be productive with Beehives

Beehives need to be insulated to keep 35 degree Celsius for the bees to thrive in both summer and winters, the beehives should be located so it's not make any risk for humans, so office rooftops or a more separated section is optional.

And parkland can have...

Coop for hens to produce free range eggs. The hens can be an attraction itself for people to stop by and watch. The coops can be made portable in lightweight material or in very flexible and easy to build structures.

...TO WATERING

Watercollectors

Rainwater can be collected straight from the roofs in water collectors, a water tank can later hold the water for more dry seasons.

Swales collect stormwater and runoff water from the ground, after it goes through filtration, in a natural cleaning process with plants and different layers of sand, the water can be collected and used for watering plants.

Greywater

Used water from homes (from laundry, showers and taps etc) can be separated and go through settler and dewatering systems without being mixed with blackwater. The process to clean the water take less time and can go back to irrigation water for plants

...TAKE CARE OF WASTE

Organic waste should always been taken care of and not mixed with other waste. Composting create a nutrition soil, and can either be made indoors, outdoors or in a effective way in a heated chamber either in the building or at a recycling centre.

Blackwater

Blackwater from homes (toilets) can go through a digester and create biogas, leaving sludge that goes through dewatering and then comes out as black earth and dry matter that can be used for growing.

Crops and fruits can also be grown very efficient on a bigger scale and is not only anything that requires large farmland, water and heave machines. We see today a revolution and blooming of farms in the cities that produce where people live and the need for food is the biggest.

WHAT IS AQUAPONICS?

Aquaponics is an ancient method of growing food without using soil. And is praised to be the farming of the future. Instead plants grow in water. The system is a hybrid between aquaculture, raising aquatic animals, mostly fishes, in tanks together with hydroponics, that simply is to let the plant roots in water rather than soil.

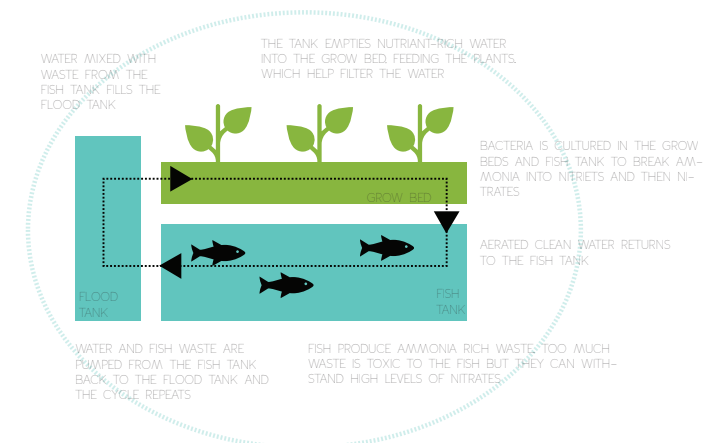
The plants grown in the hydroponic system feed the fishes and in return these help the plants to grow in the hydro-culture system.

The waste produced by fishes and left-over fish food stores in the tank. This accretion eventually makes the water too toxic for the fishes to survive, so therefore the water is circulated into the hydroponics system where the roots of the plants use these waste materials, like ammonia as nutrients. The roots of the plants absorb these pollutants and clean the water. This water is then sent back to the aquatic animals in the aquaculture system. The aquatic animals are the system generator.

Plants grown in an aquaponics system obtain their

nutrients from fishes, and don't need fertilizer as typical hydroponics system use.

The aquaponics systems can be set up everywhere and a common placement is in larger existing building in urban contexts. and is extremely effective when it uses 90 percent less water than traditional farming, in aquaponics systems the water is circulating in its ecosystem. Vegetables usually grow significantly faster and at three to four times the density than traditional farming.



HOW THE SYSTEM WORKS

For faster grow, artificial lightning is highly recommended. Aquaponics energy usage is from 70% to 92% less than a conventional or organic farm which use fuel or petrochemical-intensive fertilizers. Energy used in the aquaponics farm is electrical, energy systems can therefore be green and which can be produced locally.

TAKE A LOOK AT A FARM

FarmedHere, an aquaponics farm started 2010, converted a 25000 square meters, two-story, windowless formerly abandoned warehouse in the outskirts of Chicago into a food factory.

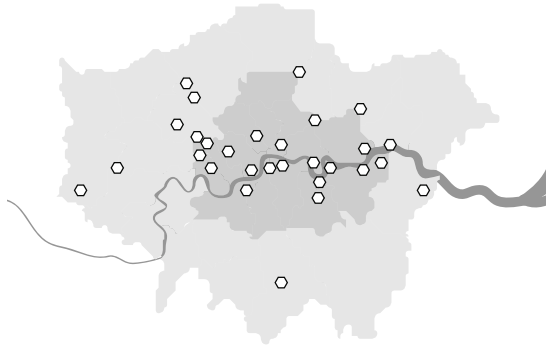
A variation of plants grow on racks stacked on top of each other in a vertical farming system together with an aquaponics system.

The company says that they grow up to 15 times as many crop cycles a year compared to traditional farming and deliver its harvest for more than 80 shops in Chicago.

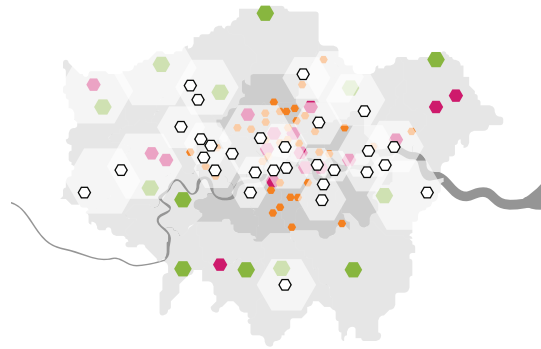
The total growing time is about 30 days, which is half the time of traditional farms. The growing technology and local distribution methods reduce energy and food miles. And support the city with locally produced crops in every season.



DEAL WITH THE PROBLEMS



1. DEVELOP THE PREVIOUS BROWNFIELD AREAS, MARKED OUT AS OPPORTUNITY AREAS INTO NEW DENSE NEIGHBOURHOODS. THE DEVELOPED OPPORTUNITY AREA WILL BECOME A HUB FOR LOCALLY PRODUCED FOOD AS IT WILL BE BUILT WITH FARMING POSSIBILITIES ON ROOFTOPS, AND COURTYARDS AND BE ABLE TO GROW A STRONG COMMUNITY. ADDED AQUAPONICS FARM CAN ADD AN EFFICIENT PRODUCTION OF CROPS AND FRUITS TO LONDON'S GROWING POPULATION.



2. INCORPORATE THE ALREADY EXISTING FARMING FACILITIES THERE IS IN THE CITY AND TRY TO SEE IF IT CAN COMPLEMENT OR BE PART OF WHATS BEING DONE IN THE NEW OPPORTUNITY AREAS. THE EXISTING FARMS WILL BENEFIT FROM A FOOD HUB IN THE AREAS AS IT CAN PROVIDE A FARMERS' MARKET AND KNOWLEDGE FROM THE GROWING INHABITANTS.



3. MOST OF THE OPPORTUNITIES AREAS ARE IN INNER LONDON. DEVELOP THE ALREADY EXISTING CYCLE SUPERHIGHWAYS TO RELEASE POSSIBLE PRESSURE OF THE PUBLIC TRANSPORT AS WELL GIVING MORE SUSTAINABLE ALTERNATIVES FOR GETTING AROUND IN THE CITY. A COMMUTE CAN BE MADE BY BIKE IF IT'S JUST AN OPTION FOR IT. THE CYCLE NETWORK WILL CONNECT CENTRAL LONDON TO THE NEW DENSE AREAS CREATING GOOD OPTIONS OF LIVING/WORKING IN INNER LONDON AND TAKE THE BIKE TO THE CITY. THIS OPTION IS NEEDED TO NOT OVERDUE THE PUBLIC TRANSPORT NETWORK WHEN MORE PEOPLE WILL BE LIVING ON THE SAME SPACE.



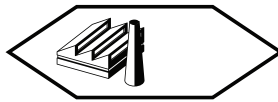
4. AS GOOD AS ALL OPPORTUNITY AREAS SIT IN DIRECT OR CLOSE CONTACT TO THE RAIL NETWORK OR A WHARF THIS BECAUSE MOST OPPORTUNITY AREAS ARE BROWNFIELD AREAS THAT PREVIOUSLY HAD INDUSTRY. THE NEW PRODUCTIVE NEIGHBOURHOODS CAN BE CENTRALLY LOCATED HUBS FOR FOOD PRODUCTION. THESE SITES SHOULD PRODUCE MORE FOOD THAN JUST FOR THE LOCAL AREA SO THE PRODUCTS CAN BE EXPORTED BY RAIL OR SHIPPING. WITHIN LONDON



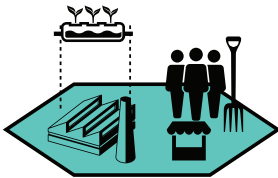
5. LONDON'S BUILT UP-PATTERN WITH SUB-CENTRES AND SEVERAL MAJOR CENTRES AROUND THE CITY SHOULD WORK MORE AS LOCAL DISTRIBUTION CENTRES THAN IT DOES TODAY. IN THIS WAY IT LET THE FREIGHT GO AS CLOSE AS POSSIBLE TO IT'S FINAL DESTINATION WITH GREEN TRANSPORTATION MODES (RAIL OR BY BOAT). THE ALREADY EXISTING FARMERS' MARKETS AROUND TOWN CAN BE COMPLEMENTED WITH TRULY NEARBY PRODUCED FOOD FROM THE OPPORTUNITY AREAS, WHICH AT MANY LOCATIONS ARE IN THE SAME AREA. THE LACK OF FARMERS' MARKETS AND POSSIBILITIES OF BUYING LOCAL FOOD IN THE NORTH-SOUTH LONDON WILL BE GIVEN THE OPTION WITH OPPORTUNITY AREAS.

THE FOOD BEING PRODUCED IN LONDON SHOULD BE EATEN BY LONDONERS. TRANSPORTED SHORT DISTANCES AND IN A SUSTAINABLE WAY. THE ALREADY EXISTING FARMERS' MARKETS CAN GROW TO BIGGER NODES WITH A HIGHER RELIABILITY AND TOGETHER WITH THE PRODUCTIVE OPPORTUNITY AREAS IT CAN SELL LOCALLY PRODUCED FOOD STRAIGHT TO THE CONSUMER THANKS TO THE NEW FOOD HUBS AROUND LONDON.

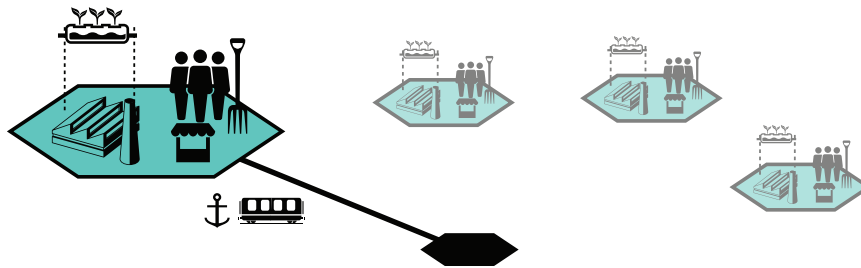
DEVELOP BROWNFIELD AREAS MARKED OUT AS OPPORTUNITY AREAS



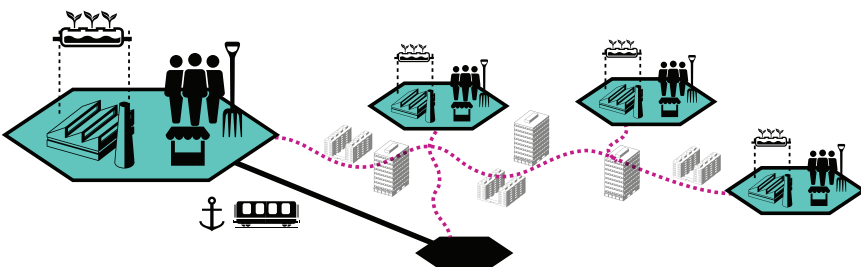
AQUAPONICS FARMS CAN BE LOCATED IN EXISTING BUILDINGS ON THE SITE. TOGETHER WITH A NEW PRODUCTIVE NEIGHBOURHOOD AND A FARMERS' MARKET FOR SELLING LOCALLY PRODUCED FOOD



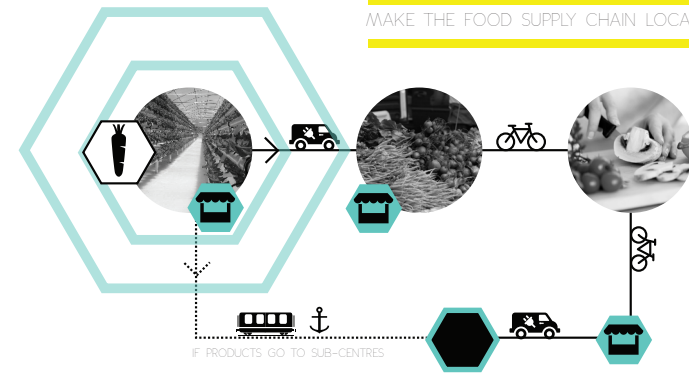
THE DEVELOPED BROWNFIELD AREAS BECOME A NETWORK OF PRODUCTIVE HUBS AROUND THE CITY FROM WHERE FOOD CAN BE SENT TO SUB-CENTRES FOR FURTHER DISTRIBUTION WITH ENVIRONMENTAL FRIENDLY FREIGHT TRANSPORT



THE PRODUCTIVE HUBS WILL BE CONNECTED AND INTEGRATED WITH A FURTHER EXTENDED AND DEVELOPED CYCLE NETWORK AND PUBLIC TRANSPORT



