# Delta Urbanism coming of age

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# *Delta Urbanism Coming of Age*

## *25 years of Delta Urbanism where are we now?*

*Han Meyer*

‘Delta Urbanism’ is a common field of interest of different disciplines, which discovered the need to work together in order to be able to develop fruitful strategies for the future development of urbanized delta regions. The birth of this collaboration can be dated in the 1980s and 1990s, with the rise of three different fields of concern on the effects of industrial society: the concern on the environmental impact of industrialization, the concern on the alarming state of affairs of cities in these years, and the rising concern on climate change. The development of a real program of Delta Urbanism at TU Delft started in 2005, with the International Architecture Biennale Rotterdam ‘the Flood’, the Katrina disaster in New Orleans and the start of the new Delta Program in the Netherlands as important driving forces. Important in the Delta Urbanism program is the search for a new ‘Darwinistic’ approach, emphasizing the evolutionary character of delta regions, and adaptivity as a main strategy to survive. This approach should substitute the traditional reductionist ‘Einstein’ approach, which is fitting in the dominating paradigm of the industrial society.

Delta Urbanism itself can also be considered an evolutionary field of interest: it is under construction continuously. For the future, we can appoint four important issues to be elaborated: a more radical approach of the new adage ‘working with water’, water as a leverage for a complex society in transition; making delta landscapes adaptive, and design as an explorative method.

## *INTRODUCTION. DELTA URBANISM PAST, PRESENT AND FUTURE*

'Delta urbanism'- what's in a name? Celebrating 25 years of Delta Urbanism suggests that it all started somewhere in the early 1990s. Perhaps we can make that plausible with a little bit of fantasy. However, it is better to say that the first ten years functioned more as a period to explore the relation between urban patterns and water landscapes; a real start (and also the use of the term 'delta urbanism') can be dated around 2005, as I will argue in this chapter. This development shows that 'delta urbanism' is not a fixed method or discipline, but a field of interest and action which is learning continuously, and, by that, also changing time by time. The question is: what did we learn in the course of time, in what sense did we develop new knowledge, new methods of research and action, and where are we now? What can we say, after 25 years of trying, testing, exploring and redefining, about the next 25 years? What will and should be the mission of Delta Urbanism of the future? This chapter is an attempt to start with an answer on these questions.

## *DARWIN MEETS EINSTEIN*

The term 'Delta Urbanism' has been used somewhere in the first years of the 21st century, to indicate a common field of interest and action of a number of disciplines. This common field of interest and action can be understood as a response to the industrial society of the 20th century.

The rise of an industrial economy in the 19th and 20th century was not only a revolutionary development in production methods, but influenced all fields of society and science profoundly. The basic idea, or the *paradigm* of the industrial society, which finds its fundaments in the Enlightenment, is the idea that everything in the world can be understood, explained, unraveled, reduced to its elementary parts, and finally rearranged, controlled and steered. This idea wasn't only applied in the industrial production itself, where raw materials were decomposed, transformed and combined, resulting in new products like refrigerators, vacuum cleaners or automobiles. The idea was also supposed to be applicable on the political organization of our society and on the spatial organization of our cities, industrial enclaves and agricultural production landscapes. Also science itself was organized according to this paradigm: divided in many different disciplines, with a clear playing field: each discipline with its own focus and methods and hardly communicating with other disciplines.

This became increasingly the *dominating* idea, but it was not the only idea about the world, economy, society and space. In his book *Darwin meets Einstein,* the Dutch physicist Frans Saris shows two opposite views on the world and science in the 19th and early 20th century, in which Einstein represents the reductionist paradigm of the industrial society, aiming to explore what nature is. On the other hand, Darwin represents a more evolutionary idea of the world, aiming to discover how nature works, in which direction it tends to change, and how species succeed to survive and to adapt to these changes[1]. *Survival* and *adaptation* are central key words in Darwin's theory.

For the time being, Einstein won the competition. This domination of the reductionist approach in science, as an essential part of the paradigm of the industrial society, has resulted in an unprecedented economic growth and to high levels of quality of life for millions of people. That is the

reason that it is very difficult to change this paradigm – even when it has become crystal clear this paradigm has brought, next to economic growth and welfare, also many problems like pollution, exhaustion of the earth, dismantling of urban communities and climate change. If we are talking about a *postindustrial* society, we don't mean a society without industry, but a society without the domination of the reductionist paradigm of the industrial society. In other words, instead of only focusing on Einstein, we need a little bit more Darwin.

2 Wolf, 2015
3 Meadows et al., 1972
4 Meyer, 2017
5 The Eo Wijers Foundation was established in praise of the late professor Regional Design and director of the *Rijksplanologische Dienst* (National Planning Service) Eo Wijers in 1985, in order to promote and stimulate design at the regional scale. https://eowijers.nl/

## *THREE FIELDS OF CONCERN: THE NATURAL ENVIRONMENT, THE URBAN QUESTION, CLIMATE CHANGE*

Also delta urbanism itself can be interpreted as a 'postindustrial' response to the paradigm and consequences of the industrial society. More precisely, the rise of delta urbanism can be considered the result of three evolutionary processes, or three fields of increasing concern on the consequences of the industrial society. In the course of the early 21st century these three fields of concern were mixing up with each other. That process of mixing up can be regarded the start of what we call 'delta urbanism'.

The first field of concern was the natural environment. There has been a concern for the environment already since the nineteenth century, when people like Alexander Humboldt showed the systemic coherence of different natural environments and their ecosystems, and warned for the serious consequences of changing these environments by large scale hydraulic works[2]. Also the establishment of nature conservation organizations in the late nineteenth and early twentieth century, like the British *National Trust* and the Dutch *Natuurmonumenten*, was the result of an increasing concern for the rapid disappearance of nature areas because of the extension of industrial and urban areas and the construction of large scale infrastructural works.

But it was the report *The Limits to Growth* of the international counsel 'Club of Rome' in 1972, which rang the alarm on the disastrous state of affairs of the earth, caused by industrial production[3]. The report was not the only event which draw the broad public and political attention to environmental issues; better is to say that it was the most comprehensive and well-argued representation of a general *zeitgeist* of that period. From the mid-1960s, an increasing concern with the deplorable state of affairs of the natural environment was expressed by nature conservation organizations, biologists and ecologists in western countries. Ad-hoc citizen initiatives were established to protest against large scale industrial and infrastructural projects.

