



# San Francisco Space Fiction

Notions of nature in a Dataism age

Master Graduation Project of Leyang Chen  
TU Delft | Landscape Architecture



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Leyang Chen

Leyang Chen  
louisyoungc@gmail.com

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Chair of landscape architecture  
Phone: +31 (0)15 27 89111  
Fax: + 31 (0)6 10339730  
E-mail: info@tudelft.nl

Postal address  
Postbus 5  
2600 AA Delft  
The Netherlands

Visiting address  
Faculty of Architecture and the Built Environment (Building 8)  
Julianalaan 134  
2628 BL Delft

First Mentor

Dr. Ir. Inge Bobbink  
Assistant Professor Landscape Architecture  
Technology University of Delft

Second Mentor

Ir. Mike Emmerik  
Researcher and Teacher Design and Politics  
Technology University of Delft

Examiner

Dr. Ir. Marjolein Spaans  
Senior Researcher Urban and Regional Development  
Technology University of Delft





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## □ SUMMARY

Investigating on far future, the progress of this project has been an explorative quest with innovative experiments, succeed or failed. Starting from the core of landscape architecture, nature notion, my footprint in this quest spread in history, philosophy, technology, movie review/making, novel writing, not to mention, architecture and urbanism. I have to admit that, for most of the time, it was a chaos. But now, looking back to this forky route I have taken, I'm finally able to distinguish the main stops and show you my journey in a comprehensible structure.

Nature has always been the authority for landscape architects (Spirn, 2002), and its definition changes all the time. The project starts with an examination of the notions of nature in landscape architectural praxes through history and raised a question, what will be our next notion of nature.

Among all trends claimed to change the world, Big Data has been the new minion of almost every discipline according to Steve Lohr's (2015) observation. Data-ism is thus proposed to be the next dominant ideology after animism, theism, and humanism by Yuval Noah Harari (2017). Fascinated by this concept, the research question of this project is formulated as what will be the new notions of nature and new forms of urban landscape in a data-ism age.

It is a question related to far future with countless possibilities. To evoke my imagination and, at the same time, limit it in a scientific frame, an experimental research and design method, reflective scenario, is established. It contains three rounds of scenario making, predictive scenario, explorative scenario and normative scenario. Each round of scenario making builds up its scenario base upon reflection on the previous round. The scenario base will be developed into context scenario in an abstract level and finally translated into spatial quality. The steps in each scenario jump between time and scales, and make sure the result to be scientific and coherent, while the reflections between the 3 phases could involve and scope my personal intuition. The method is adapted to fit in this particular project. In the adapted method, reflections refer to notions of nature, future technology collections become the scenario bases, context scenarios are studied and presented in the form of story and

collage, and the spatial scenario is illustrated by future images.

As a monument of humanism and a frontier of data-ism, San Francisco is a perfect site to test the concept of data-ism and the method of reflective scenario. Responding to the pressure of six environmental risks in San Francisco, namely flood, earthquake, energy, food, traffic and housing, the radical transformation becomes more relevant and reasonable.

The first round of scenario making takes the concept, resilience, as a start point, where nature is regarded as dynamic process. The predictive scenario shows an undesirable image and revealed the dilemma of resilience. Reflecting on that, the new relationship between nature, human and data is explored. As a result, three new notions of nature are proposed. They are nature as post-humanity, nature as eco-program, nature as trans-reality.

