ABSTRACT

Rising sea levels – due to global warming – are increasing the risk of London being inundated by floodwaters. The current Thames barrier, designed in the late 70s, offers protection against a one-in-2000-year chance that the capital will flood but, by 2030, the chance will double.

Under the threat, Architect Sir Terry Farrell was asked to propose a five-mile barrage across the mouth of the Thames, all linked by islands. According to the new scheme, the barrier would contain numerous gates to allow water to flow in and out of the Thames estuary according to the tides. This proposal comes complete with a cable-stayed road and rail bridge to create a transport link between Essex and Kent and the artificial islands will turn into a colony of settlements provided with infrastructures such as hydrogen power-plants and floating airports.

This paper will also show how this “planning on the water” strategy provides unrivalled opportunities for a new kind of amphibian communities: the Thames Estuary 2100 Project is indeed based on self sufficient settlements able to support – at the same time – biodiversity and human activities, establishing a dialogue between London, the river and the sea.
I | The Flood Risk

The literature on Thames flood hazard is replete with evidence of rising annual flood-related damages in the face of increasing Public spending on engineering protection works and of calls for new options to help create a social structure capable of modifying human behaviour in ways likely to decrease rather than increase flood-loss potentials. London and the Thames Estuary have always been vulnerable to flooding. In 1928 central London was flooded and 14 people died. Then, in the great North Sea flood of 1953, which killed nearly 2,000 people in the Netherlands, the Thames and River Lea burst its banks causing damage to over 1,100 homes in East London and killing 300 people. Therefore, even though flood disasters are not a new phenomenon, the recent changes in climate, as well as the extensively anthropic use of river areas, are making it necessary to undertake immediate interventions to protect the land. The history of the Thames Estuary 2100 Project brings us back to the tragedy of 2005, when the Mississippi river, driven by Hurricane Katrina, flooded New Orleans. This event documents the dangers of over-reliance upon single engineering solutions to environmental problems. This should not be taken to mean that the city was completely recalcitrant in facing up to its flood problems. But its options were narrowed by conventions which placed responsibility for flood problems on a few federal agencies whose interest confined solutions to an engineering type based, on a mode of economic analysis assumptions for which later experience proved tragically at fault.

There exist many an analogy between the Mississippi flood and the scenario of a possible flood of the river Thames: first of all, the extensive use for residential purposes of areas prone to flood. In fact, we can contend, with a certain degree of approximation, that until 2006 very few local authorities in the United Kingdom were willing to adopt flood plain regulations that would limit urbanization; on the contrary, most of them preferred flood plan protection which would allow continued development, especially in areas like the Thames estuary characterized by intense demographic and urban development. Unfortunately most of these areas and part of the city of London are on the flood plain and this is one of the most challenging aspects of development here, not only because of the real threat of flooding but also because of the harsh impact of flood defences on the environment.

Since as early as the 1970’s, part of the estuary has been equipped with walls and artificial banks, partly made up of embankments and partly of nothing less than concrete barriers. Among these barriers, one of the most remarkable is the one across the Thames, a large movable flood-control structure on the river, commissioned by the London Council and completed in 1982. Located downstream of central London, the barrier’s purpose is to prevent the city from being flooded by an exceptionally high tide moving up from the sea, often exacerbated by a storm surge. It only needs to be raised for the duration of the high tide; at ebb tide it can be lowered to release upstream water that backs up behind it. The barrier was originally designed to protect London against a flood level with a return period of 100 years in 2070 after which the protection would decrease but be within acceptable limits. This defence level included long term changes in sea and land levels as understood at that time. However, the slow yet constant rise in sea level due to global warming will make these barriers ineffective within a few decades, leaving London and its estuary exposed to increasingly frequent and forceful floods.
The Farrell’s Masterplan

Under this threat, in 2007 the Homes and Communities Agency commissioned British architect Sir Terry Farrell to draft a plan aimed at protecting the entire estuary. Essentially, this plan develops along three lines: identifying new areas of urban expansion, enhancing the existing barriers, and developing new flood defence systems inside the estuary. Terry Farrell’s proposal consists of a five-mile barrage across the mouth of the Thames, all linked by artificial islands. According to the new scheme, the barrier would contain numerous gates to allow water to flow in and out of the Thames estuary according to the tides. This proposal comes complete with a road and a rail bridge to create a transport link between Essex and Kent after the model of the Oosterschelde dam that stretches 1.75 miles across the three channels of the Eastern Schelde. Here, as is the case with the Thames, the river bed is characterized by shallow sand banks and canals with strong currents flowing in and out. Therefore, the barrage is comprised of mobile bulkheads installed in correspondence with mouths and artificial islands built on the shallow bed of the estuary. This system has also been adopted in Farrell’s masterplan, where three artificial islands made of fill material delimit three access canals. As in the Oosterschelde Dam, roads and railways also run through the embankments and dams of the Thames Gateway, connecting the regions of Essex and Kent to the immediate east of the capital. Furthermore, in Farrell’s proposal the artificial islands are conceived as actual cities on water. Over a million houses and other infrastructures – such as bridges and river dockyards connected to the inland by a high-speed network – will be accommodated in this area, destined to become a high-density urban district.