*figure 01 — page 30*

And with success: In the Netherlands, plans for nuclear plants and an airport south of Rotterdam were cancelled for this reason. Also the reclamation of the Markerwaard (the final part of the *Zuiderzee* works, north-east of Amsterdam) and the closure of the East Scheldt (the final part of the Delta works) were cancelled during the 1970s and early 1980s, as a result of strong protests[4]. In the central river area, citizen initiatives succeeded to obstruct the enhancement and elevation of the dikes, and to force the government to start a broad debate on the future of the river area, taking into account the cultural and ecological values of this landscape. It was the reason for the Eo Wijers Foundation[5] to start a design competition on the future of the Dutch river land-

*figure 02 — page 30* 

scape. The winning project, *Plan Ooievaar* ('Plan Stork', ), was a plea for a radical change in river management, planning and design. Instead of continuing the approach of narrowing riverbeds and strengthening the dikes, they proposed to widen the riverbeds by the replacement of dikes and the construction of by-passes. The riverbed would get more room for extreme peak discharges as well as for more biodiversity. This groundbreaking change would become the major principle in the later program 'Room for the River'(2005-2015).

The *Plan Ooievaar* was submitted by a team of young landscape architects, ecologists and civil engineers, all recently graduated. It shows the rising interest in concern for the environment among the students of the academic institutions and young professionals.

The second field of wconcern was the increasingly dramatic and deplorable state of the cities in the 1970s and 1980s. The spatial policy of most western countries during the postwar decades was focused on the creation of a new type of urbanity, fitting in the idea of industrialization and modernization of the society as a whole. The emphasis was put on the layout of new housing districts in the urban outskirts and the countryside, on the industrial serial production of housing units in these new districts, on the promotion of the automobile as the representation of modern living in the industrial society par excellence, and, as an essential contribution of the public sector, on the construction of vast network of highways. The leading example was the New Deal policy in the USA of the 1930s and the many projects by 'power broker' Robert Moses[6]. It inspired postwar European policies, like the Dutch national spatial policy agenda in the 1950s and 1960s[7] and, especially, the policy and concepts for the reconstruction of the bombed city of Rotterdam. The result was a mass emigration of people from the existing cities to the new suburbs, leaving the old cities in an increasingly deplorable state. In the Netherlands, cities like Amsterdam, Rotterdam[8], The Hague, lost more than a quarter of their population in the period 1965 – 1980. The central city areas were left to chance, inhabited by

*figure 03 — page 31* 

a low-income population in an obsolete housing stock.

In other European cities comparable developments took place. With the departure of so many inhabitants, the cities lost tax revenues and the basic support for public as well as commercial facilities like schools, hospitals, shops, theatres, cinemas. Everywhere in the western world, cities were getting tangled in a spiral of neglect, impoverishment, decay and criminality. In the USA, large cities like New York and Chicago found themselves at the edge of bankruptcy during de mid-1980s.

The concern on the state of affairs of the big cities was not a result of a sudden awareness, but showed its first signs already in the 1950s and 1960s. In the USA, the books by Lewis Mumford[9] and Jane Jacobs[10] functioned as important manifests against the domination of modernistic concepts for urban development. In Europe, the sociologist Manuel Castells published his influential pamphlet *La Question Urbaine*[11] in 1972, which opened the eyes of many professionals and academics concerning the need for another policy in the cities. The result was a wave of attention to renewal and repair of the older housing stocks in many European cities in the 1970s, followed by an increasing attention to restore and revitalize

6 Caro, 1974
7 Bosma, 1993; Van der Cammen & de Klerk 2012
8 Wagenaar, 1992
9 Mumford, 1961
10 Jacobs, 1961
11 Castells, 1972

the urban diversity and economy of cities in the 1980s and 1990s. In the professional and academic world, the critics on the modernistic concepts led to a renewed attention to the relation between urban form and urban vitality, expressed by many studies on urban morphology and typology by several European as well as North-American 'schools'[12]. Several publications from this period still play an influential role in the current debate on urban design, like the books by Philip Panerai and Jean Castex, Christopher Alexander, and others[13]. As we stated in our first publication and seminar on 'Dutch Urbanism Today' in 2003, the special contribution of Dutch urbanists to this international tendency was the attention to the relation between the landscape and urban form. Urban designers like Rein Geurtsen, Maurits de Hoog, Frits Palmboom, Jaap van den Bout and many others, all of them active in academia as well as in professional practice, showed the need of being aware of the close interaction between the marshy landscape of the Dutch delta, the hydraulic systems to make this landscape inhabitable, and the specific character of urban form of Dutch cities[14]. This attention of urban designers to the landscape condition created the condition for a close collaboration of urban designers and landscape architects, and, as we already saw in the example of the *Plan Ooievaar* project, hydraulic engineers.

It was this special focus and attention to the relation between urban form and landscape, and the close collaborations between urbanists, landscape architects and engineers, which created the fundaments for the new urban regeneration plans in the Netherlands like those for the derelict port districts in Amsterdam and Rotterdam *figure 04 — page 31*  , but also for many new extension areas of the 1990s (the 'VINEX' projects[15]), like the Ypenburg project near The Hague, Nesselande near Rotterdam, IJburg near Amsterdam and Leidsche Rijn near Utrecht. The two fields of concern (with the environment and with the state of the cities) met each other and were interwoven in an increasingly common practice. This interweaving of urban design and landscape architecture was also expressed in the rise of a new generation of design firms like Quadrat, BGSV, Palmbout, West 8: all of them include urban designers as well as landscape architects.

Also in academia the attention to the mutual influences of urban design, landscape architecture and engineering was increasing in this period of the 1990s and early 21st century. The analysis of the construction and transformation of port city landscapes was an example of this attention, expressed in my study *City and Port*[16]. The PhD thesis of Fransje Hooimeijer is another example. She analyzed this combination of disciplines, starting from the 15th and 16 centuries, as a basic condition for the growth and beauty of the Dutch polder cities[17].