MAKE THE FOOD SUPPLY CHAIN LOCAL



PRODUCTIVE NEIGHBOURHOODS ON PREVIOUS BROWNFIELD AREAS



MARKET PLACE OR GROCERY STORE THAT SELL LONDON PRODUCED GROCERIES

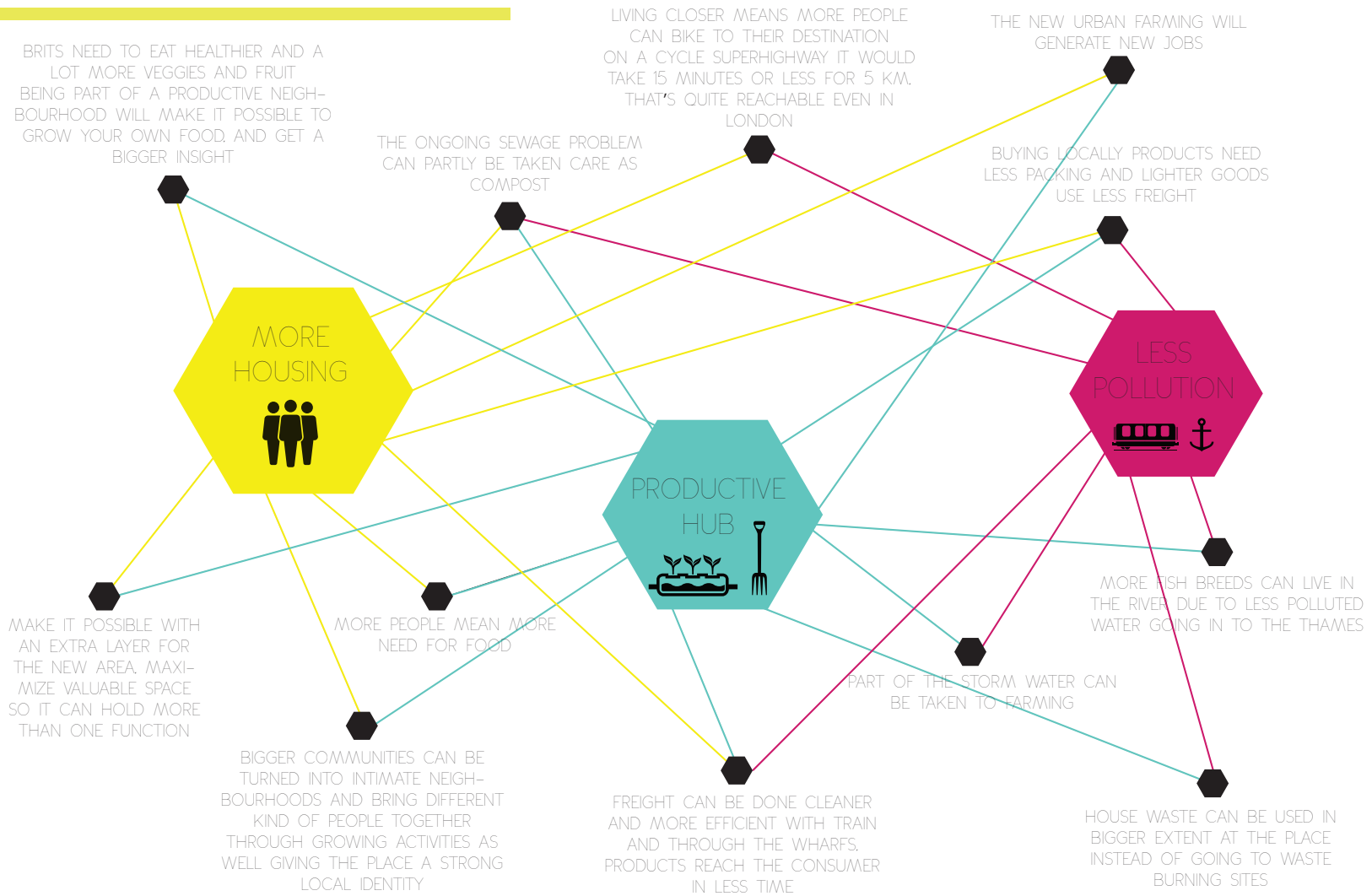


FOR LONGER TRANSPORT WITHIN THE CITY FREIGHT WILL GO ON THE TRAIN NETWORK OR THROUGH A WHARF THE SUB-CENTRES WILL DISTRIBUTE GOODS AND TAKE IT TO NEARBY MARKETS IN ELECTRICAL SMALLER VEHICLES



THE LAST TRIP HOME TO THE CONSUMER CAN BE MADE BY BIKE THROUGH A DEVELOPED BIKE NETWORK

WHAT GOES WITH THE CHANGE

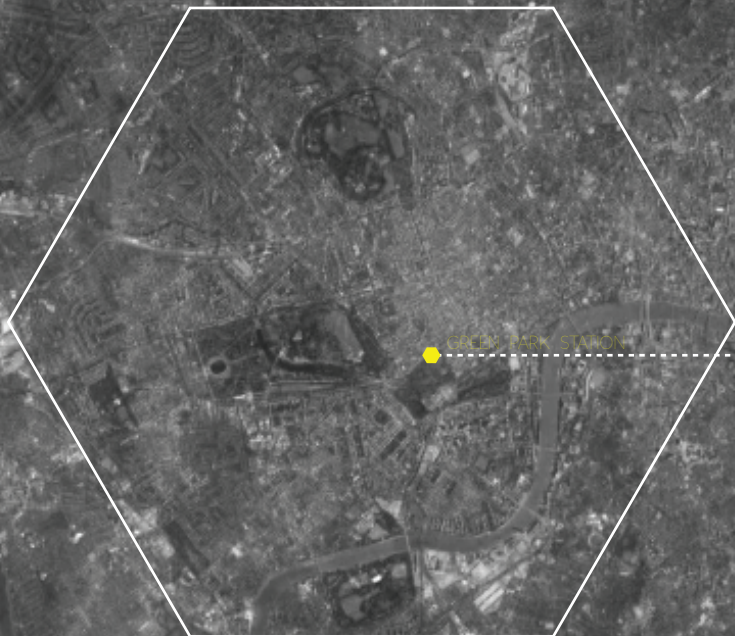


THE SITE

CHAPTER FOUR



CENTRAL
LONDON



GREEN PARK STATION

10 KM

14 MINS ON
THE TUBE



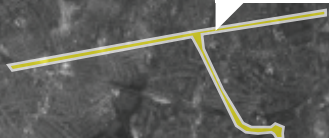
THE
SITE



150
HECTARES

THE SITE GREENWICH
PENINSULA

OXFORD AND
REGENT STREET



REGENTS PARK AND
LONDON ZOO

BOÖI
MALMO



OLD TOWN OF
STOCKHOLM



MALMO CITY CENTRE
WITH CASTLE



BILLINGSGATE FISH MARKET 

LONDON CITY AIRPORT 

FINANCIAL DISTRICT CANARY WHARF 

BLACKWALL ROAD TUNNEL 

THAMES BARRIER 

CHARLTON RETAIL PARK AND SMALL SCALE INDUSTRIES 

MUDCHUTE PARK AND FARM 







GREENWICH FOOT TUNNEL 

WOOLWICH TOWN CENTRE 

MARYON PARK 

GREENWICH VILLAGE AND PARK 

WOOLWICH SPORT FIELDS 

-  RAIL NETWORK
-  UNDERGROUND, JUBILEE LINE
-  ELEVATED LIGHT RAIL DLR
-  CYCLE SUPERHIGHWAY
 DOTTED LINE IS PLANNED
-  MOTORWAY

MEET GREENWICH PENINSULA

Greenwich Peninsula is a 150 hectares large area in south east London, with a linear distance of just 10 km from to the central parts of London. It is today a brownfield area in transformation and marked as an opportunity area for the city of London. Since the millennium the area seen some drastic changes making it more open to the public but is still an unorganized and scattered part of the city which is still having large spaces of wasteland, parking spaces, heavy roads and a very divided character when it comes to functions.

A HISTORICAL LOOK BACK

The Greenwich peninsula was drained in the 16th century, allowing it to first be used as pasture land. In the 17th century.

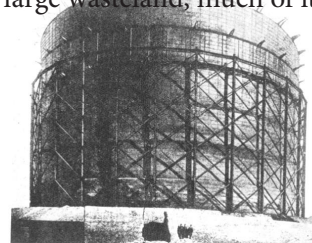
The peninsula was gradually industrialised from the early 19th century onwards, some of the first industries included making guns, chemicals, submarine cables, iron and steel. In the early 1860s a steel work supplied the ongoing shipbuilding industry. In 1886 The East Greenwich Gas Works opened up and left an eye-catching gas holder, the most modern one in London. There were two gas holders to start with but the larger holder was damaged in an explosion in 1917. For over 100 years the peninsula was dominated by the gasworks which primarily produced coal gas. The industry covered most of the peninsula and the site had its own railway system, connected to the main railway line near Charlton, and a large jetty used to

unload coal. The plant later began to manufacture gas from oil in the 1960s but the industry later declined when natural gas reserves was found in the north sea.

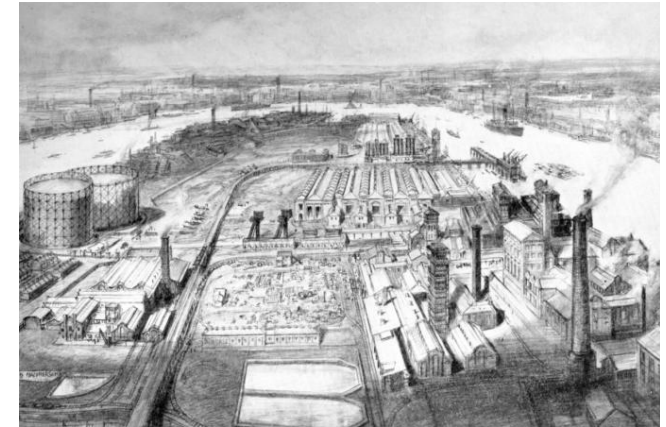
At the south-east end of the peninsula Enderby's Wharf was occupied by submarine cable companies from 1857 onwards. On the west side Morden wharf was constructed in line with a glucose refinery. The modern wharf has undergone many changes after that and in 1995 the factory closed down. Most buildings have been demolished during the time and left today is some brick warehouses dating back from the 1950's and some additional older office buildings. Today the Brenntag group is using the buildings as a distribution centre for industrial chemicals.

The peninsula stayed fairly remote from central London until the opening of the Blackwall Tunnel in 1897. By the 1930s, capacity was reached, and consequently a second bore opened in 1967, handling southbound traffic while the earlier 19th century tunnel handled northbound.

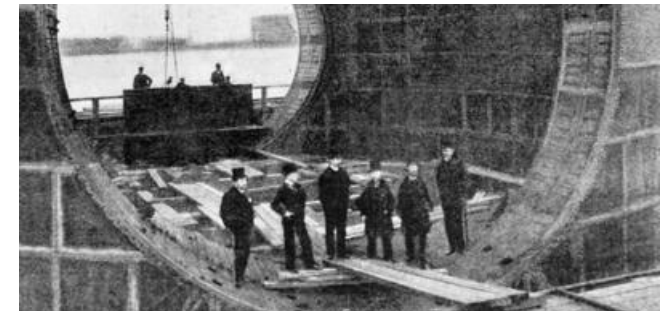
Closure of the gasworks, power station and other industries in the late 20th century left much of the Greenwich Peninsula a large wasteland, much of it heavily contaminated.



THE GAS HOLDER IN USE



GASWORKS OCCUPYING THE PENINSULA



CONSTRUCTION OF THE BLACKWALL TUNNEL



MORDEN WHARF IN USE IN THE 60S

THE NEW PENINSULA

In 1997 the national regeneration agency purchased 1.21 square kilometres of disused land on the Peninsula and developed Greenwich Millennium Village, a residential development, with a primary school, a medical centre, a nature reserve with an education centre. A hotel was also built nearby, and the Greenwich Yacht Club was relocated to a new site south-east of the Dome. Next to the bypass is a larger retail park with a cinema, supermarkets and hardware stores. Next next to the Enderby's wharf a waste management company housing. It recycles material from the construction industry as well with waste from local communities and recycle glass, wood, soils, brick and concrete, metals and paper/card.

The indoor arena Millennium Dome with a capacity for 10.000 opened 1997 together with a pier on the east side next to the arena with commuter boat service

to other parts of London. It's large parking spaces, almost 8.5 hectares of parking right next to the arena. Two years later the North Greenwich tube station on the Jubilee line. Ravensbourne College, a design school, relocated to Greenwich Peninsula in September 2010 and a few more office buildings was constructed at the same time.

One of the latest contributions to the site is a cable car over the River Thames, that got constructed before the 2012 Summer Olympics began. This runs from a riverside station south-east of the O2 over the river. A new park, named Central Park, that leads down to the Millennium Village was also constructed the same year. As late as last year a new hotel complex got built next to the arena as well as further more housing next to the Central Park.

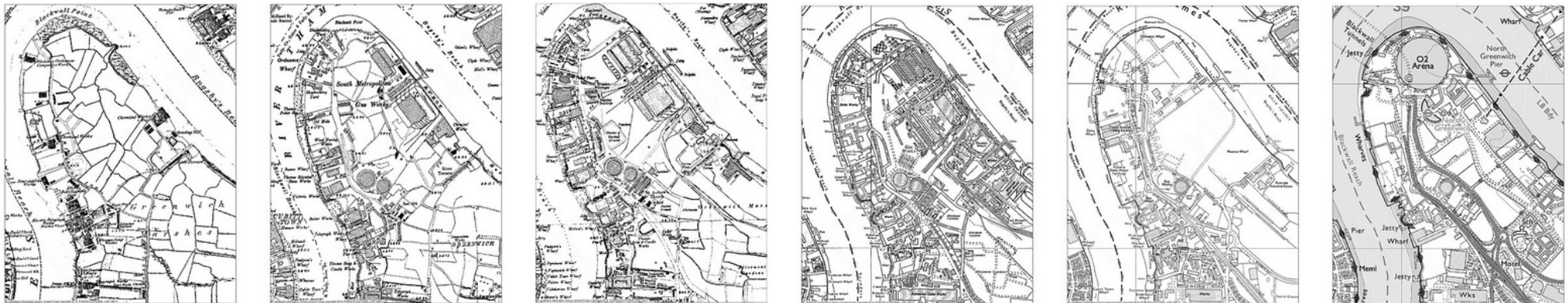
Further down south-west of the newly opened hotel complex the peninsula is today completely fenced off and part of concrete supplier that mix ready-to use

concrete.

Next to the Brenntag warehouses in the nearby Morden wharf smaller industries like car repair shops and various warehouses are located.

On the west side Morden wharf was constructed in line with a glucose refinery. The site has undergone many changes after that and in 1995 the factory closed down. Most buildings have been demolished during the time and left today is some brick warehouses dating back from the 1950's and some additional older office buildings. Today the Brenntag group is using the buildings as a distribution centre for industrial chemicals.

North-west of the peninsula is today part of concrete supplier, that mix ready-to use concrete. Further down smaller industries, car repair shops and warehouses are located.