Claiming land from the sea has always represented the apex of an effort opposing human beings to nature. Building in water, as is the case of the Thames Gateway, requires technology, infrastructures and resources. In the last few decades, we have witnessed the enhancement of waterfronts throughout Europe, the extension of dams and ports in Holland, as well as the creation of artificial islands in Dubai and Hong Kong. The urbanisme seems to be directed towards the sea, which is an element that climate change is transforming into the most insidious threat. Why, then, claim virgin land in a hostile environment? Coasts have always been a privileged point of human, commercial and cultural interchange. In an age devoted to mobility such as ours, large costal cities represent the most important interface between peoples and continents: London, Rotterdam, Venice, New York, Tokyo and Hong Kong embody this paradigm on a global scale.

The deltas of the Pearl and Yangtze Rivers on the southern coast of China are very well known examples. Urban development in these areas have given rise to what may be the largest concentration of adjacent metropolitan areas in the world, home to over 150 million people. These areas are characterized by an uninterrupted urban system connected by bridges and underwater tunnels. Many primary infrastructures – such as ports, airports, power plants and petrochemical industries – are located along the coast or built into the estuary itself; for instance, the Hong Kong International Airport. The custom of claiming constructible land from the water has extended the city into the delta, originating “amphibious” urban districts linked by bridges and connected to the mainland by both land and sea. In areas like Hong Kong and Shanghai, we are witnessing the birth of a wather urbanisme i.e., a special development model centred on a marine space along whose margins a
city with its infrastructure has developed. Although differing in scale and size, the Thames estuary potentially belongs to the same scenario. In fact, it is an urban area dominated by a river, located behind a capital city, which is a nodal point of land, sea and air exchange towards the inland, as well as towards the continent through the Eurotunnel.

Thames Estuary Project than does not simply concern itself with the construction of a commercial or railway link connecting one region to another, nor a barrier preserving the capital from floods. The project’s amplitude and its social and urban repercussions call for a far bolder proposal, an active project able to both establish a long term development framework and to provide world class measures for flood risk management through the creation of artificial islands and mobile barriers.

3 | Alternative Proposal 2009

The government is indeed committed to a £9bn transformation of the region by 2011, and the plans include 160,000 new homes, supported by high quality transport infrastructure. However, in actual fact little is left of the investments originally allotted: the current economic slump and opposition by local authorities have reduced the project to mere ecological ‘beauty treatment’, depriving the Thames Gateway of all its key infrastructures, including the barriers, bridges, and artificial islands. (citare fonte e descrivere nuova schedule).

This decision is a blow to the very heart of the project. And, without adequate flood defences, the capital and the entire estuary will be exposed to increasingly frequent and forceful floods. It seems that the only alternative way to face this concrete threat is building tall, devastating coastal banks, thus blocking the natural tidal exchange in the wet areas of the estuary. The impact on the local economy will be even more devastating, leaving the area completely destitute of the infrastructure necessary to its development and integration with the urban system of Greater London (crf problemi burocratici).

In view of what seems to be a failure to harness a historic opportunity, several proposals have been put forward as an alternative to Farrell’s scheme. Among them, one particularly noteworthy was prepared by Ghost Architects, a London-based research group, in February 2009.

The core of their proposal is to render the barriers an infrastructural pole of primary, irreplaceable importance, equipped with ports and airports, concentrating in the estuary all the connections to and from the capital. The area's geographical opening and its relative proximity to London make such an amphibious mega-structure an essential node for air and sea traffic, whose economic and demographic repercussions would lead to a new urbanism in the estuary.

The building of the barriers would indirectly impact all residential development in the area. The plan, in fact, includes new low-density settlements built inside amphibious parks. They would include one- or two-family houses located in the flood plain, which would consequently no longer be subject to the constant risk of flooding. Moreover, the building of the barriers would make the land banks superfluous, rendering more flexible the boundary between land and river wet areas. Under these specific conditions, it would also be possible to extend the shoals and swamps into the areas previously reclaimed for agricultural purposes, thus increasing the inland network of natural parks.

Despite the primary role played by the environmental component, the Ghost Architects’plan is decidedly infrastructural in nature. Ports, airports, barriers and flowing corridors are the large frame in which all the functions of the area are housed. This frame is sufficiently strong to make it possible to plan the present and future development of the entire estuary around it. As in a sort of pyramid chain, each element of the system imposes the need for the following one. The road and railway connections on the barriers will serve to link ports and airports to the capital; the ports will, in turn, lead to secondary urbanism connected to the tertiary and tourism sectors. The entire estuary area – with enhanced infrastructures and transports – will see the rise of urban settlements, partly on the mainland, partly on the flood plain, and partly on artificial islands or floating platforms located inside the river.