The third field of concern was climate change. The concern with this serious consequence of the industrial society started some decades later than the first two: The Intergovernmental Panel on Climate Change (IPCC) was founded by the United Nations in 1988, and delivered its first report in 1990. Since then, every three to four years a new assessment report in climate change has been published by the IPCC, with increasingly alarming conclusions concerning flood risk in densely populated areas. The general public and political awareness of the seriousness of climate change followed some later. The movie *An Unconvenient Truth* by All Gore, released in 2006, was an important accelerator of a growing public and political involvement

12 Moudon, 1994.
13 Panerai et al., 1975; Alexander, 1977. See also our treatise on the renaissance of the attention to urban form in Meyer et al., 2020, p. 36-41
14 Meyer, 2003
15 'VINEX' is an abbreviation of *Vierde Nota Extra,* which was a special attachment of the *Vierde Nota Ruimtelijke Ordening* (Fourth Memorandum on Spatial Planning) of the Dutch government, published in 1990. With the Vinex-document, the national government indicated exactly the locations and the allowed numbers of new houses of new urban districts
16 Meyer, 1996/1999
17 Hooimeijer, 2014

in this matter and was followed by international conventions and agreements in Copenhagen (2009) and Paris (2015). It is true that the concern on climate change can be considered part of the concern on environment, as described before. But the awareness of the impact of the industrial society on the *change* of the climate resulted in a new agenda for action: first, it showed the necessity of *mitigation,* which means the introduction of processes which could stop the emissions of greenhouse gasses. Energy transition, leading to a zero-fossil energy production, is the most important aspect of this part of the agenda for action. Second, the awareness of climate change showed the necessity of *adaptation*. This means that we should take into account that the consequences of the current climate change, like sea level rise, more intense precipitation and increasing discharges by rivers, but also the rise of temperatures and the increase of periods of heat and drought, will persist for many decades – even when we succeed to mitigate successfully tomorrow.

The most important consequence for our field of work - our cities and landscapes - is that we learned that we shouldn't regard cities and urbanized landscapes as industrial machines, but as complex, evolutionary systems, and that the future of these systems is uncertain. Complexity, evolution, uncertainty, adaptation became the new key words for disciplines like urban design, landscape architecture, hydraulic engineering, but also for environmental sciences, informatics, governance-studies. This is where the 'Darwinistic' approach is starting: Being aware of the evolutionary, complex character and uncertainty of urban landscapes. Working together, these disciplines started to pay more attention to the mutual influences of landscape characteristics, built interventions, water systems, manmade hydraulic systems, environmental processes and social, cultural and political processes.

In the Netherlands, the awareness that climate change was happening started in 1993, some years after the publication of the first IPCC report. The reason was an extreme peak discharge in the rivers in that year, followed by a second in 1995, which resulted in the evacuation of more than

*figure 05 — page 32*


250,000 people from their homes in the central river area. These events in the central river area contributed to a general awareness that something was happening which was never foreseen: a structural increase of the rivers discharge volumes, far more than ever calculated in previous years. Instead of enhancing and heightening the river dikes one more time, the perspective of the *Plan Ooievaar* of broadening the river beds offered more perspectives for dealing with complexity and uncertainty and for a new policy of *adaptation*. It resulted finally in the already mentioned program

*figure 06 — page 33*


*Room for the River* (2005-2015), offering more space for river water, and more possibilities to pay attention to the different desires of local communities and environmental issues concerning spatial, cultural and ecological qualities of the river area[18].

## *THE RISE OF AN INTEGRATED APPROACH*

However, it is not before the middle of the first decade of the 21st century that Delta Urbanism became more tangible and recognizable as a special program, with special reasons and characteristics:

*Urgency*

Especially the debate on the environmental impact of climate change, the consequences for sea level rise and increasing river discharges, and, as a result, the increasing flood risk for cities in deltas and coastal areas gained momentum in 2005. It was the year of the 2nd International Architecture Biennale Rotterdam, curated by landscape architect Adriaan Geuze, who titled this event 'The Flood'. Linked to this Biennale, the book 'Atlas of Dutch Water Cities'was published, showing the legacy and existing practice of the interweaving of hydraulic engineering and urbanism in Dutch urban design[19]. But the Biennale especially showed that only cultivating the close relationship between delta landscapes, urban patterns and engineering systems was not enough; it was time to come with new solutions and new approaches.

Less than three months after this event, the dramatic Katrina disaster in New Orleans showed the correctness of this call to new solutions. For the Dutch government, it was the decisive reason to establish a Delta committee, who advised to start a special Delta Program. The final report of the Delta committee was entitled '*working together with water'*, which was a reference to the need of new solutions and a new approach: instead of 'fighting against water', which was the adage of hydraulic engineering in the 20th century, the Delta Committee plead for an approach which should be based on the understanding and use of the natural dynamics of water systems[20]. It was the same way of thinking which was the fundament of the program 'Room for the River', also starting in 2005 and intending to turn the dominating idea on the relation between water system and urban/economic systems 180 degrees. The Delta Committee and the Room for the River program pointed out the long term, slow but fundamental changes of natural water systems, and the impossibility to control or hold back these changes. So, instead of 'water systems should follow the logics of urban/economic systems', the Delta Committee plead for more attention to the need of 'adapting urban/economic systems to the logics of water systems'.

*Complexity*

The way of thinking in the Room for the River program and the Delta Committee was indebted to the work of the American landscape architect Ian McHarg[21], who plead for more attention to slow, long-term but very powerful changes of natural systems, and whose ideas were imported and elaborated among landscape architects and academics the 1970s and 1980s. These ideas joined those of the French historian Fernand Braudel, who showed the complexity and mutual influences of natural and man-made systems, and emphasized the influence of the natural landscape as an important, very slowly changing power on the culture of people[22]. His ideas of the 'longue durée' of natural systems became popular with urbanists in the Netherlands in the 1980s. The influence of these ideas show the increasing search for a more 'darwinistic' approach in Dutch urbanism and landscape architecture. This development was accelerated by the organization of two conferences on the relevance of complexity theories for urbanism at TU Delft, in 2009 and 2013[23]. Complexity theories were rising in all scientific fields from the 1990s, showing an increasing displeasure and discomfort of scientists with the dominating reductionism in science, and a search for new concepts and approaches for the big challenges of the post-industrial world of the 21st century[24]. Also in urbanism complex-

19 Hooimeijer, Meyer & Nienhuis, 2005
20 Delta committee, 2008
21 McHarg, 1969
22 Braudel, 1966
23 Both conferences resulted in a book: Portugali et al., 2012; Portugali & Stolk, 2016.
24 See for instance Mitchel M., 2009; Mitchel S.D., 2009; Saris, 2010

ity theories were recognized as relevant for a new approach in design and planning, taking into account uncertainty and the need to include possibilities for adaptation in spatial designs. It influenced the research and educational programs in Delft and other universities fundamentally.