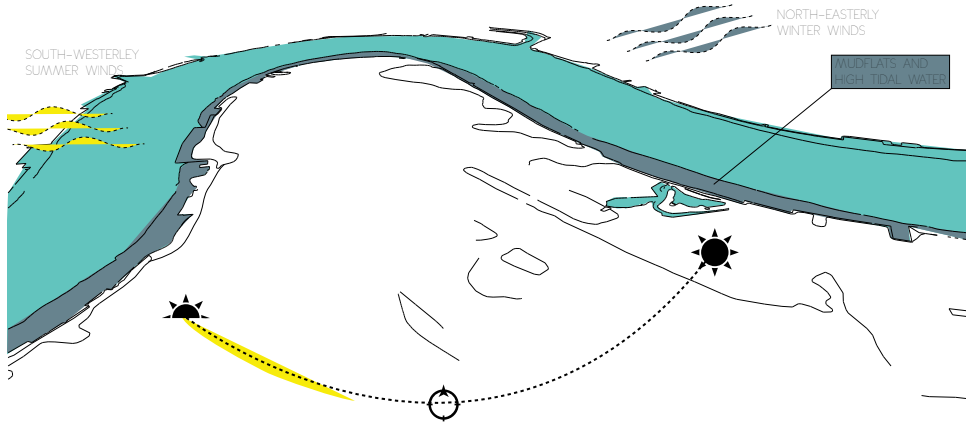


FROM PASTURE LAND TO ARENA COMPLEX. STAGES OF DEVELOPMENT AT THE PENINSULA

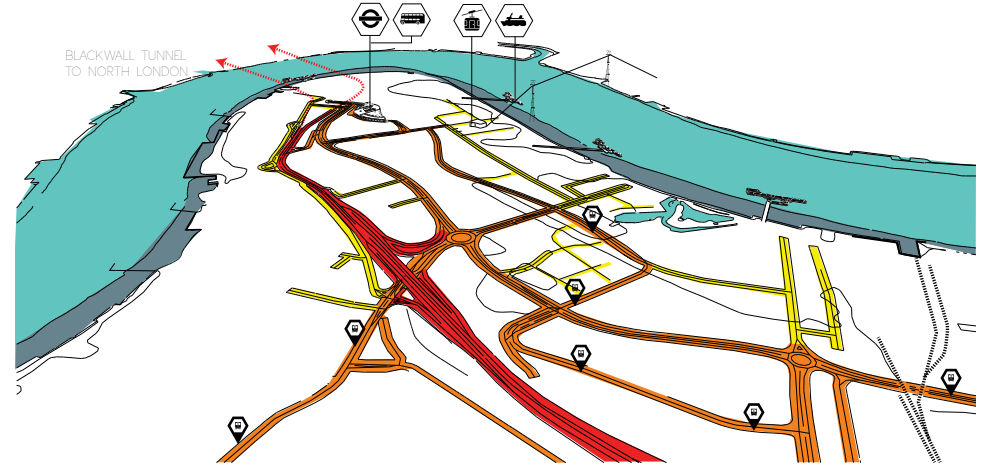
THE PENINSULA HAVE BEEN DIVIDED INTO FOUR AREAS TO SHOW THE DIFFERENT ASPECTS OF THE SITE.
 YELLOW, PUBLIC ENTERTAINMENT,
 RED, MORDEN WHARF AND INDUSTRIES
 GREEN, HOUSING AND NEW CONSTRUCTION
 BLUE DIFFUSE LAND-USE AND WASTE CENTRE





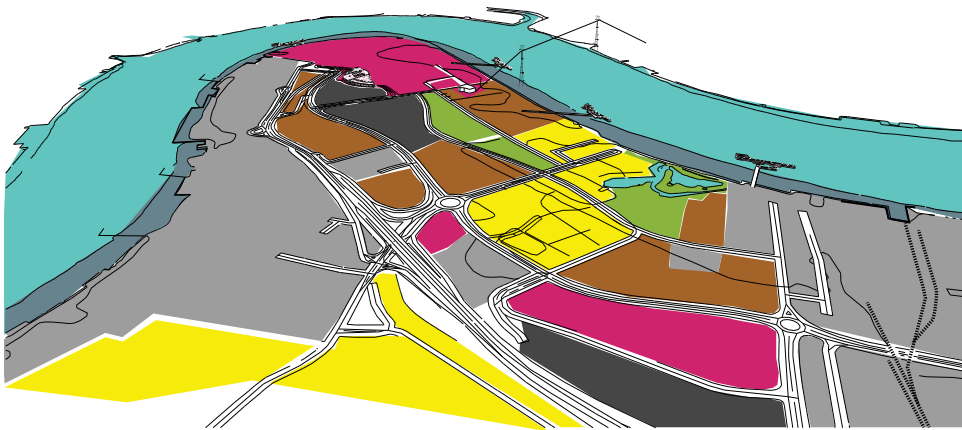


BASIC SITE CONDITIONS









TRAFFIC FLOWS

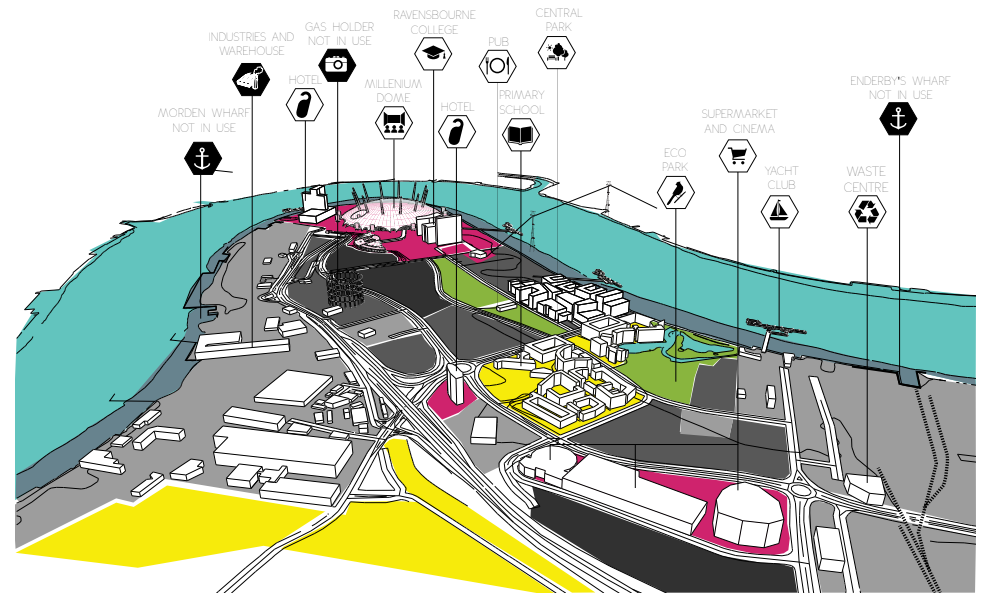
RED [BUSY] EXPRESSWAY
 ORANGE [USED FREQUENTLY] - MAIN STREET
 YELLOW [MODERATE] - LOCAL STREET





MORE THAN 60 PERCENT OF THE SITE

- 
 PARKING SPACE
- 
 BROWNFIELD- OR
 ABANDONED LAND
- 
 SMALLER INDUSTRI
 OR WAREHOUSE
- 
 HOUSING
- 
 PARK
- 
 LEISURE AND
 SHOPPING

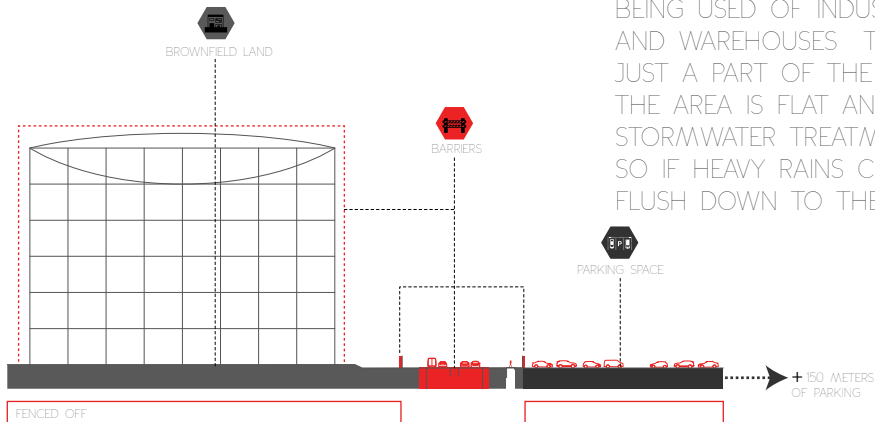
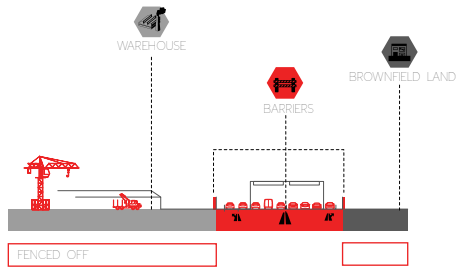
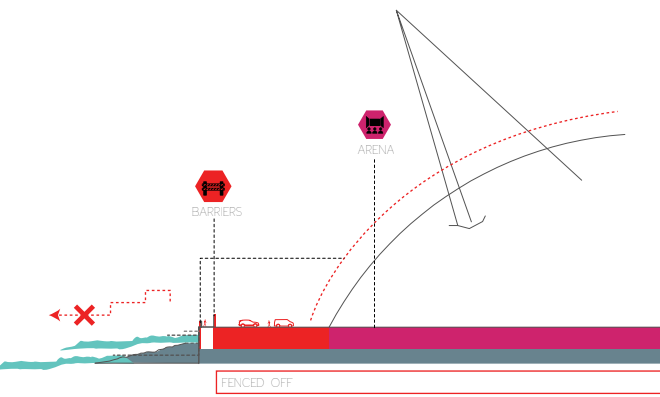
LAND USE



FUNCTIONS ON THE SITE

- 
 POINT OF
 INTEREST
- 
 NODE OR
 MEETING PLACE

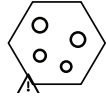
MAIN OBSTACLES ON THE SITE TO OVERCOME



50 METERS



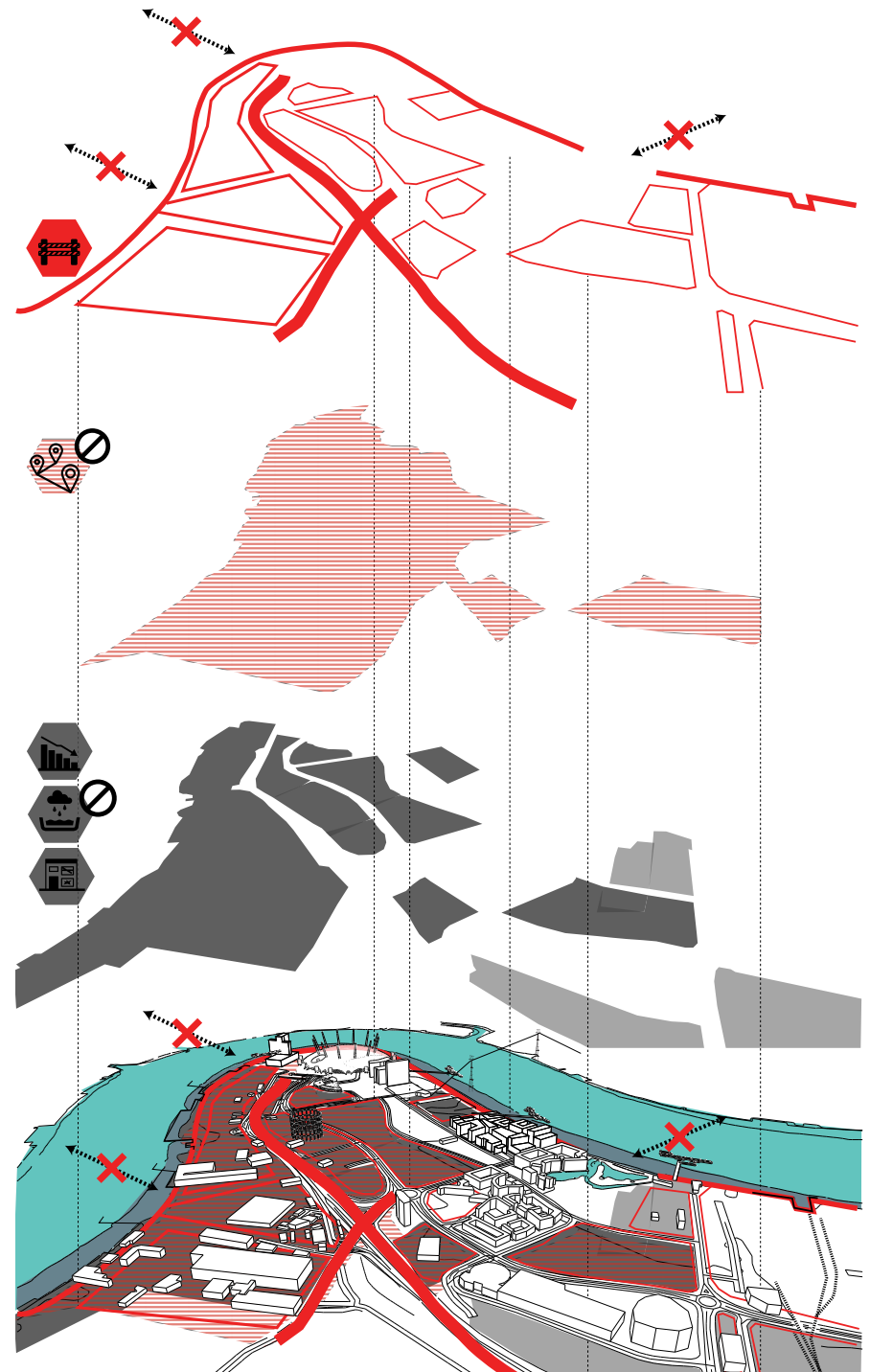
BARRIERS FROM ROADS, FENCED OFF AND LOCKED SITES MAKES IT HARD TO REACH THE WATER. THE PENINSULA LACK CONNECTIONS OVER THE RIVER TO SURROUNDING LAND



THE MAPPED AREA SHOW PLACES THAT MORE OR LESS COMPLETELY LACK NODES, MEETING PLACES OR EVEN POSSIBILITIES TO REACH AND IS HIGHLY SEPARATED TO THE NEW CONSTRUCTION ON THE EAST SIDE



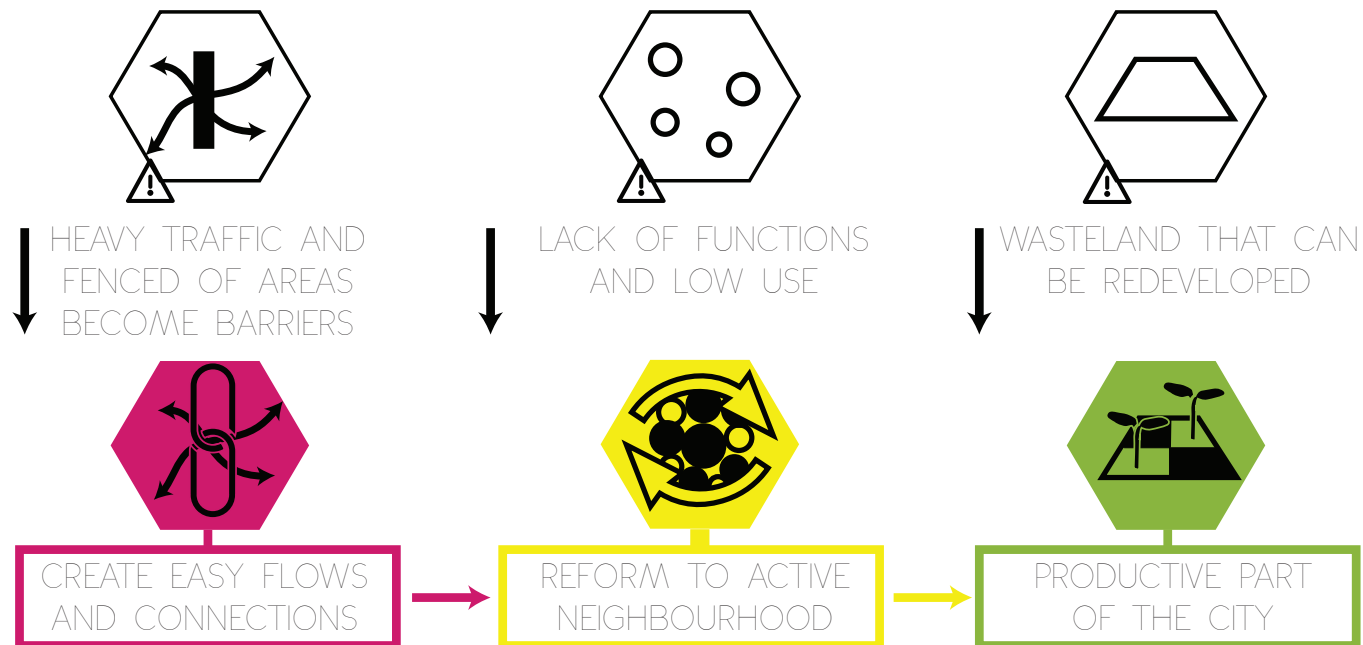
A LOT OF LAND IS STILL BROWNFIELD AND ARE EITHER BEING PLOTS THAT WAITING FOR RE-DEVELOPMENT OR BEING USED OF INDUSTRIES AND WAREHOUSES THAT USES JUST A PART OF THE PLOT. THE AREA IS FLAT AND LACK STORMWATER TREATMENT SO IF HEAVY RAINS COME IT FLUSH DOWN TO THE RIVER



PROPOSAL

CHAPTER FIVE

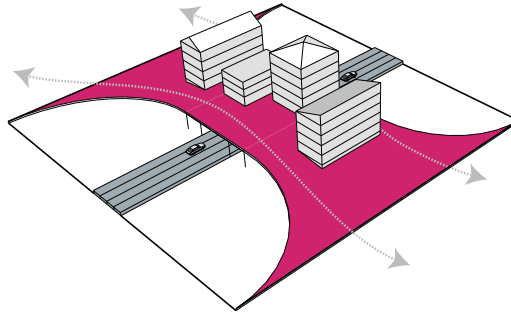
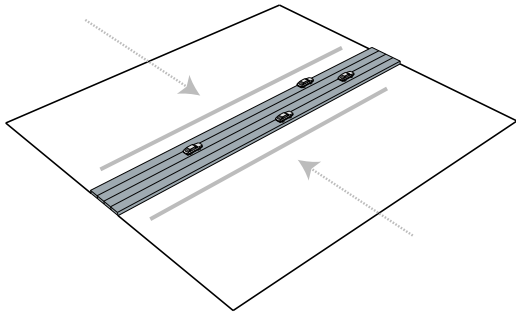
START WITH THE OBSTACLES



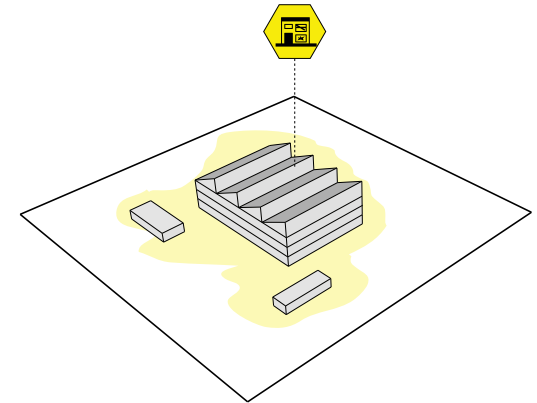
HOW?