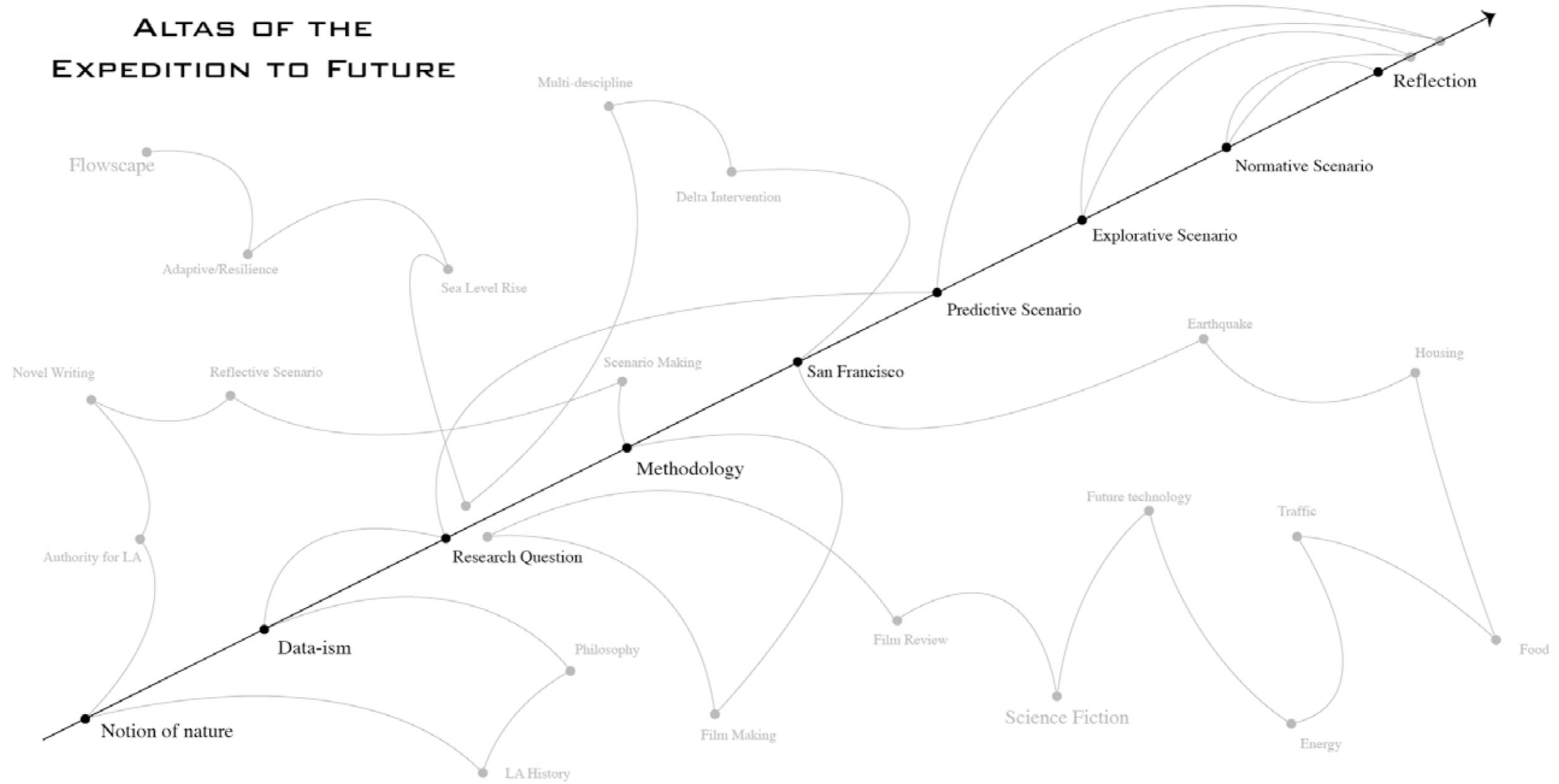
The second round of scenario making explores the social-spatial consequences of the three new notions of nature respectively. By taking a monistic view, each notion of nature is pushed to an extreme and their main characteristics are exposed. However, this reductive approach ignores the complexity of the reality and the particularity of the site, thus remains irrelevant. Reflecting on that, the third round of scenario is made

aiming to localize the three notions of nature through time and space.

The third round of scenario making starts with comparing the technologies and “living models” based on the three new notions of nature. With the results as input, three spots in San Francisco along the axis of the city are designed through time. The design might seem to be abstract and personal. But it helps to open the discussion by making it tangible.

This project addressed the relationship between nature notion and landscape practice, established a method to explore far future, proposed three new notions of nature in the data-ism age, speculated the future urban landscape in San Francisco under the new notions of nature. However, the aim of this project is not to give a direct answer, but rather trigger a new discussion on alternative futures in the discipline of architecture, urbanism and landscape architecture.