TU Delft stimulated interdisciplinary and applied research in platform like the Delft Research Center Water (2003 - 2009) and the Deltas, Infrastructures & Mobility Initiative (DIMI, from 2009). The work by these platforms enhanced the awareness of the need of interdisciplinary collaboration and resulted in many invitations for advisory boards, workshops and conferences on water-related urbanism all around the world, including an advisory paper to the UN Habitat III conference in 2016[25].

*Internationalization*

The period around 2005 showed also a 'momentum' of a number of initiatives to regard the worldwide relevance of new approaches to water-related spatial questions. Initiated by KU Leuven urban design professor Marcel Smets, the TU Delft, together with KU Leuven, IUAV Venice and UPC Barcelona started a new European Master program on Urbanism (EMU) in 2005[26]. The EMU program, organized as 'master-post-master', and intended for graduated students with already some professional experience in architecture, landscape architecture and urbanism, functioned as an accelerator of new design and planning concepts for urbanization in water dominated regions, like the Dutch delta, but also the Veneto and the Venice lagoon, the Flemish lowlands and the Catalonian coastline[27]. The semester 'Constructing the Sustainable Delta City' of the Delft EMU program, and the many graduation projects of EMU students, dedicated to this theme, functioned as an accelerator of knowledge and new design concepts for urbanized delta regions.

*figure 07 — page 34*

The already mentioned disaster of Katrina in New Orleans also happened in 2005, and was the reason of the start of *Dutch Dialogues*, a close collaboration of American and Dutch academics and professionals to develop a new plan for the reconstruction of the devastated areas in the metropolitan region of Greater New Orleans. The result was presented as the Greater New Orleans Urban Water Plan in 2013[28].

*Delta Urbanism as a program*

These processes of increasing urgency, increasing awareness of complexity, and increasing internationalization, led to the development of a *program* of Delta Urbanism, in which research, education and a focus on application in practice were combined.

In the field of educational programs, the EMU played an important role, as already mentioned, as well as a special interdisciplinary graduation studio *Delta Interventions,* which became a central place of collaboration of students ànd staff members in Architecture, Urbanism, Landscape Architecture, Civil Engineering and Technical Management[29]. The studio was focused mainly on the Dutch territory, but was dedicated several times also to other places like New York (2013-2014, after hurricane Sandy in 2012), Houston (2014-2015)[30] and San Francisco (2016-2017). In addition, individual students also focused and graduated on deltas, rivers and coasts like the Mississippi delta, the Mekong delta, the Danube, the Parana delta in Argentina, and others.

25 Meyer & Peters, 2016
26 http://www.emurbanism.eu/
27 Important 'engines' in the EMU program on water was the work of Vigano and Secchi (IUAV Venice) on the Veneto region, developed with EMU students, and the work of DeMeulder and Shannon of KU Leuven. See Vigano & Secchi, 2016; DeMeulder & Shannon, 2013
28 Waggonner+Ball Architects, 2013
29 The studio started in 2008 and was originally titled 'Climate Adaptation Lab', coordinated by Anne Loes Nillesen, see Nillesen et al., 2016. From 2016, the studio is led by Taneha Bacchin
30 Kothuis et al., 2015

Both the Delta Interventions studio and the EMU studios functioned as an engine for intensified collaboration of staff members of Urban Design and Landscape Architecture at TU Delft, resulting in combined projects for the EMU program and to a series of common publications[31].

A PhD program on Delta Urbanism started, with PhD students from all over the world and focusing on the deltas and water landscapes like the Rhine river in Germany[32], the Rhine-Meuse delta in the Netherlands[33], the Pearl River delta (PRC)[34], Kaohsiung (Taiwan)[35], the Parana delta (Argentina)[36], Porto Alegre (Brazil)[37].

Also the Dutch Delta program, started in 2009, functioned as an important accelerator of research and education in Delft, for instance with extensive research programs in which universities and other institutes collaborated with each other intensively. Examples are the programs on multifunctional flood defenses[38], on the future of the Southwest delta[39] and the future of the Dutch coastline[40]. The results of the Delta Interventions Studio and the EMU projects were helpful for the advisory role of some TU Delft staff members (Maurits de Hoog, Anne Loes Nillesen, Han Meyer) in the Delta program on the Rotterdam region. This program aimed to explore different options for flood risk reduction in this region. The student projects, focusing on design explorations to discover potential effects and possibilities of the different options, played an important role in the recommendations of the TU Delft advisors to the Delta program, and in the final decision making of the Delta program itself. *figure 08 — page 34*

Moreover, the results of the student projects played a role in several scientific publications.

An important contribution was the initiative of the EFL Foundation[41] to start the Van Eesteren chair at TU Delft, dedicated to the future of the IJsselmeer area. The work of this chair (2014 - 2018) showed how design explorations can result in an inspiring vision on the future of an urbanizing deltaic region[42]. *figure 09 — page 34*


## *THE FUTURE OF DELTA URBANISM*

From the work of the last fifteen years, we can distillate some issues which need to be elaborated in the next years. The most important of them are:

### *Working with water: more radical*

The new adage of the Delta Committee 'working with water' seems to be adopted in main stream practice, considering the quantity of urban and regional plans which pay attention to the presence of water. However, looking with a more close eye to these plans, 'water' is mainly an added element in many of these plans, and not a guiding principle. The change from 'water follows function' to 'function follows water' is not yet a generally accepted rule in design an planning. The Room for the River program produced several interesting examples of applying this rule, for instance in the *Waalsprong* ('Waal jump') project in Nijmegen. During the 1990s, the city of Nijmegen had prepared a new plan for urban extension at the North embankments of the Waal river. Under these conditions, the only way to enhance the flood defense system was to elevate the river dikes. After many design workshops with the Room for the River program team, the plan was turned in a radical way: the priority was changed to the widening of the river bed by creating a