TOOLBOX

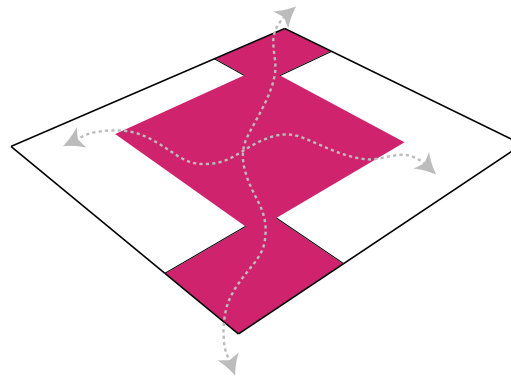
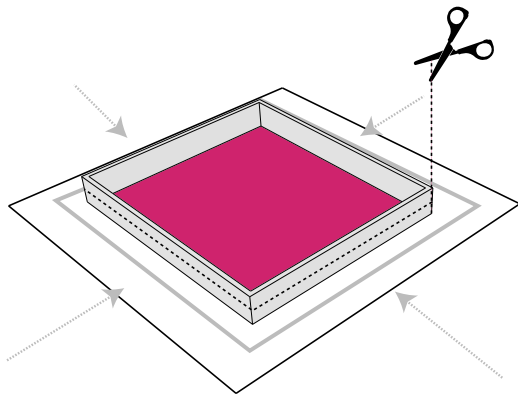
CONNECT
AND
OVERDECK



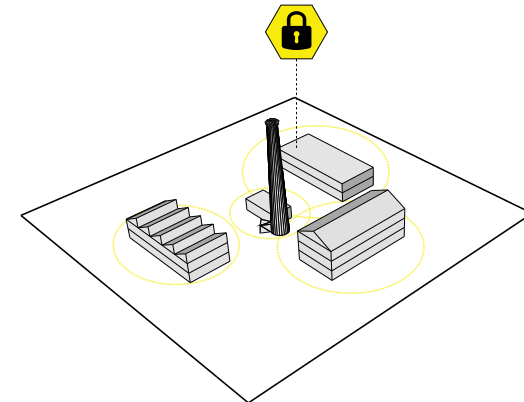
REFORM
AND
UPDATE



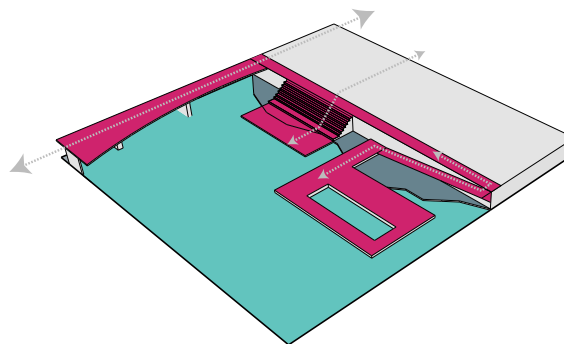
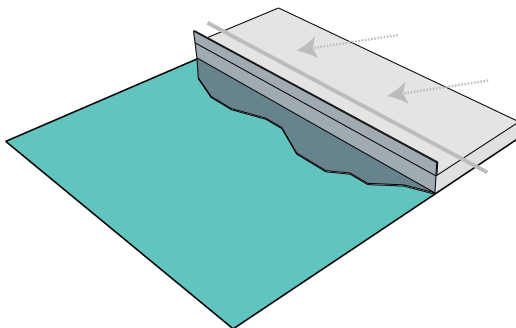
CONNECT
AND
OPEN UP



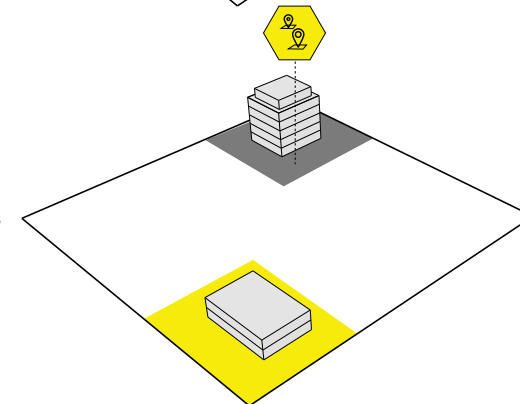
REFORM
AND
DENSIFY

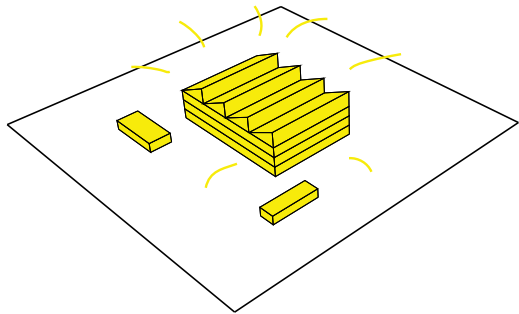


CONNECT
AND
GET CLOSE

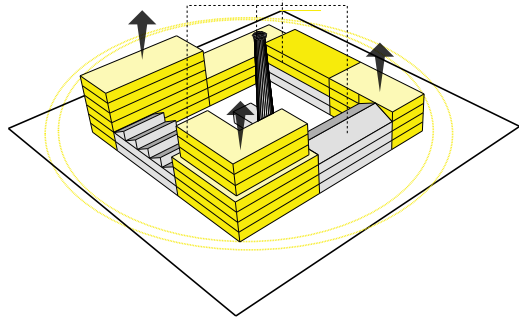
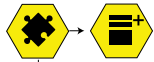
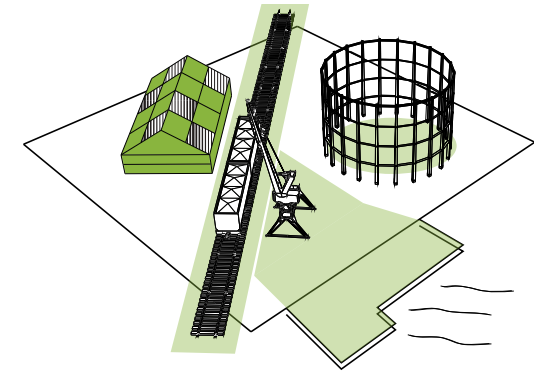
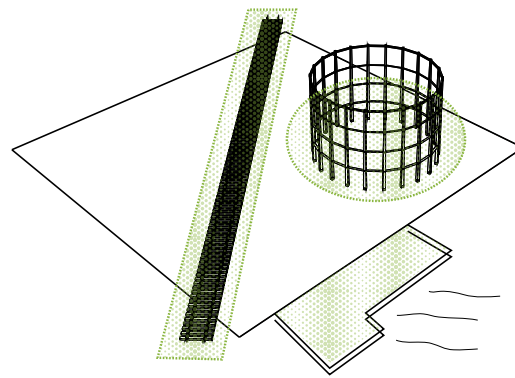


REFORM
AND
MIX IN
NEW
FUNCTIONS

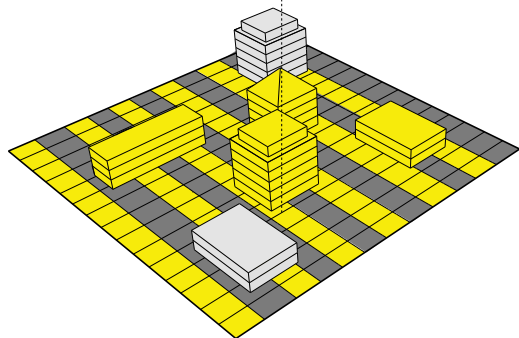
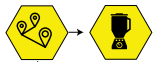
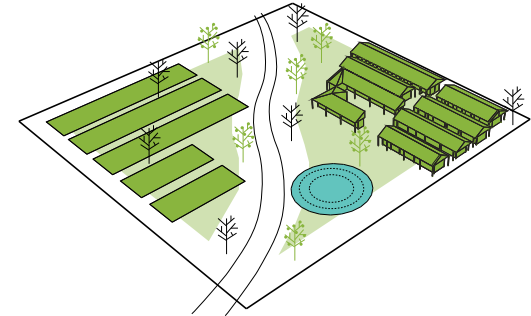
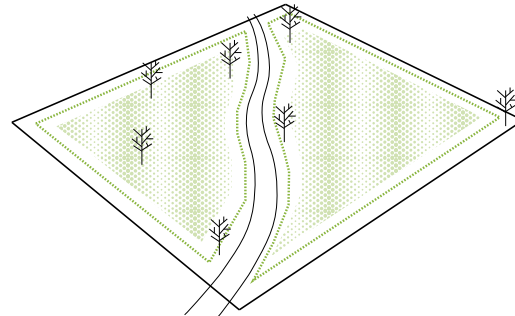




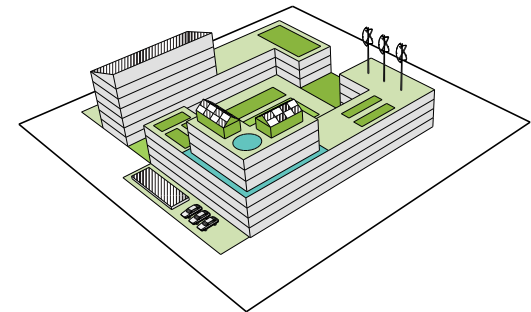
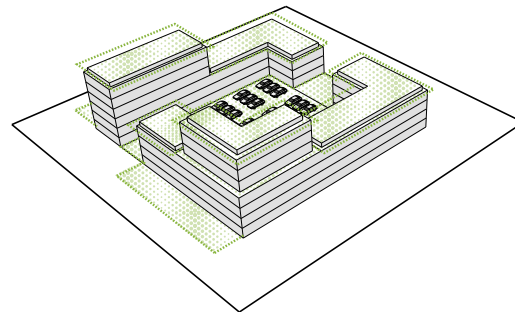
PRODUCE
AND
ADD FOOD
BUSINESS



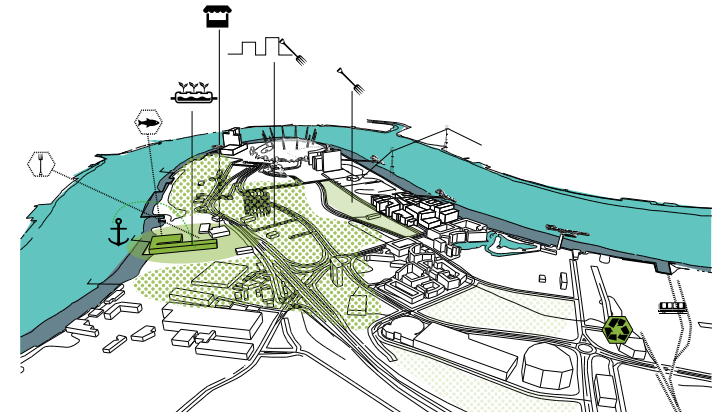
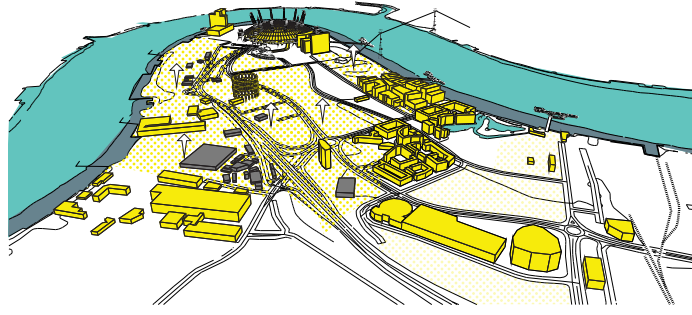
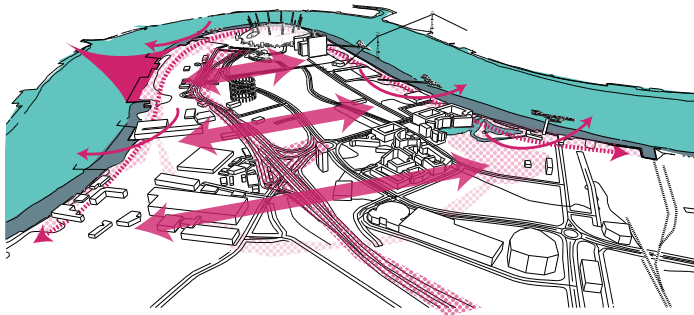
PRODUCE
AND
USE PARKS



PRODUCE
AND
STRONG
NEIGHBOUR-
HOOD



STRATEGY



CONNECT



DECK THE BUSY MOTORWAY
THE CARBON DIOXIDE FROM
AFFIC TO BOOST GROWING

- CONNECT THE ECO PARK
WITH NEW PARKLAND

- OPEN UP FENCED
OFF AREAS

- CREATE CONNECTIONS TO AND FROM
THE PENINSULA TO SURROUNDING LAND

- CREATE BOARDWALK WITH
ACTIVITIES TO GET CLOSE TO
THE RIVER

REFORM



- REPLACE BUILDINGS IN BAD
CONDITION WITH NEW HOUSING

- TRANSFORM INDUSTRIAL BUILDINGS
TO FARMING ORIENTED BUILDINGS
SUCH AS AQUAPONICS FARM IN
MORDEN WHARF

- INTERGRATE EXISTING STRUCTURES WITH
NEW ADDED BUILDINGS

- BREAK THE SEPARATED LAND USES
AND SPREAD OUT THE PUBLIC LIFE

- TRANSFORM BROWNFIELD LAND
INTO NEW VALUBLE SPACE

PRODUCE



- CREATE A SUSTAINABLE NEIGHBOURHOOD
IN LONDON. DESTINATION
FOR URBAN FARMING AND AQUAPONICS

- CREATE FARMERS MARKET AND A
MEETING PLACE WHERE LOCALLY
PRODUCED FOOD CAN BE SOLD

- A SMARTER WAY OF USING THE LAND
WHEN THE SITE CAN BE SEEN AS
PART OF A LOCAL CYCLE

- INTERGRATE MUDCHUTE FARM
(CREATE A PLACE TO SELL) AND
FISH MARKET IN NEW PRODUCTION

- CHANGE CHARACTER OF NEARBY
WASTE CENTRE TO SUPPORT NEW
NEIGHBOURHOOD

THE STRATEGY
WILL BECOME...