4 | Decommissioned Fields

Urbanization of this scale requires not only infrastructure, but also land suitable for building, as well as an adequate energy supply plan. Many areas in the estuary are today occupied by industrial and chemical plants which are still operating. Furthermore, next to the river there are a number of the country’s largest thermal power plants on whose operation the energy supply of the entire region depends. Consequently, a careful examination paradoxically shows that the Thames estuary is an area bound to have a difficult urban future, because the land is currently densely industrialized making any process of land reclamation long and costly.

The industrial history of the Thames brings us back to the 17th century, when the estuary presented itself as a landscape of canals and sandbanks that remained unkempt until the first industrialization. From 1830 (?) to 1990 a series of reclamations stole wet areas in order to settle industries of any kind, from the iron and steel to the naval ones, from the chemical plants to the refineries. However, if the estuary past history tells us of continuous industrial expansion, the current one deals instead with soil pollution, abusive dumps and hundreds of discarded plants. Abandonment is, actually, a slow but gradual process, which involves above all the field of chemistry and industry. The reasons can be found in the high costs of plants maintenance, of the purification plants, of the reclamation activities and the safety measures, which are all procedures that the law has imposed only recently.

Today the banks of the Thames are a territory where abandonment gives the spectator a
feeling of disorder and absence; it is a land with no future, which cannot be industrialised because its proximity to settlements, on the other hand, cannot be de-industrialised either because the soil is highly polluted; and which cannot be loved, since for decades it has caused intoxications and deaths among the local population. Then, what to do of a land which is rich of infrastructure, close to a harbour in full activity, in a strong a quickly economically expanding area near London, which is the annual destination of millions of people? The problem of reclaiming and reconstituting the polluted areas, underlines the limits of the actual energetic system that burns fossil fuels in order to get power and synthesizes oil into plastic materials, which are subsequently abandoned in dumping grounds; a system which, when facing the always growing energetic demands, finds hard to exploit the alternative energetic sources.

The areas we are talking about are not only situated close by crowded urban settlements, but also occupy territories of high landscape and archaeological degree, which today are somehow compromised and polluted. Once they are abandoned, industrial areas become no-man’s land; when they lose their productive aim, they appear only as a hidden mosaic of abusive dumping grounds and makeshift squats for clandestine immigrants who cannot find housing elsewhere. Ghost Architects proposed to design such areas as energetically self-sufficient urban settlements, capable of working in harmony with the environment and its sources. Moreover, the idea is to produce power from the tidal movements and from the gasification of urban waste. The barrier indeed takes advantage of the existing currents in the channel. Certain perforations in the structure act as marine current turbines, accelerating water movement and currents. Because the water level in the estuary is relatively shallow, flows tend to be faster, generating more energy. The energy produced from this action is channelled into accumulators and then delivered to the housing settlements. Urban and agricultural waste represents a second, sizeable energy resource, especially in areas like the estuary where low-density settlements alternate with extensive farming areas. Urban waste and agricultural biomass will be turned into liquid hydrogen through a gasification process, then distributed to the settlements. According to this proposal, the concept of the power plant abandons the prototype of the old traditional centralised plant and stretches its definition in order to include a system of micro-plants scattered throughout the region.

5 | Conclusions

Trying to understand what is actually proposed for the Thames Gateway is a difficult undertaking. It encompasses a large number of projects over a massive area. All projects share the need of protecting the estuary and London from increasingly frequent floods, but vary greatly in how they propose to achieve such a goal. In the plan adopted by the Department for Communities and Local Government, architect Terry Farrell proposes a system of mobile dams installed at the mouth of the river, and a series of eco-cities built on artificial islands near the barriers. In Farrell’s proposal high-density settlements concentrate close to the capital leaving the outer gateway land largely undeveloped with Parks and wild wet areas. In actual fact, due to the lack of funding (la confusa amministrazione), the project has been downsized to a system of land banks without any actual flood defence. The problem of the Farrell plan is having limited the strategic extent of the barriers to a merely defensive mechanism. Other proposals, such as the one by Ghost Architects, aim at implementing the construction of ports and airports, so as to create an irreplaceable node in the transport system to and from the capital. Much of the infrastructure would be represented by artificial islands built on the shallow sand bed of the river using fill materials. The idea of building airports and seaport terminals on artificial islands is not new, as shown by projects carried out in Hong Kong, Shanghai and Macau. The system of barriers in the estuary is also not a novelty, considering the dams that protect Amsterdam and Rotterdam in Holland. What makes London unique is the will to integrate an urban system of 7 million inhabitants with a second system, mainly suburban, dominated by the river and sea. Since its origins, London has never been a water city like we might consider Venice, Amsterdam or Portsmouth in the U.K. London has based its trade on a system of river ports, and on the Thames as a link to the open sea. By transforming the estuary into a single urban area, the Thames Gateway Project essentially links the city to the coast; the presence of ports, airports and primary infrastructural facilities on the coast determines a deep modification to the “inland” nature of the city itself, opening it to a system of connections with other water-facing urban systems.