31 See for instance the publications of Meyer and Nijhuis 2013 and 2014
32 Redeker, 2013
33 Bobbink, 2016; Van Veelen, 2016; Nillesen, 2019
34 Tai ,2018
35 Chung, 2104
36 Zagare, 2018
37 Bacchin, 2015
38 The STW-funded program MFFD (Multifunctional Flood Defenses) was a collaboration of three universities: University of Twente, TU Delft and Wageningen University. See: Kothuis & Kok, 2017
39 The NWO- funded program IPDD (Integral Planning and Design in the Delta) was a collaboration of TU Delft, Erasmus University, Wageningen University and several other research institutes and private firms. See: Meyer et al., 2015
40 The *Atelier Kustkwaliteit* (Studio Coastal Quality) was a collaboration of and financed by TU Delft, Delta program, provinces, municipalities and private firms. See: Brand et al., 2014
41 The EFL Foundation (van Eesteren, Fluck & van Lohuizen Foundation) aims to pay attention and to explore the current relevance of the legacy of Dutch urbanists Cornelis van Eesteren (1897 – 1988) and Theo van Lohuizen (1890 – 1956). See: https://efl-stichting.nl/
42 Palmboom, 2018

by-pass; the plan for the new urban area had to be changed and was subordinated to the primary goal of the river system. However, it turns out to be difficult to apply this principle always and everywhere. Especially in densely urbanized and industrialized port areas, the focus still is on the function of the enhancement of these regions as central pivots of the industrial system and on the adaptation of the water system to this function. As described elsewhere, the Mississippi river delta and the Rhine-Meuse delta are two examples of port regions where the river system needs a radical change, but where it is extremely difficult to apply these changes because of the interests of the port industries[43]. This touches also the next issue:

*Water as a leverage*

In most urbanized river- and delta-regions, 'water' is not the only issue to be solved. Governments and planning institutions are facing multiple problems and tasks to solve: next to rising sea levels and increasing peak discharges of rivers they have to deal with energy transition, which needs a fundamental reorganization of the industrial economy to a circular economy, ongoing urbanization and shortages on the housing market, enhancing biodiversity and diversification of agriculture, potential revolutions in transport systems, etcetera. All these different issues are related to each other and influence each other. It makes spatial planning and design in these regions extremely complex and can result easily in paralysis. There are many courageous attempts to develop 'integral' or 'comprehensive' planning approaches, which try to pay attention to all these different issues and to develop coherent future visions. But the problem is that all these different issues have different evolutionary time-paths. The fundamental notion of the water system as an element of the '*longue durée*', as explained by people like French historian Fernand Braudel[44] and North-American landscape architect Ian McHarg[45], emphasized the need to give priority to the building of strong basic water systems, which create possibilities and can stimulate the transitions in other domains like industry, urbanization and agriculture. An example is the development of the Dutch Delta Works in the 1950s and 1960s. During the postwar decades, the Netherlands were facing multiple problems too, like a very weak industrial economy, a fragmented and inefficient agriculture, high poverty rates in the cities, an insufficient housing stock and a poor road system. In the first instance, the flood disaster of 1953 seemed to worsen the critical situation of the nation. But the Delta Works, planned and built in the years after 1953, were not only an answer to increasing flood risk, but contributed essentially to the economic and spatial resurrection of the country. Building the Delta Works offered not only a new flood defense system to the Southwest of the Netherlands, but was also an essential contribution to a new national transport system, which connected the isolated islands of the delta to each other, a new network of navigation routes, new industrial plants, a spatial reorganization of the agricultural land and a new framework for urban development. The building of the Delta Works was a catalyst in the transformation of the Netherlands from one over the poorest countries of North-Europa to one of the richest countries of he world. Moreover, after the economic crisis of the 1930s, the German occupation during World War II, the loss of the Dutch colonies in the East in the 1940s, and finally the flood disaster of 1953, the Delta Works contributed to a new collective idea of national identity and proudness.[46]

43 Meyer, 2019
44 Braudel, 1966
45 McHarg, 1969
46 Meyer, 2017

This example is relevant for the current context, in the sense that we should try not only to pay attention to the short term problems of a necessary change of the water system, but also on the long term benefits for spatial, economic and cultural transitions.

47 See also Meyer et al., 2020

*Adaptivity*

A big difference between the Delta Work and the current need to change the water systems, is the need to make the water system *adaptive,* that means that it should be prepared not only for current changes in conditions like sea level rise, but also for future, still uncertain changes. The water system should be able to deal with the capricious and unpredictable character of climate change, sea level rise and river discharges. While the Delta Works are an expression of 'Einsteinian' paradigm of the industrial society, focusing on exploiting and controlling the natural system, we need a more 'Darwinistic' approach, which takes into account the evolutionary character of natural as well as societal systems. The classical method for making systems adaptive, is creating *redundancy*. This is not only a classical rule in water management, but also in construction-engineering and urbanism. Before it was possible to calculate the load of floors of buildings and the strength of beams, it was common practice to apply oversized beams. They assured that the building would stay upright, also when the way of use and the load of the floors would change in the future. In 19th century urbanism, it was usual to design oversized streets and boulevards, prepared for changes and intensification of traffic and other ways of use of public space[47]. Also the most important aspect of the Room for the River program is creating redundancy, by making oversized river beds, bypasses and overflow areas. An important question in all these examples is how redundant elements or areas can get a value, also when they are not in use for their primary function? How can oversized beams in buildings, oversized streets in cities, or oversized riverbeds in landscapes be accepted, also when the redundant space is used only once in ten years? This is a question of smart design as well as smart temporary use. The research project IPDD ('Integrated Planning and Design in the Delta') developed a set of design-principles, which combine redundant space for high water events with temporary use as agricultural area, woodlands, recreational landscape or a combination of these types of land use. Only in periods of critical high water events, the redundant space will be in use as overflow areas for the river water, and the land users know that and are supposed to be prepared to deal with this temporary disturbance.