# ALTAS OF THE EXPEDITION TO FUTURE





## 1 INSPIRATION: NATURE & LANDSCAPE

### *1.1 The authority of nature*

During my study in track Landscape Architecture, I was constantly asked the question, what is landscape architecture. Every time, by answering this difficult question from a slightly different perspective, I found myself enriching the possibility of the discipline as well as myself.

In this graduation project, I asked myself this question again, from another perspective. That is, what can justify a landscape architecture design and what is the sovereign authority in landscape architecture?

I find my answer in the authority of nature.

Nature has always been a core concept in the discipline of landscape architecture. As Spirn observed, “Landscape architects hold strong ideas about nature; whatever it means to them, they tend to care about it, for the beliefs and values those ideas represent are usually at the heart of why they entered the profession.” She further pointed out that “nature and natural are among the words landscape architects use most frequently to justify their designs or to evoke a sense of ‘goodness’” (Spirn, 2002).

Indeed, no matter representing nature, protecting nature, experiencing nature or designing (building) with nature, all those approaches of landscape architecture are justified in the name of nature, whereby they represent the position we hold ourselves in nature. Nature is the authority for landscape architecture.

However, this authority is highly problematic, since nature is “perhaps the most complex word in the language [English]” (Williams, 1982). It originally meant the essential or given quality of something, then extended to two additional meanings, “the inherent force which directs either the world or human beings or both” and “the material world itself, taken as including or not including human beings” (Williams, 1982).

These definitions are so abstract and broad that they almost contain everything from form to process, and that they are not helpful to justify our behaviors. In context, the word nature can be much more specific. Sixty-six senses of the words nature and natural have been identified by Lovejoy and Boas from literature and philosophy from the ancient Greeks to the eighteenth century (Lovejoy and Boas, 1973). Inspired by their approach, I took a journey on examining the nature notions specifically in landscape praxes through history. Here, the focus is on the mainstream of western landscape history, since the project will be located in San Francisco (a western context) and the precedent research have been down deeply.

Cultivate  
Experience  
Protect  
Design with  
Represent  
Reclaim

Relate to

# Nature

## 1.2 Nature in landscape architecture

The origin of western landscape praxes, the enclosed garden, can find its landscape archetypes in the clearing in the forests and oasis in the deserts (Aben and De Wit, 1999). Aben and De Wit suggest that the primitives hold an ambivalent attitude to nature living in the clearing and oasis: a wildness with danger and a source of income (1999).

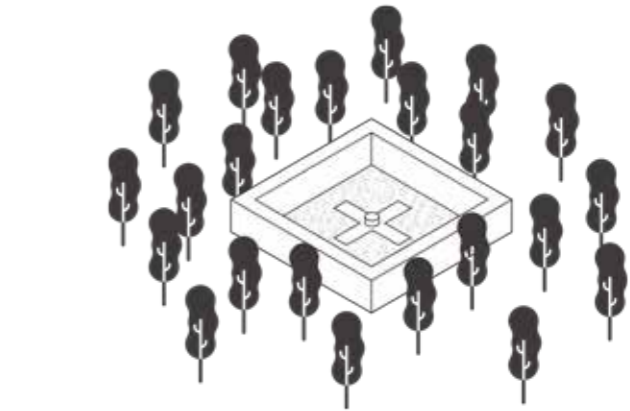
In the Middle age, where the enclosed garden prevailed, the ambivalent attitude as Aben and De Wit (1999) described were explained by Bible. Nature was regarded as both gifts from God to his proud creation and punishment for their self-recognition. In between, there was the enclosure of the enclosed garden, to protect people from nature as wildness and to enjoy the nature as sources. Starting from this theistic point of view, the enclosed garden copied its qualities from "paradise", the safety, the natural diversity and the access to god.