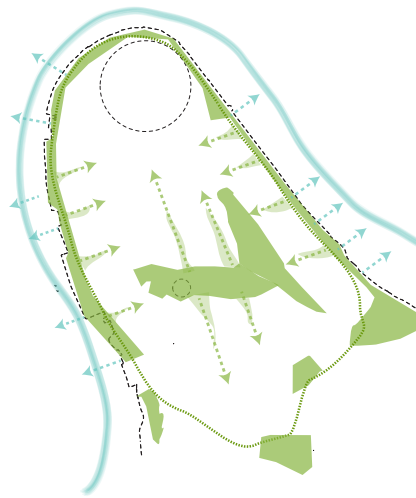


DETAIL 1: PRODUCTIVE
NEIGHBOURHOOD
AND RIVERFRONT
FISH FARM

DETAIL 2:
PRODUCTIVE GREEN HEART
IN MORDEN WHARF
WITH AQUAPONICS FARM

WASTE
CENTRE

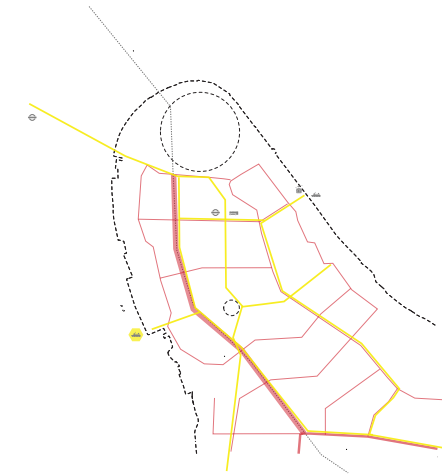
FUTURE
EXPANSION



CONNECTION WITH GREEN AND BLUE

THE LARGER GREEN AREAS SPREAD OUT LIKE FINGERS INTO THE AREA THROUGH GREEN STREETS, WHICH MAKE IT EASY TO CONNECT TO RECREATIONAL SPOTS AND PARKS WHEREVER YOU LIVE IN THE AREA. THE PENINSULA IS NOW COMPLETELY OPEN TO WALK AROUND WITH THE NEW BOARDWALK JOINED WITH A PARK STRETCH WHICH CREATE A GREEN LOOP THROUGH THE SITE

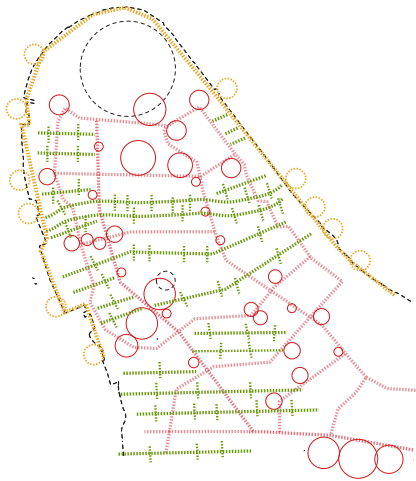
NEW ACTIVITIES ON PIERS OR RAFTS [DUE TO THE TIDE] MAKE IT EASY TO COME CLOSE TO THE RIVER AND ENJOY ESPECIALLY THE SOUTH-WEST SIDE OF THE PENINSULA.



ROAD STRUCTURE AND CONNECTIONS

A HIGH STREET FOR THE AREA HAVE BEEN CREATED ON TOP OVER THE NOW OVER DECKED MOTORWAY THAT CONTINUES INTO THE BLACKWELL TUNNEL. THE STREET NETWORK CONNECT FROM EAST TO WEST TO THE HIGH STREET CREATING PLOTS FOR NEIGHBOURHOOD BLOCKS THAT CAN HAVE CAR FREE INNER STREETS BETWEEN THEM, ALLOWING GREEN SPACE AND FARMING TO TAKE PLACE BETWEEN THE BLOCKS INSTEAD

A CYCLE NETWORK FOR FAST AND EASY TRANSPORT CONNECTS WITH EXISTING CYCLE SUPERHIGHWAYS TO GREENWICH VILLAGE TO THE SOUTH AND CANARY WHARF ON THE NORTH SIDE OF THE RIVER. THE CROSSING WILL BE MADE WITH A NEW PEDESTRIAN AND CYCLE BRIDGE. THIS CONNECTS THE PENINSULA WITH A DLR STATION JUST 400 METERS FROM THE FOOT OF THE BRIDGE. THE CYCLE NETWORK CONNECTS TO PUBLIC TRANSPORT AND MAJOR NODES ON THE SITE. A NEW FERRY STOP ARE BEING MADE ON THE SOUTH-WEST SIDE CLOSE TO THE PRODUCTIVE SQUARE



THE CHARACTER OF THE STREETS

THE URBAN STREETS DO NOT ONLY WORK AS A STREET FOR CARS. THESE ALSO CONNECTS THE URBAN PLACES SUCH AS TRANSPORT HUBS, SQUARES, INFORMAL MEETING PLACES, COMMERCIAL AND OFFICES. THESE ARE HAVING A MORE BUSY CHARACTER AND THE BLOCKS AND BUILDINGS FRAME THE STREET AND HAVE COMMERCIAL GROUND FLOORS.

THE GREEN STREETS ARE EXTENDED COURTYARDS, CALMER PEDESTRIAN STREETS. IT LET GREENERY BLEND IN TO THE COURTYARDS AND BLOCKS ARE HAVING A MORE OPEN STRUCTURE TO IT. THESE STREETS TOGETHER WITH THE PARKS HAVE SWALES TO HARVEST AND TAKE CARE OF THE STORMWATER SO THE WATER CAN BE USED FOR FARMING.

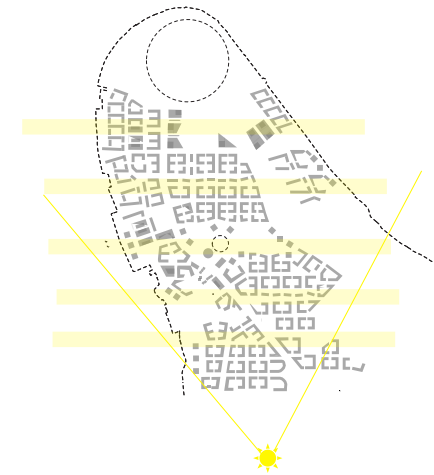
THE BOARDWALK MEETS BOTH THESE STREETS AND HAVE A VARIATION OF NODES ALONG IT THAT MIX BOTH RECREATIONAL GREEN SPACES AND MORE BUSTLING PLACES SUCH AS URBAN SPORTS OR FOOD SQUARES.



FOOD PRODUCTIVITY

THE FOOD IS BEING GROWN IN THE NEIGHBOURHOODS ON PRODUCTIVE ROOFS AS WELL ON THE EXTENDED COURTYARDS. ALLOTMENTS ARE ADDED TO THE PUBLIC PARK AND THEN THERE IS THE AQUAPONICS FARM WHICH IS THE FOOD HUB THAT SELL AND MANUFACTURE FOOD FROM WHAT IT PRODUCES ITSELF AS WELL AS SELLING THE SURPLUS THE ROOFTOPS WONT SELL THEM SELF AT FARMERS MARKET WHICH IS LOCATED IN THE PRODUCTIVE GREEN HEART IN MORDEN WHARF. THIS PLACE BECOME A FOOD CENTRE WITH SEQUENCES OF URBAN ROOMS WHERE FOOD ORIENTED BUSINESSES WILL BE LOCATED. A FRUIT GARDEN AND MEETING PLACE DOWN AT THE RIVER. THE NEARBY GAS HOLDER WILL BECOME MORE OF A LANDMARK WHEN A HISTORICAL GREENWICH PENINSULA- AND FOOD MUSEUM ARE PLACED WITHIN AND NEXT TO THE GASHOLDER.

THE NEARBY WASTE CENTRE WILL CHANGE CHARACTER AND TAKE CARE OF THE NEW NEEDS THE PRODUCTIVE NEIGHBOURHOOD WILL HAVE, SUCH AS BIOGAS. DRY MATTER FROM BLACKWATER AND RECYCLE PACKAGES TO THE FOOD FACTORY. THE SHIPPING OF THE GOODS FROM THE SITE WILL BE TAKEN FOREMOST ON THE RIVER FROM THE UPDATED DOCK IN MORDEN WHARF. THE RAILWAY LEADING IN ON THE PENINSULA IN THE EAST CAN BE USED IN DISTRIBUTION AS WELL.



BUILT UP PATTERN

THE URBAN BUILT PATTERN EMBRACE MOST OF THE SUN, ESPECIALLY IN THE WINTER MONTHS WHEN FARMING MOSTLY WILL OCCUR ON TOP OF THE ROOFS AND IN THE ADDITIONAL GREEN HOUSES WITH RIGID BEDS. THE WINTER WINDS FROM NORTH-EAST WILL BREAK AND NOT BLOW STRAIGHT IN TO THE EAST-WEST ORIENTED STREETS.

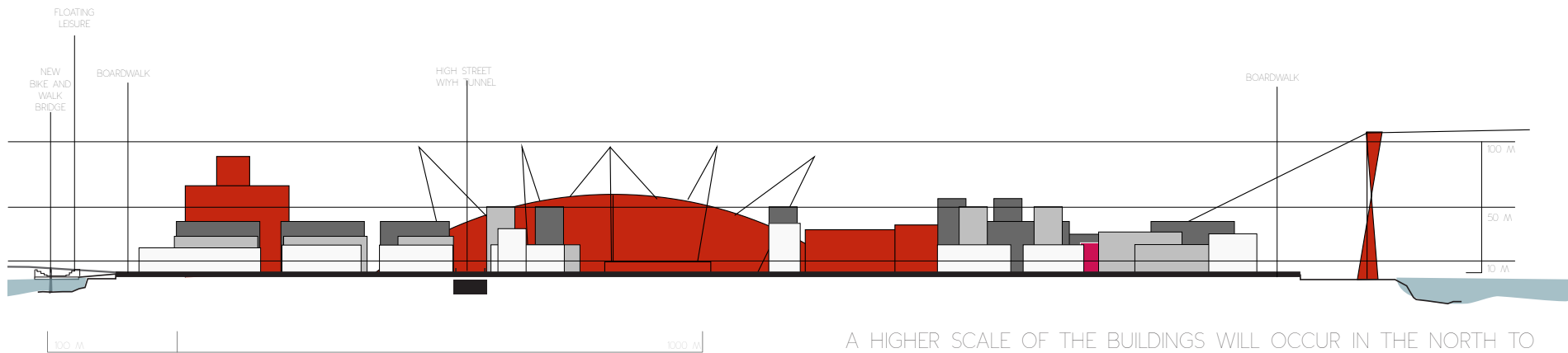
THE BUILDINGS OPEN UP TOWARDS THE RIVERFRONT AND THE PARK, MAKING A SMOOTH OVERLAP BETWEEN OPEN GREEN AND STRUCTURES. SEE TYPOLOGIES HOW THESE BUILDINGS CAN BE PLACED.



WASTE CENTRE

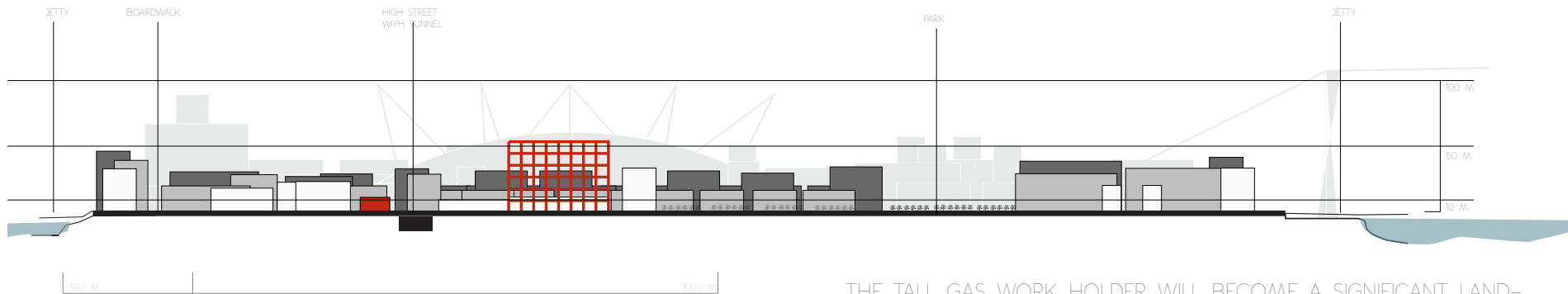
DETAIL 1: PRODUCTIVE NEIGHBOURHOOD AND RIVERFRONT FISH FARM

DETAIL 2: PRODUCTIVE GREEN HEART IN WOODEN FARM WITH AQUAPONICS



SECTION A-A

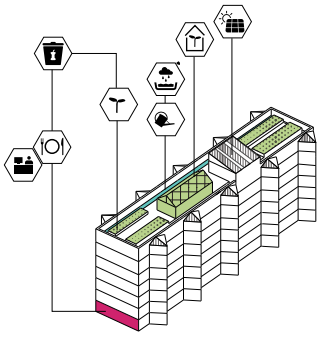
A HIGHER SCALE OF THE BUILDINGS WILL OCCUR IN THE NORTH TO MEET THE BIG STRUCTURES AND MAKE THE MOST OF THE TRANSPORT HUB.



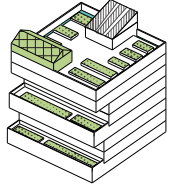
SECTION B-B

THE TALL GAS WORK HOLDER WILL BECOME A SIGNIFICANT LANDMARK FURTHER DOWN.