*figure 10 — page 35*


*Design as an explorative method*

The question how to deal with the need of creating redundancy and flexibility is directly related with the need of a strong role of design as a method of exploring new possibilities for land use and cultural value. While the 'Einsteinian' approach presented proposals for new dikes and dams as the inevitable results of exact calculations, to be implemented in a hierarchical decision making system, a more 'Darwinistic' approach supposes a more exploring and scanning procedure, in which the contribution of creative designers is indispensable, as well as an open attitude of involved decision-making institutions, citizens and other stakeholders. This is not

a change from a previous 'top-down' decision-making system towards a new 'bottom-up' organized process. The complexity of the water systems in relation with other big tasks in spatial development cannot be approached by a new centralistic 'top-down' approach nor by only new 'bottom-up' procedures. The point is that we should find new balances between aspects which should be explored and finally decided at a large scale, and aspects which should be explored and decided at a small, local scale. This makes it necessary that designers and planners are able to 'switch between the scales' constantly, and that governance systems are able to deal with this 'switching between the scales'. As an example, again, we can refer to the Room for the River program. This program was led by a central program direction, which had defined some very general rules, like the minimum capacity of the river bed for water discharge, and some starting points for ecological and spatial quality. Next to this, forty projects were defined to be designed and implemented by local teams of water managers, engineers, landscape and urban designers, environmental scientists, related with local stakeholders like city administrations, civic organizations, famers, recreational entrepreneurs, etcetera. The elaboration of the local projects was discussed with the 'Quality Team' of the central program organization frequently[48]. In this context, it was possible to adapt proposals of the local teams to the general rules of the program, but also to adapt the general rules of the program to new findings and inventions of local teams. It resulted also in new governance arrangements for the implementation and long term management of the projects.

Design as an explorative method and the organization of new governance arrangements are not two different fields of discussion but closely connected to each other: new results of the design process often suppose new governance arrangements, and vice versa.

48 Klijn et al., 2013; Sijmons et al., 2017

## *CONCLUDING REMARKS*

'Delta Urbanism' is an example of a process of 'coming together' of different disciplines. Increasing collaboration of different disciplines, looking for new approaches to complex issues with high societal impact, is happening everywhere in the current world. It has become clear that the current division of academic and professional work in many different disciplines shouldn't result in a complete isolation of these disciplines. Instead of an isolation in separated 'silos', disciplines should learn to work together and to find new ways of interdisciplinary research and development. Everywhere in the world, universities, public bodies as well as private firms are experimenting with working in interdisciplinary teams. It doesn't mean that a discipline has to deny and abolish its own body of knowledge, methods and theories, but it does mean that each discipline is aware of its own limitations, and is able to communicate, exchange information and create added value together with other disciplines. This working together is essential to reach a more 'Darwinistic' approach to evolutionary processes, which enables us to see the coherence and mutual influences of different disciplinary fields instead of staring blindly to the maximum score in each separated discipline.

'Delta Urbanism' shows that this development of interdisciplinary work is an evolutionary process, which will probably never end in a final method. Delta Urbanism shows that, after 25 years, we are able to define

some essential aspects and starting points, as explained in the previous paragraph. For the next 25 years, the task is to elaborate these starting points in clear methods and solutions.

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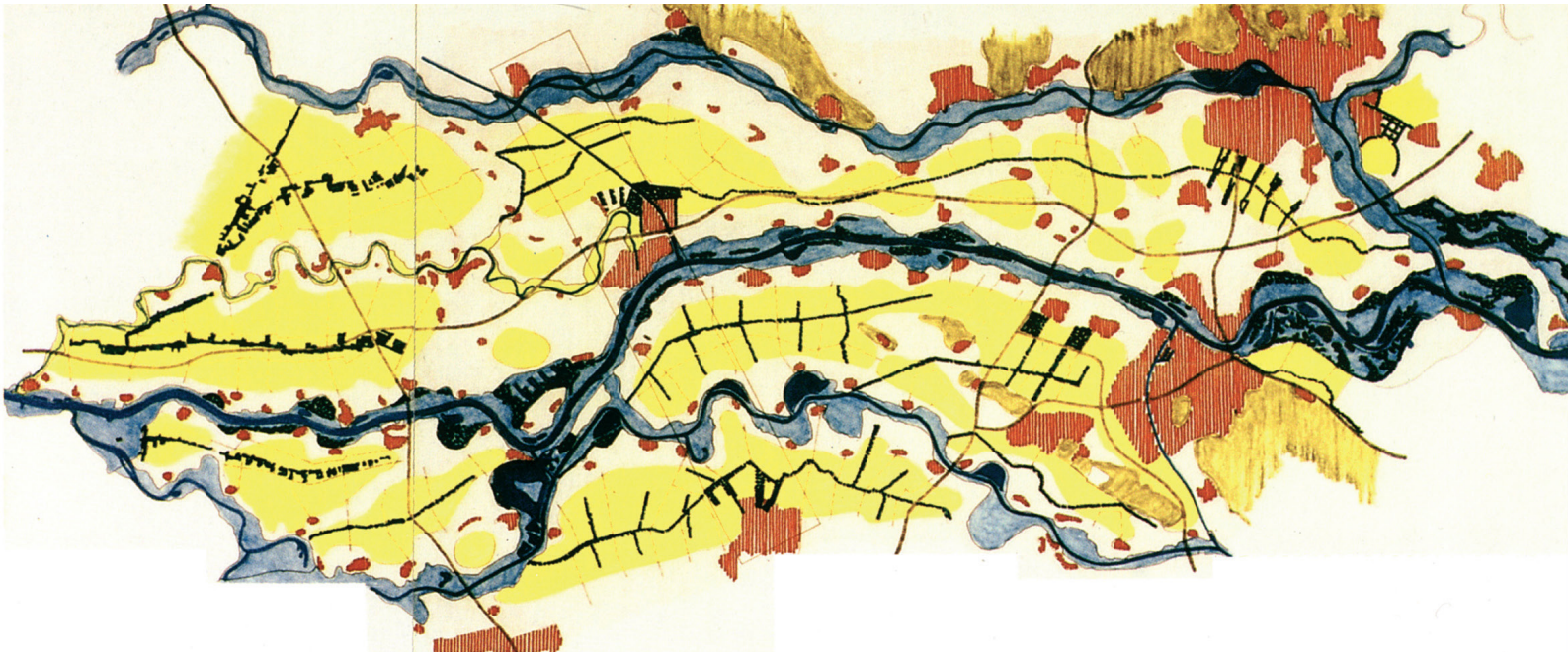


*02*

*01* Protest against air pollution by oil industries in Rotterdam region, 1970. Photo Herbert Behrens, National Archive (public domain).

*02* 'Plan Stork', winning entry for the design competition 'The future of the river land' by the Eo Wijers foundation, 1986. Design by D. de Bruin, D. Hamhuis, L. van Nieuwenhuijze, W. Overmars, D. Sijmons, F. Vera.

*03*

*04*

*03* Rotterdam in the 1980s: at the time the largest port city of the world, with an obsolete housing stock.
Photo by Piet Rook.

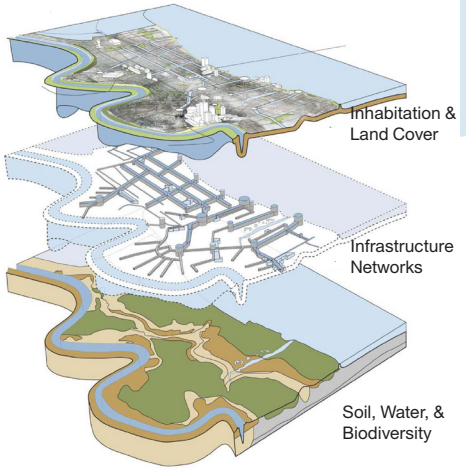
*04* Analysis of the Rotterdam river landscape, as a leading motive for the design of new urban patterns. City planning department Rotterdam, 1990.
Drawing by Paul Achterberg.

*05*

*05* Extreme high water event in the Dutch river area, February 1995.
Photo by Rijkswaterstaat.

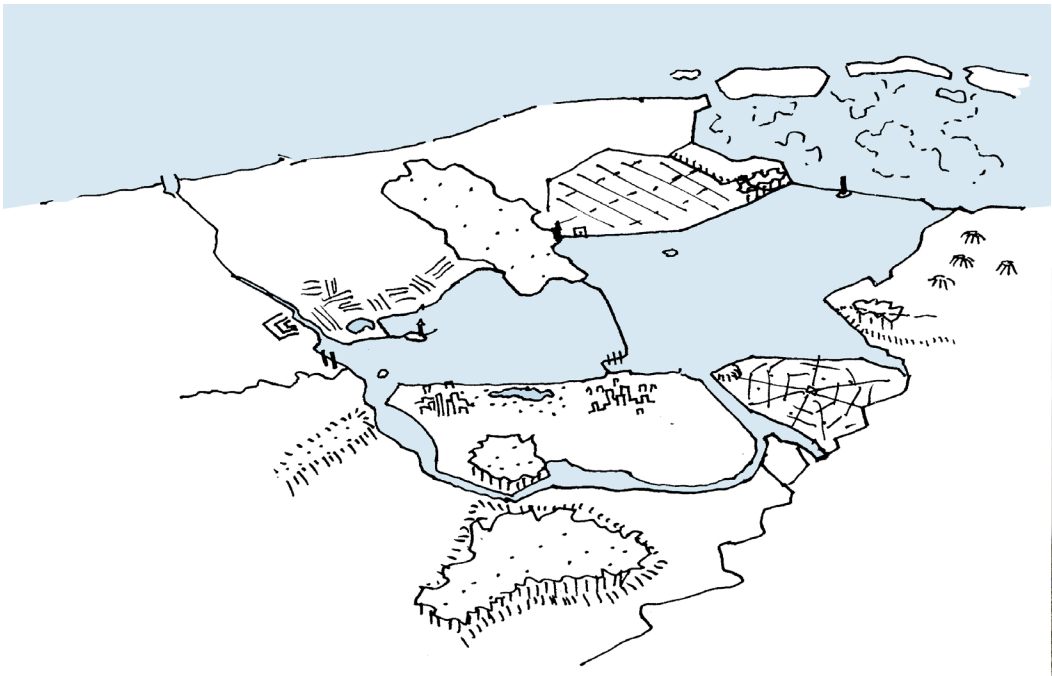

*06*

*06* Program Room for the River. Indication of intervention projects. Map by program team Room for the River, 2005.




Layered Planning Process
Working from the ground up to determine how to integrate the natural flows of the landscape into infrastructure networks and the physical shape of our communities

*07*



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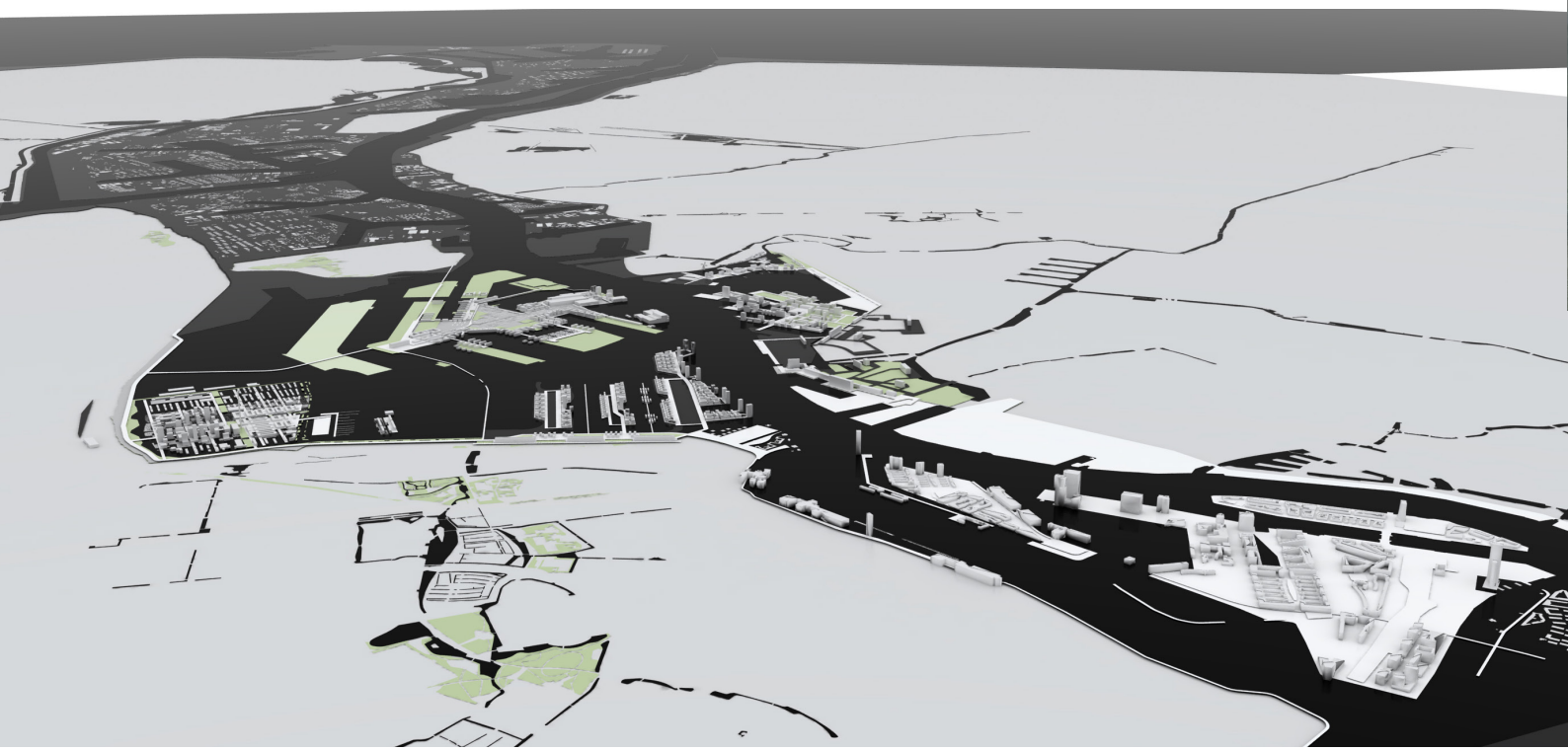