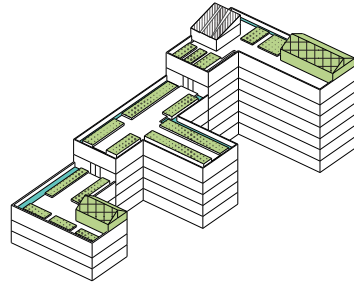
TYOLOGIES



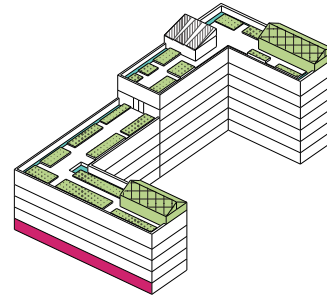
THE FINGER



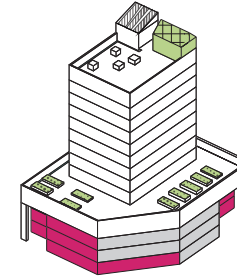
THE TRUNK



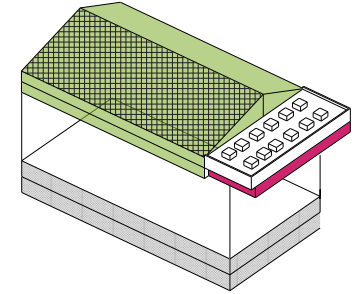
THE EXTRA



THE BLOCK EDITOR

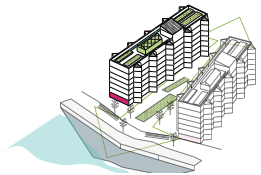


THE MORE MIXED

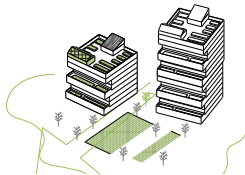


THE CONVERTED ONE

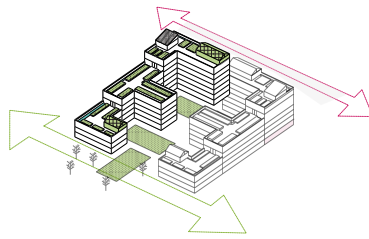
PLACE THE BUILDINGS IN A CONTEXT.
HOW TO FORM THE BLOCKS



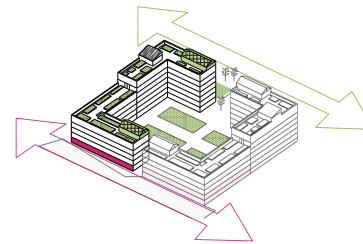
OPEN UP TO NATURE AND FOREMOST THE RIVERFRONT, LET THE GREEN STREETS IN TO ALLOTMENTS BETWEEN THE BUILDINGS



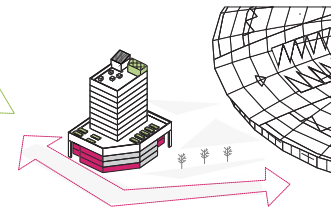
SITS IN THE FRINGE OF LARGER PARKLAND AND RIVERFRONT TO CREATE AN OPEN AND SMOOTH BRIDGE TO THE MORE URBAN PARTS



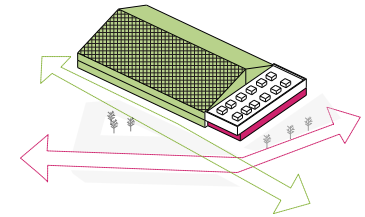
EXTRA POTENTIAL OF THE ROOFTOP FARMING AND OPEN UP TO THE GREEN STREETS BUT ARE MORE CLOSED TO THE URBAN STREETS



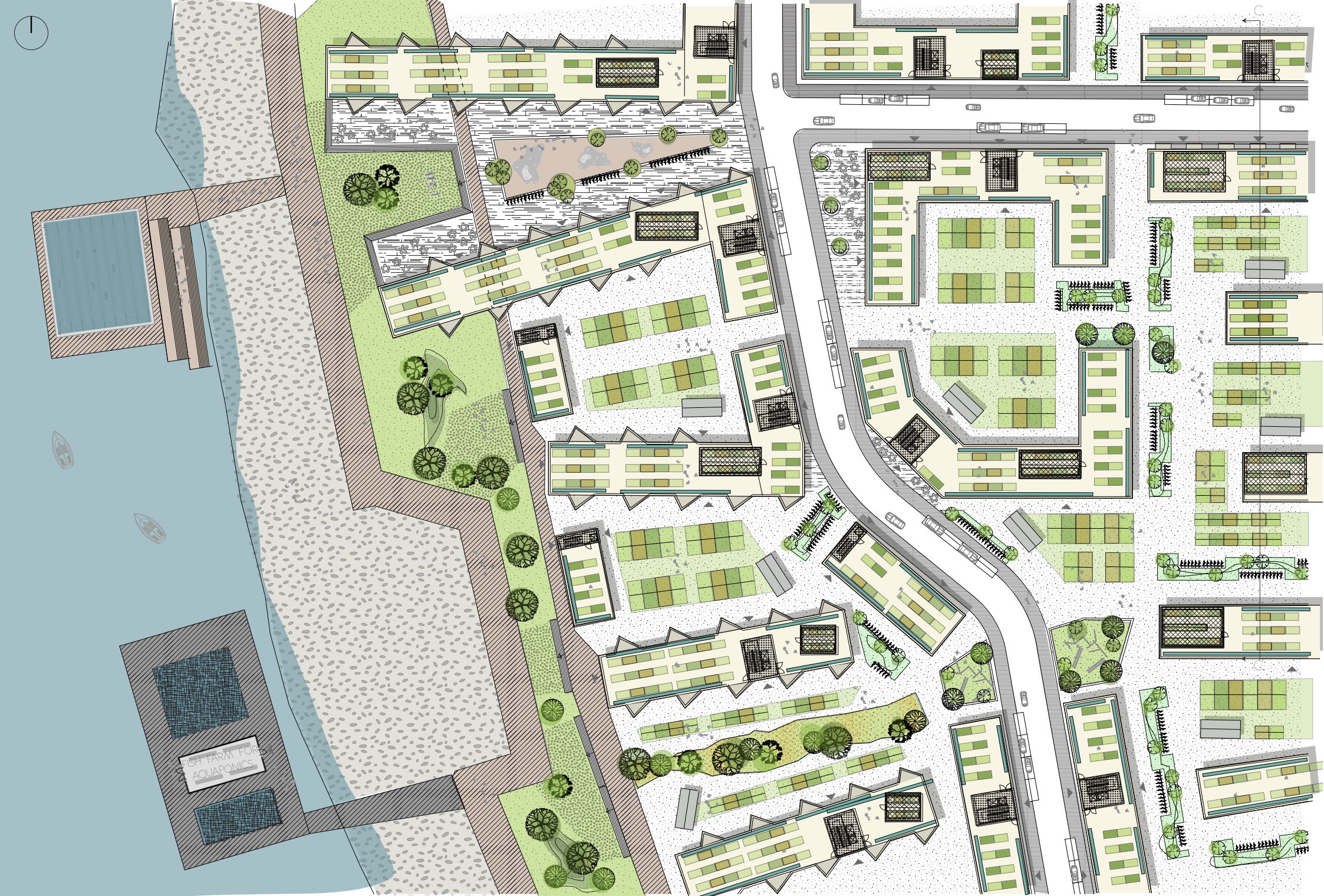
CREATE A BLOCK THAT CAN BE PLACED BETWEEN AN URBAN STREET AND THE GREEN STREETS. MORE CLOSED TO THE MORE BUSY URBAN STREET AND MORE OPEN TO THE GREEN STREETS TO LET IN MORE SUNLIGHT



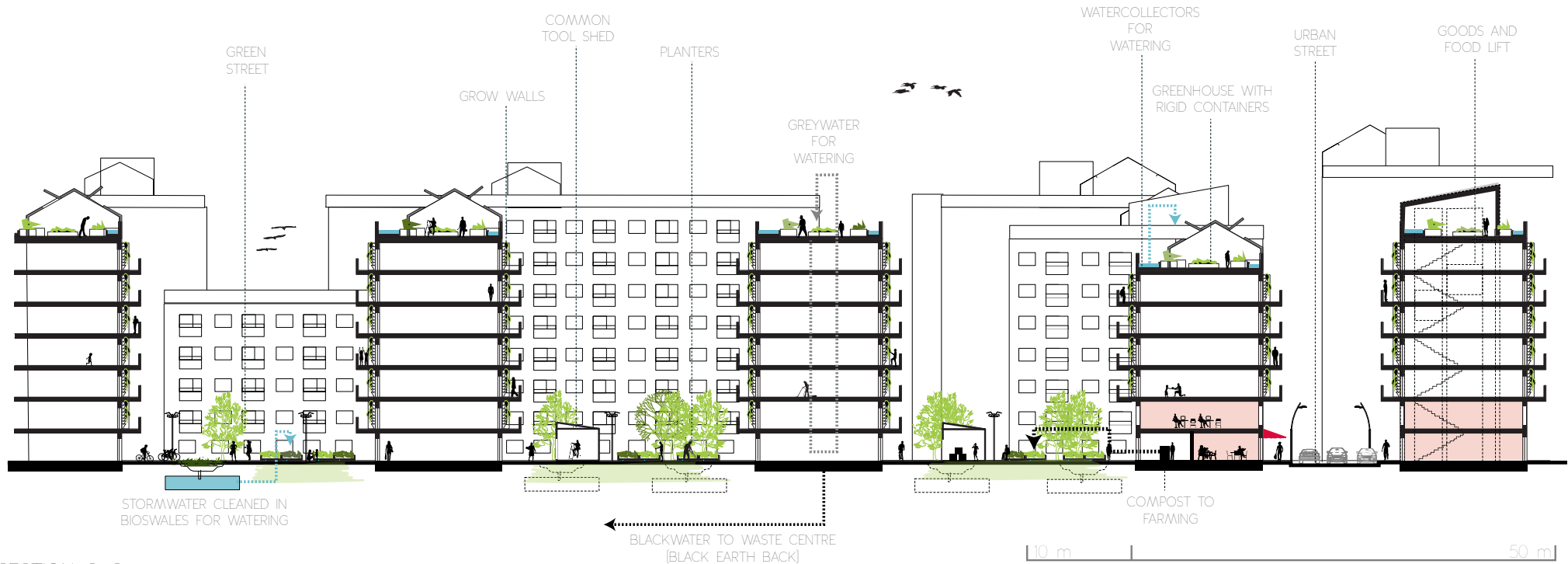
THE MIXED ARE SITUATED NEXT TO THE TUBE STATION AND ARENA. DUE TO ITS PRIME LOCATION IS IT MIXED WITH FUNCTIONS. MORE COMMERCIAL AND PARKING GARAGE FOR ARENA GUESTS THAT FOR SOME REASON NEED TO TAKE THEIR CAR. HOUSING ON TOP OF THE BASE WITH ROOFTOP FARMING



THE INDUSTRIAL BUILDING ALREADY ON THE SITE WILL BE CONVERTED TO HOST A NEW TYPE OF INDUSTRY



THE PRODUCTIVE NEIGHBOURHOOD



SECTION C-C

DETAILED PLAN

This is how a neighbourhood will look like in the growing city. Food production and more urban meeting places sits close together. The floating structures, like an outdoor pool will be a place for both visitors and people living on the site to meet.

A fish farm will supply aquaponics with the fishes needed. And fishes like bass and cod can be raised in the Thames river and work well in aquaponics systems. The fishes will later be sold at the Billingsgate's fish market after it's been used in the aquaponics farm.

SECTION

Most common vegetables and fruits can be grown with aquaponics systems but Root vegetables have been less successful so this lack could be complemented with the rooftop/ courtyard farming.

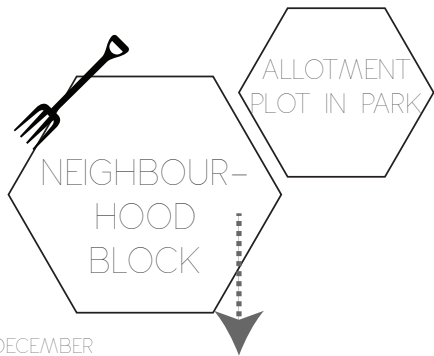
The neighbourhood will collect water

from bioswales and rain collectors on the rooftops and use greywater for the farming. The growing will take place in grow walls, planters and rigid containers that uses less water with a dripping function together with green houses that can be used all year around.

THE ROOFTOPS CAN BE A PLACE FOR PEOPLE
TO COME TOGETHER AND ENJOY.
GENERATE A COMMUNITY FEELING IN LONDON.



WHERE AND WHAT WILL BE GROWN



DECEMBER
SPROUTS, TURNIPS, SWEDE, PARSNIPS, POTATOES, RED CABBAGE, BEETROOT

NOVEMBER
LEEKS, CABBAGE, POTATOES, SWEDE, PARSNIPS

OCTOBER
CAULIFLOWER, MARROW, BEETROOTS, SQUASH, MAIN CROP POTATOES

SEPTEMBER
SWEETCORN, SPINACH, ONIONS, CABBAGE, CURLY KALE FRENCH BEANS, MARROWS

AUGUST
PEPPERS, LETTUCE, NEW POTATOES, PEAS, AUBERGINES, CHARD

JULY
STRAWBERRIES, REDCURRANT BLACKBERRIES, COURGETTES, BROAD BEANS, LETTUCE

JUNE
NEW CARROTS, NEW POTATOES, BLACKCURRANT FENNEL, BROAD BEANS

MAY
SAGE, CHIVES, FENNEL, MEADOW FLOWERS

APRIL
OVERWINTERED SPINACH, THYME, SAGE, CHIVES, FENNEL, MARJORAM

MARCH
PURPLE SPROUTING, BROCCOLI, RADISHES, SPRING GREENS,

FEBRUARY
CAULIFLOWER, CHARD, POTATOES, CARROTS

JANUARY
GREEN CABBAGE, LEEKS, ARTICHOKE, FORCED RHUBARB, ONIONS

ENGLAND'S GROWING SEASON IS TODAY AS LONG AS 280 DAYS AND WITH EFFICIENT USE IN GREENHOUSES THE GROWING SEASON CAN BE ALL YEAR AROUND. THE AQUAPONICS FARM CAN BE RUNNING ALL YEAR AROUND WITH A HIGH CAPACITY DUE TO ARTIFICIAL LIGHTING AS WELL BEING INDOORS IN THE CONVERTED INDUSTRIAL BUILDING

FULL SUN (MAINLY ON ROOFTOPS, ALLOTMENTS IN THE PARK AND AT OPEN COURTYARDS)

SWEETCORN, RADISH, COME AGAIN SALAD, LOGANBERRIES, REDCURRANTS, BLACKCURRANTS, GRAPE VINES, COURGETTES, MARROW, PUMPKIN, STRAWBERRIES, RASPBERRIES, TOMATOES.

HALF SHADE (SOME BALCONIES AND SOME PARTS OF COURTYARD)

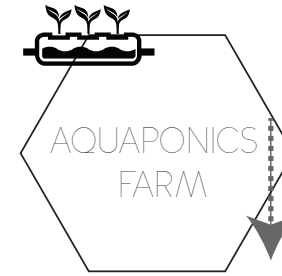
SPINACH, CABBAGE, BROCCOLI, CARROTS, ARTICHOKE, LEEKS, SPROUTING PURPLE BROCCOLI, POTATOES, LETTUCE, SPRING GREENS, CAULIFLOWER, CHARD, ONIONS

FULL SHADE (UNDER TREES)

MUSHROOMS, FUNGI, RHUBARB, MINTS

HONEY FROM BEEHIVES ON SOME ROOFTOPS AND EGGS FROM HENS IN THE PARK CONTRIBUTE TO THE LOCAL FOOD PRODUCTION AS WELL

FRUIT TREES AT THE FOOD SQUARE IN THE CONVERTED MORDEN WHARF WILL HOST A MIX OF FRUIT TREES LIKE APPLE, PEAR, CHERRY AND FIG FOR THE PUBLIC TO HARVEST



IN AQUAPONICS SYSTEMS MOST OF THE COMMON CROPS AND FRUITS CAN BE GROWN. HOWEVER, LEAFY VEGETABLES ARE THE EASIEST TO GROW AND THEREFORE GROW FASTEST

SALAD VARIETIES: TOMATOES, LETTUCE, CUCUMBER, SHALLOTS, CELERY, CAPSICUM, CHILLI, SNOW PEAS AND RED SALAD ONIONS.

VEGETABLES: CAULIFLOWER, BROCCOLI, CABBAGE, BEANS, EGGPLANT A

HERBS: BASIL, PARSLEY, WATERCRESS, CORIANDER, SAGE, LEMONGRASS. THE LIST GOES ON

A VARIETY OF FRUITS AND BERRIES: STRAWBERRIES, BLUEBERRIES, RASPBERRIES AND DWARF CITRUS TREES LIKE LEMONS, LIMES AND ORANGES

...SO MOST FRUITS AND VEGETABLES WE ARE USED TO FIND IN OUR SUPERMARKET CAN BE GROWN HERE

ROOT VEGETABLES HAVE BEEN LESS SUCCESSFUL FOR AQUAPONICS SO THIS LACK COULD BE COMPLEMENTED WITH THE ROOFTOP/ COURTYARD AND ALLOTMENTS FARMING

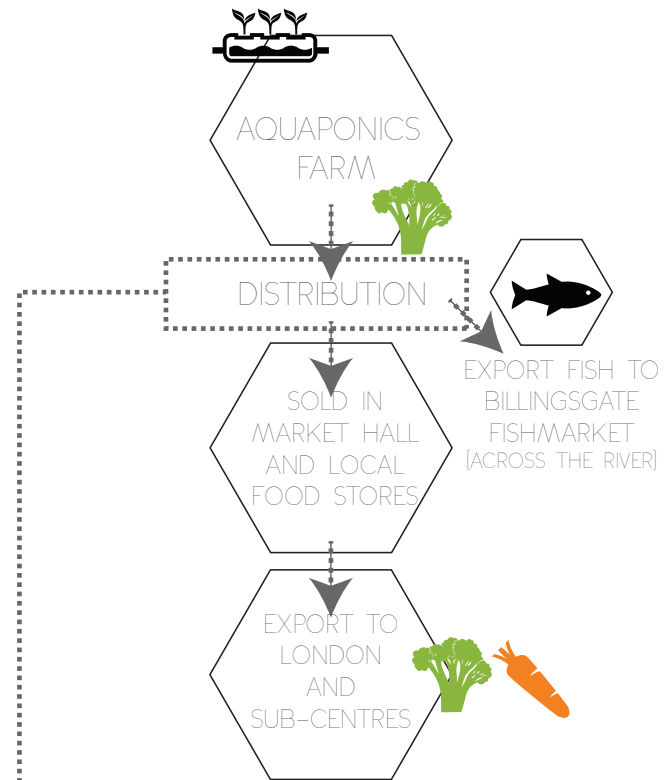
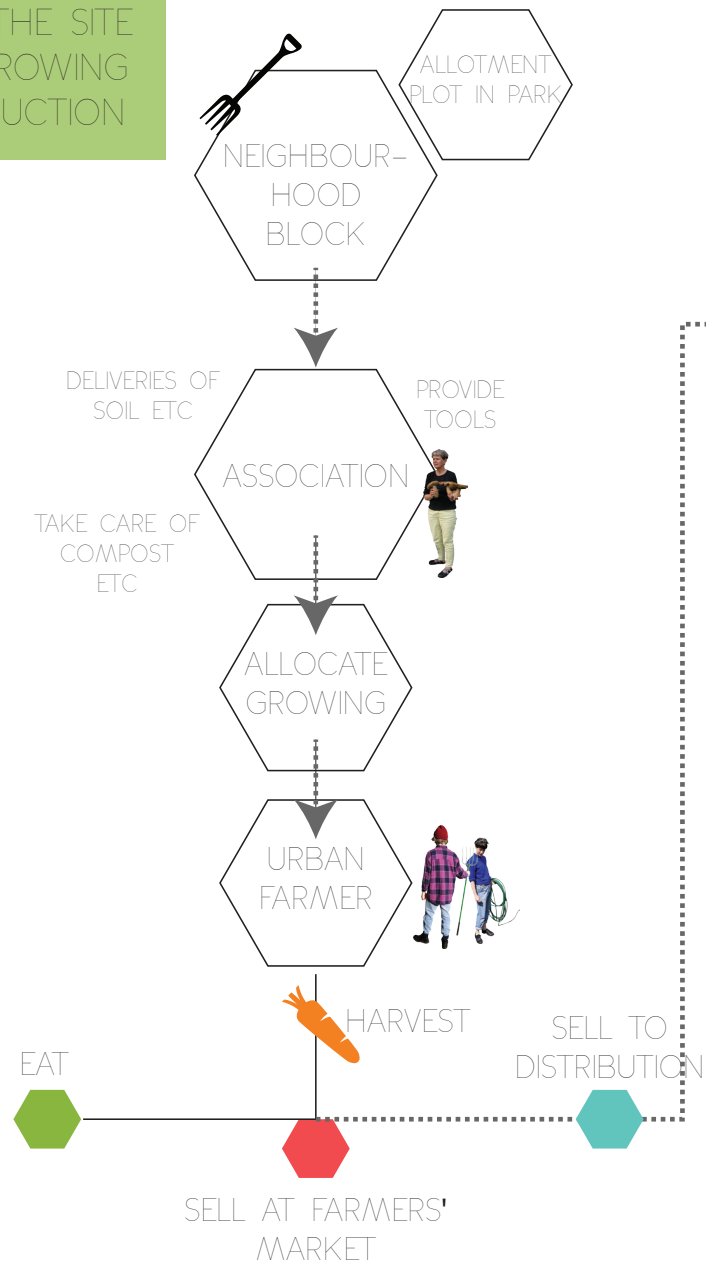
FISHES THAT CAN BE RAISED IN THE THAMES RIVER AND WORK WELL IN AQUAPONICS SYSTEMS ARE

- BASS
- CARP
- CATFISH
- EELS
- EVEN COD AND SALMON



ALL OF THESE SPECIES ARE ALREADY REPRESENTED IN THE RIVER AND COULD THEREFORE ALSO BE RAISED IN THE RIVER, USED IN THE SYSTEM AND THEN LATER BE SOLD AS FOOD

HOW DO THE SITE HANDLE GROWING AND PRODUCTION



HOW DOES IT WORK OUT?

An association in each block allocate growing and the harvest can either be eaten by themselves, sold at the local market or be shipped away through a distribution centre to London.

THE PEOPLE IN THE GROWING CITY




I AM RETIRED AND ENJOY HAVE MY DAYS BUSY IN THE NEIGHBOURHOOD. THAT'S WHY I'M PART OF THE ASSOCIATION THAT ALLOCATE THE FARMING SO WE GET A GOOD RESULT. OH, PLEASE REMIND ME, I NEED TO GET SOME NEW TOOLS NEXT WEEK

I HAVE BEEN ALLOCATED A LOT OF SPACE FOR FARMING AND YOU COULD SAY THIS IS MY WORK AND PASSION. I SELL BOTH AT THE FARMERS' MARKET TWICE A WEEK AND SELL A LOT OF MY VEGGIES TO THE DISTRIBUTION SO LONDONERS CAN EAT GOOD AND I GET MONEY. A WIN WIN

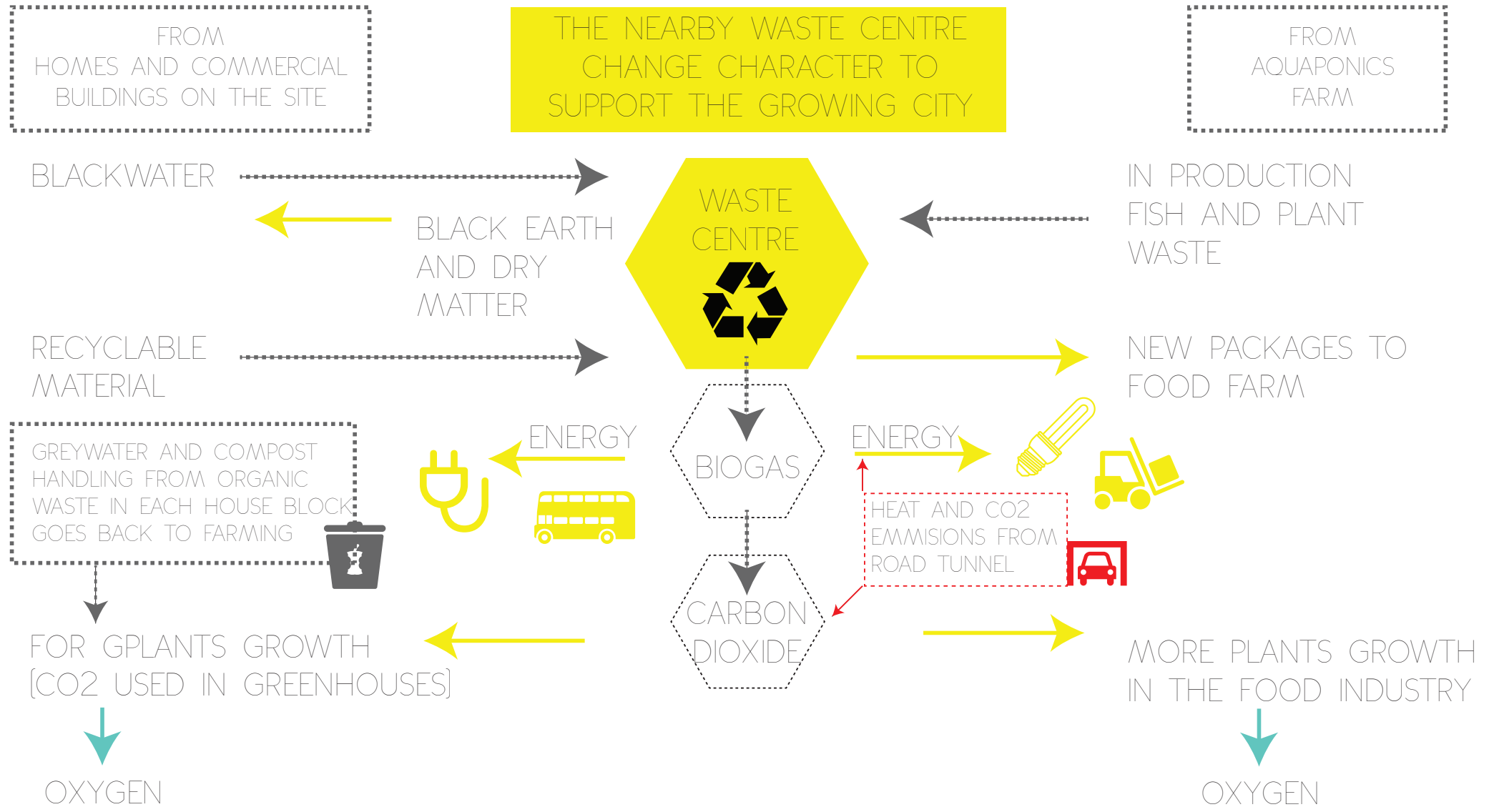


I ENJOY BEING OUT IN THE SUMMER AND HAVE A SPOT WHERE I CAN BOTH MEET THE NEIGHBOURS AND TRY MY GREEN FINGERS. I HAVE ONE PLANTER UP ON THE ROOFTOP AND THE VIEW IS MAGNIFICENT... I WOULD LOVE TO GROW MORE BUT I'M SO BUSY AT WORK SO ONE PLANTER IS GOOD FOR NOW



A photograph of a waste management facility. In the foreground, there are several green and brown skips with the text 'WWW.MURPHYSWASTE.CO.UK' and 'MURPHYS WASTE' printed on them. In the background, there is a large industrial building, a tall pile of rubble, and a street with a car. A large yellow hexagonal overlay is centered in the image, containing the text 'THE WASTE CENTRE WILL BE REFORMED TO BE PART OF THE REDEVELOPED PENINSULA'.

THE WASTE CENTRE
WILL BE REFORMED
TO BE PART OF THE
REDEVELOPED
PENINSULA





HISTORICAL GREENWICH PENINSULA AND FOOD MUSEUM

GARDEN SCHOOL AND RETAIL

FOOD PRODUCTION BUSINESSES
BREWERY
BAKERY
FOOD PRESERVATION
COFFEE ROASTERY

FARMERS' MARKET AND FRUIT SQUARE

MARKET HALL AND RESTAURANTS

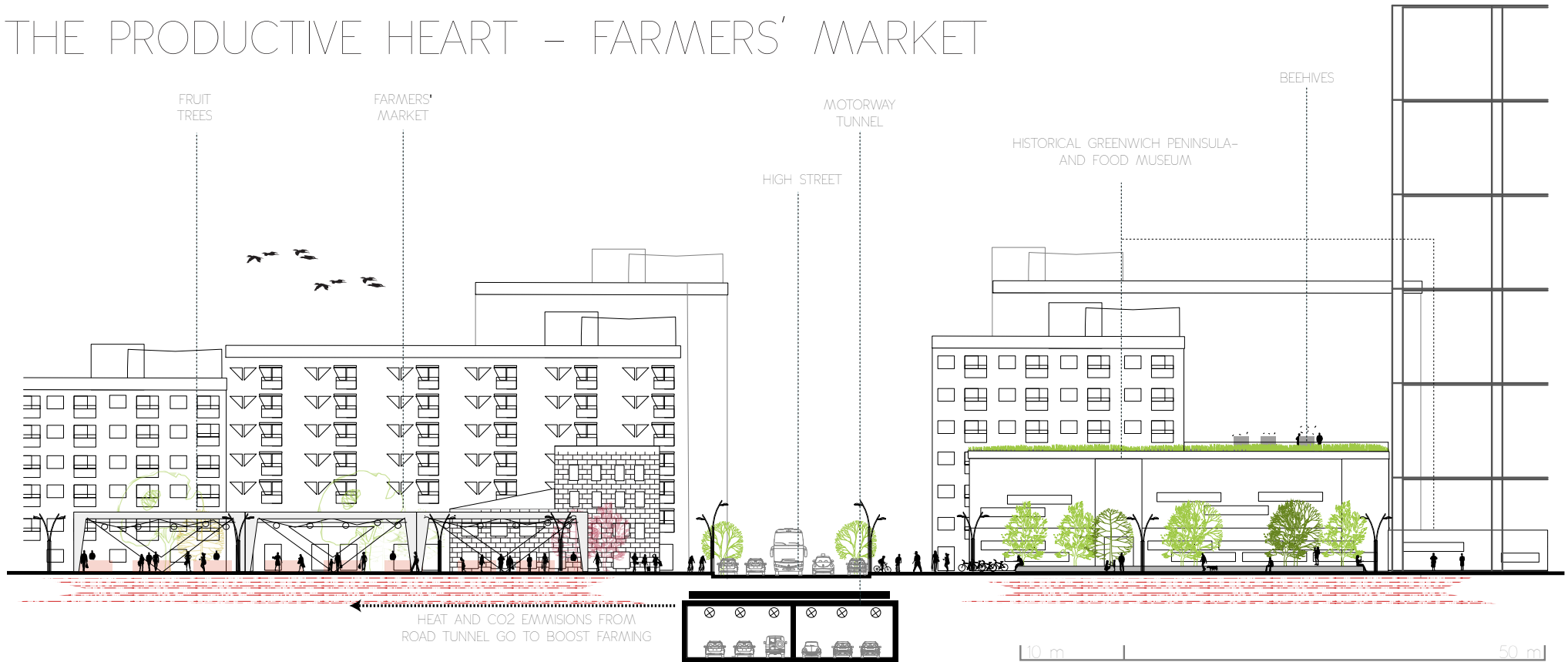
AQUAPONICS FARM

DISTRIBUTION OFFICE AND VISITOR CENTRE

50 m

100 m

THE PRODUCTIVE HEART – FARMERS’ MARKET



SECTION D-D

DETAILED PLAN

The boardwalk leads up to fruit garden and the farmers market, that is surrounded by various food oriented business in re-used buildings, which create a hotspot for the whole peninsula and London. This place is connected to the high street going to the tube station. And you can easily

just stop here for a quick purchase in the market hall or the farmers market.