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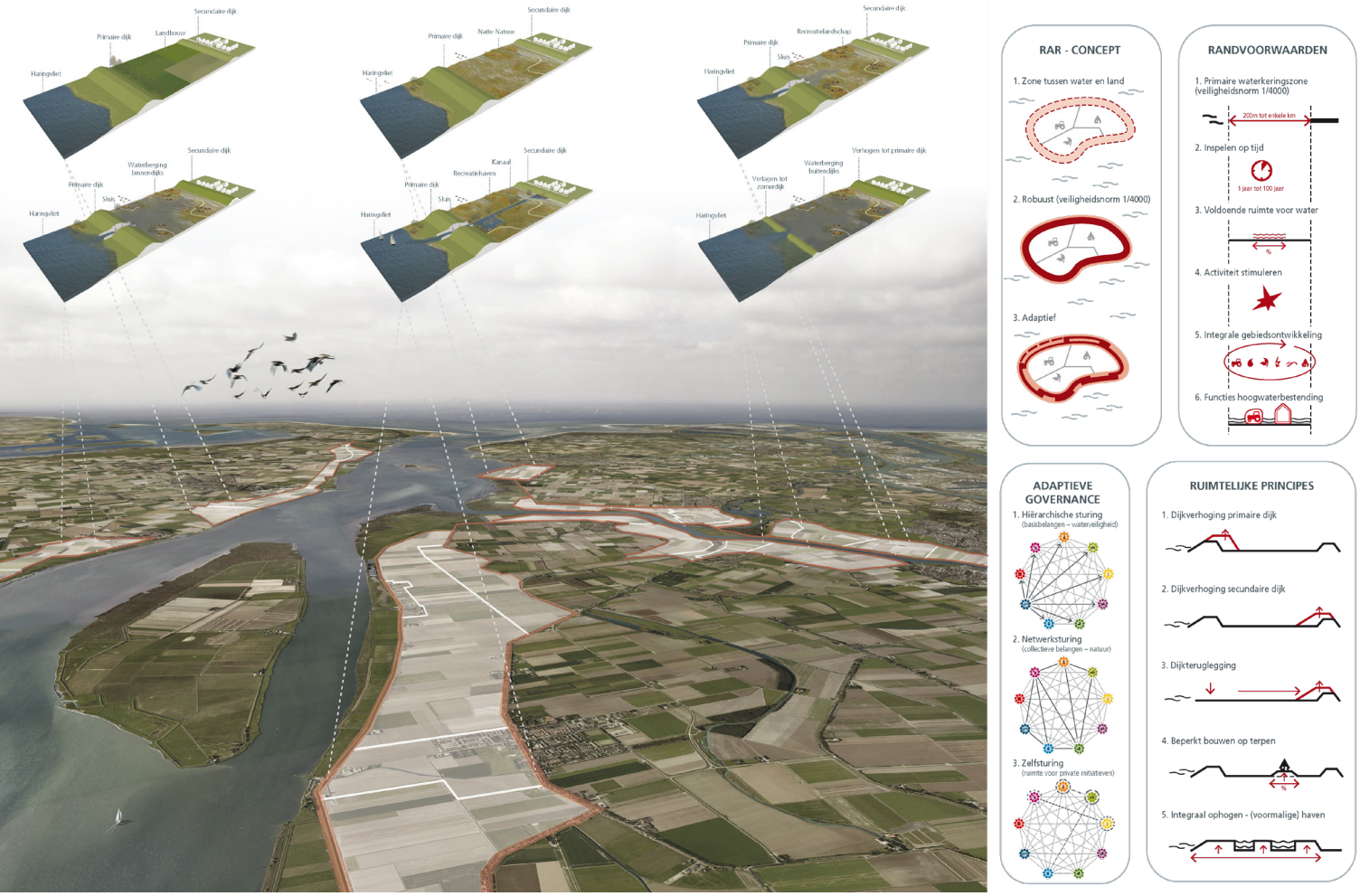
*07* New Orleans as a complex system, composed by different layers: the landscape of the substratum (bottom), the network of hydraulic infrastructures (middle), the urban pattern (top). Greater New Orleans Urban Water Plan, 2013. Drawing by Waggonner+Ball Architects, New Orleans.

*08* Design exploration of a possible future of the city of Rotterdam in times of extremely high sea levels. TU Delft, EMU project 'Constructing the sustainable delta city', 2011.

*09* The IJsselmeer area as a 'metropolitan breath of fresh air'. Drawing by Paul Broekhuisen and Frits Palmboom.







*10*

*10* Design rules for a 'robust adaptive framework' in the Dutch Southwest delta, combining redundancy for flood control with temporary use of flood zones. IPDD project, 2014.

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