SECTION

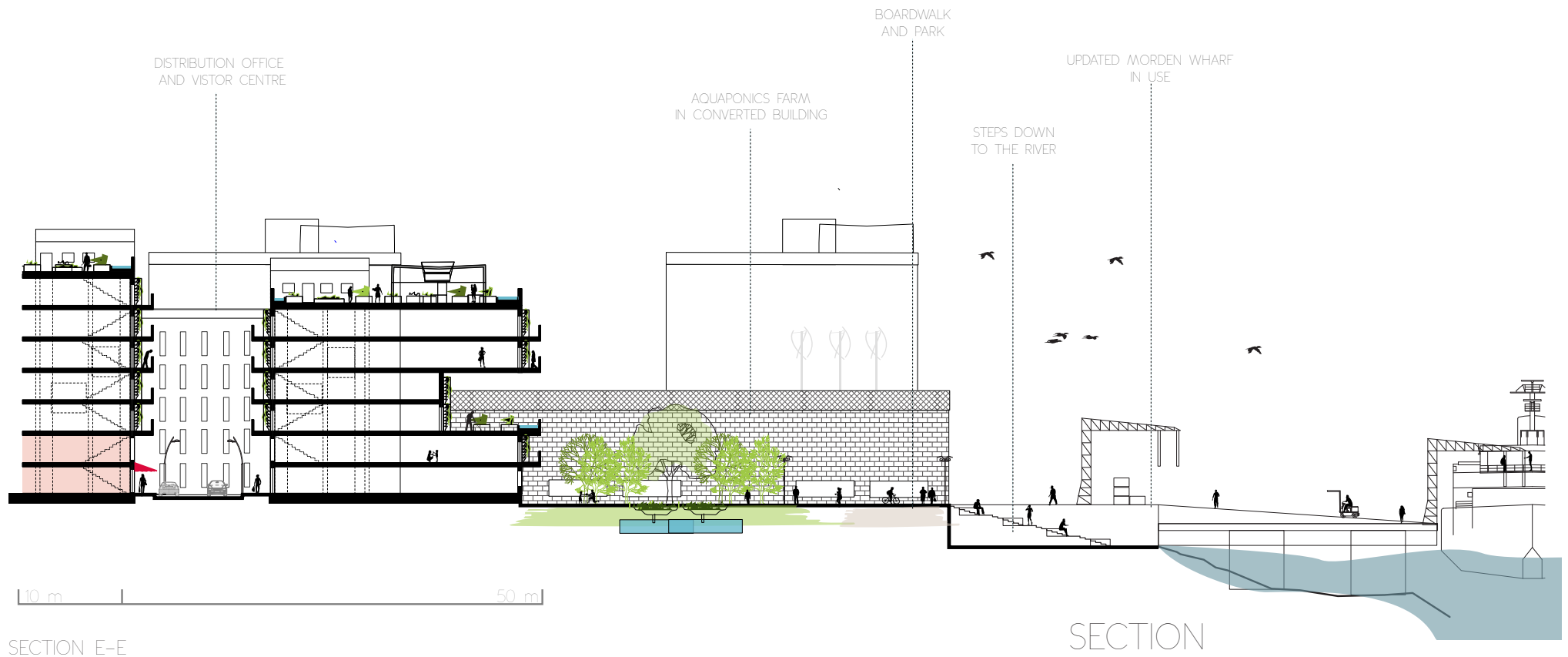
A historical site- and food museum are placed within and next to the gasholder creating a landmark. Bee hives can be an extra addition on the rooftops of public buildings. The motorway cutting the peninsula into two halves is now in a tunnel. Productive rooftops from

surrounding neighbourhoods can be spotted from the square.

PEOPLE FROM ALL OVER LONDON CAN ENJOY
LOCALLY PRODUCED FOOD... OR EAT SOME
CHERRIES FROM THE FRUIT TREES.



THE PRODUCTIVE HEART – AQUAPONICS AND THE WHARF



The aquaponics farm housing in a converted building next to the wharf and use it for shipping, the farm itself has large windows into the production. You can sit down on the steps and get close to the river and munch on something while you see the food export to the sub-centres.



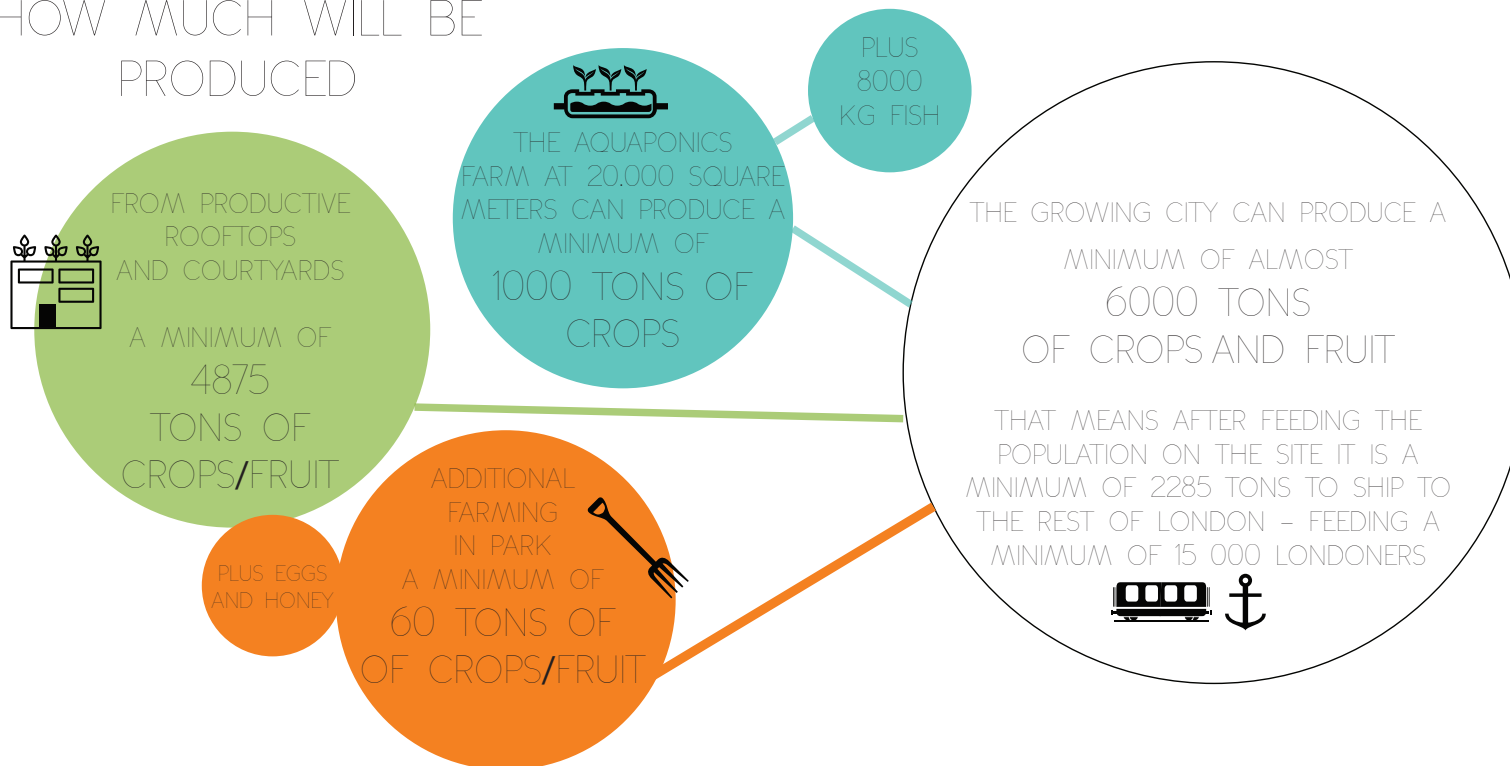
HOME FOR 25 000 LONDONERS ON THE PENINSULA

22 727 PER SQUARE KILOMETER [RE-DEVELOPED LAND OF 110 HECTARES]

WHO EAT A TOTAL OF 3650 TONS OF FRUIT AND VEGGIES

6000 NEW WORKPLACES

HOW MUCH WILL BE PRODUCED



THE PHASING OF THE GROWING CITY



PHASE 1

THE MOTORWAY THAT TODAY CUT THE SITE IN TWO GET OVER DECKED AND BECOME A TUNNEL. THE FOOD INDUSTRY SETS UP AND USE THE TUNNEL AS A FERTILIZER WHEN HEAT AND THE CARBON DIOXIDE CAN BE USED IN THE GREENHOUSES AND AQUAPONICS. THE WASTE CENTRE GETS TRANSFORMED TO BE ABLE TO BE A LOCAL WASTE CENTRE FOR THE SITE WITH BIOGAS DIGESTER AND COMPOST FACILITIES AS WELL AS RECYCLING PACKING MATERIALS FOR THE EXPORT OF FOOD FROM AQUAPONICS FARM.

DEVELOPMENT WILL COME ALONG THE NEW HIGH STREET ON TOP OF THE TUNNEL AND THE FOOD SQUARE WILL BECOME A NEW NODE ALONG WITH THE NEWLY OPENED FOOD AND HISTORICAL GREENWICH PENINSULA MUSEUM PARTLY IN THE OLD GAS HOLDER.



PHASE 2

THE RIVERFRONT OPENS UP WITH BOARDWALK AND PARK THAT BECOMES A NEW DESTINATION NODE. THEREFORE THE PEDESTRIAN AND BIKE BRIDGE WILL GET BUILT FOR A WELL CONNECTED AREA.

NEIGHBOURHOODS CLOSE TO THE UNDERGROUND STATION WILL GROW SOUTH DOWN TO THE SITE AS WELL AS THE NEIGHBOURHOODS ALONG THE HIGHSTREET SPREADS OUT.

A NEW PARK WILL LATER BE DEVELOPED WHERE ALLOTMENTS WILL BE INTEGRATED IN THE PARK.



PHASE 3

THE BOARDWALK AND RIVER PARK WILL CONTINUE ON THE EAST SIDE AND NEW HOUSING WILL BE BUILT BETWEEN THE PARK AREAS. THE ALREADY EXISTING PARK IN THE AREA WILL BE UPDATED WITH FURTHER ALLOTMENT PLOTS.

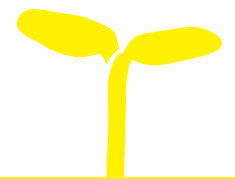
LONDON CAN GROW

The proposal, the growing city, for Greenwich peninsula want to change the previous unused and fenced of land areas as previous brownfield or large parking spaces and open up for the potentials the site already have as the closeness to Thames river, park areas and an already well developed public transport network. The proposal suggests not only a lively place for people to live, work and enjoy 24/7 but also be a productive part of the city. Productive when it comes to growing crops and fruits in the neighbourhoods and parks but also get an additional food factory, an aquaponics farm that use a 20 000 square meters industrial building from the 1950s in Morden wharf. The old average age of farmers will most likely be changed if food hubs in London will be set up.

The re-developed peninsula will host a strong community where knowledge and food can grow. It will also be a hotspot for food lovers where they can get great organic locally produced food. This pilot project can be a start of a food revolution for London, so it can start sustain its own needs when it come to food supply. This will have the great benefits of less food miles, which means less road freight and less pollution.

We all need to be more concern of how the food reach the plate and what comes with it. It's a complex chain that doesn't really need to be that complex. London already have the elements as wharfs and a large rail network, that connects sub-centres so we better see how we can update this with new layers of productivity and freight handling. Brownfield or wasteland can not stay as relics; they need to be updated in populated cities so let's fill them with more layers than just static dwellings. We just need to combine and make better use of the places in the city.

I also want to take the opportunity to thank my supervisor Louise Lövenstjerne for valuable input and reflections throughout the work with this thesis.



A SEED HAS BEEN SOWN. LET'S HOPE LONDON IN THE FUTURE CAN GROW
IN A SUSTAINABLE AND HEALTHY WAY THAT MAKE THE LARGE CITY
A GREAT GROWING CITY.

LIST OF SOURCES

BOOKS

Carrot City, Gorgolewski Mark, ISBN 978-1-58093-311-7, The Monacelli Press 2011

DIGITAL PUBLICATIONS

City Harvest - The feasibility of growing more food in London, Sustain: The alliance for better food and farming, May 1999

Food miles: Do UK consumers actually care, Marketing Department, University of Otago, February 2010

Growing food in cities - A report to highlight and promote the benefits of urban agriculture in the UK, National Food Alliance and SAFE Alliance, June 1996

London Freight Data Report: 2014 Update, Transport for London, December 2014

The food miles report - The dangers of long-distance food transport, Sustainable Agriculture, Food and Environment (S.A.F.E.) Alliance, December 2011

The London Plan - The spatial development strategy for London, Mayor of London, March 2015

Value and importance of rail freight, Network Rail, April 2013

WEBSITES

<http://atlas.media.mit.edu/en/profile/country/gbr/>
<http://aquaponics.com/learn/aquaponics-journal/aquaponics-faq/#plants>
<http://www.bbc.com/news/uk-england-london-31056626>
<http://cleanthames.org>
<http://content.tfl.gov.uk/technical-note-12-how-many-cars-are-there-in-london.pdf>
http://eartheasy.com/grow_raised_beds.htm
<http://www.economist.com/news/britain/21582259-it-has-become-nation-microwavers-and-takeaway-munchersbut-surprisingly-sociable-one>
<http://ecowatch.com/2015/10/19/nations-largest-vertical-farm/>
https://en.wikipedia.org/wiki/Port_of_London
https://en.wikipedia.org/wiki/Greenwich_Peninsula
<https://en.wikipedia.org/wiki/Aquaponics>
<https://en.wikipedia.org/wiki/London>
https://en.wikipedia.org/wiki/Agriculture_in_the_United_Kingdom
https://en.wikipedia.org/wiki/London_commuter_belt
https://en.wikipedia.org/wiki/Transport_in_the_United_Kingdom
<http://www.worldwatch.org/node/6064>
<http://www.fruitexpert.co.uk/whentoharvestfruit.html>
<http://aquaponics.com/aquaponic-systems/home-and-school-systems/>
<http://www.pla.co.uk/FAQ>
<http://www.express.co.uk/news/weird/579518/Children-ketchup-strawberries>
<http://www.greenacreaquaponics.com/why-aquaponics/>
<https://greenwichpeninsulahistory.wordpress.com>
<http://greenwichpeninsulawildlifeheritage.co.uk/greenwich-history-maps/>
<http://www.howtoaquaponic.com/nutrition-cycle/what-is-aquaponics-and-how-does-it-differ-from-other-food-production-systems/>
<http://www.independent.co.uk/news/uk/politics/britains-food-self-sufficiency-at-risk-from-reliance-on-overseas-imports-of-fruit-and-vegetables-9574238.html>
<http://www.innerself.com/content/living/home-and-garden/gardening/8654-aquaponics-vs-traditional-agriculture.html>
<https://www.rt.com/uk/235163-uk-food-imports-double/>
<https://www.scribd.com/doc/271641490/King-s-College-London-report-on-mortality-burden-of-NO2-and-PM2-5-in-London>
<http://www.theguardian.com/environment/2015/feb/24/uk-will-need-to-import-over-half-of-its-food-within-a-generation-farmers-warn>
http://www.verticalfarm.com/?page_id=36

CHECK ME OUT IF YOU WANT
TO KNOW MORE ABOUT FOOD
MILES, URBAN FARMING AND HOW
LONDON (UK) CAN BECOME A
GROWING CITY.