It is ironic to see that this theistic point of view was supported rather than opposed by science and humanism in Renaissance. It was believed that God's divine order is in nature, although concealed by an apparent chaos. Scientists were approaching God by observing nature. For landscape architects, according to Marsilio Ficino, "virtue is nothing other than nature transformed into perfection, the garden, in which nature was sublimated" (Steenbergen and Reh,

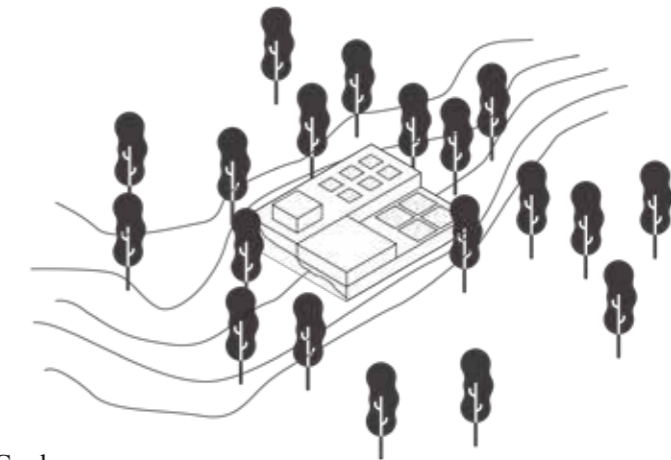
1996). Shaped by this thought, the rational garden played with the geometric transformation of the geomorphology and was much more welcoming to observe the real nature than the enclosed garden.



Clearing & Oasis  
Nature: Danger & Resource  
Aesthetic & Ethic: Surviving



Enclosed Garden  
Nature: God's presents and punishment  
Aesthetic & Ethic: Access to God



Rational Garden  
Nature: God's Instruction  
Aesthetic & Ethic: Reveal order from chaos





[http://www.framearch.co.uk/t5/wp-content/uploads/2006/06/clearing\\_780px.jpg](http://www.framearch.co.uk/t5/wp-content/uploads/2006/06/clearing_780px.jpg);  
[https://cdn1.wimp.com/images/sthumbs/2015/01/2af94a9a580823265b0879619a9f16f0\\_oasis1.jpg](https://cdn1.wimp.com/images/sthumbs/2015/01/2af94a9a580823265b0879619a9f16f0_oasis1.jpg)

Clearing & Oasis



[http://blog.metmuseum.org/cloistersgardens/2011/05/26/women-and-the-medieval-garden/lady\\_honor\\_450-2/](http://blog.metmuseum.org/cloistersgardens/2011/05/26/women-and-the-medieval-garden/lady_honor_450-2/)

Enclosed Garden  
(Honor Making a Chaplet of Roses)



<http://www.fiesoleforyou.it/wp-content/uploads/2016/01/villa-medici-fiesole-4.jpg>

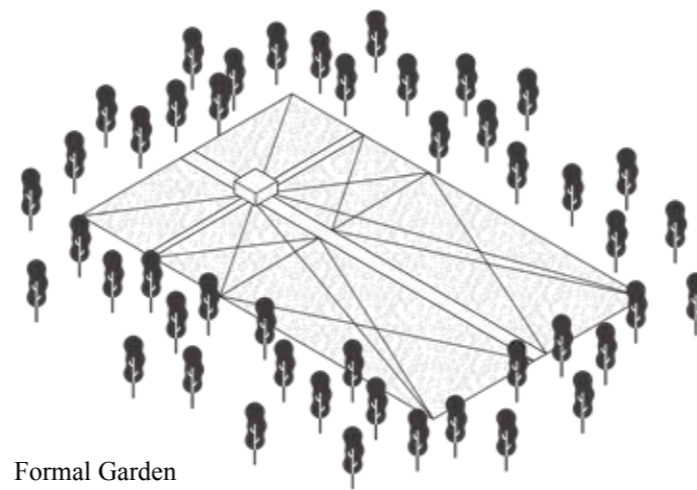
Rational Garden  
(Villa Medici, Florence)



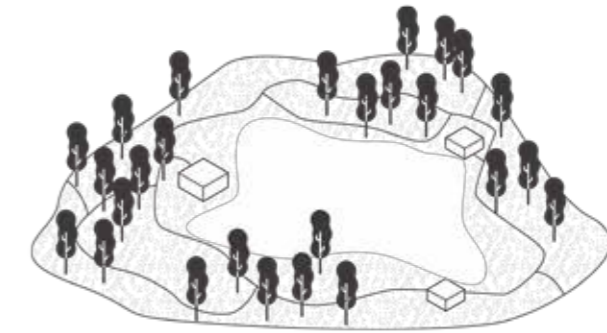
The scientific concept of nature was isolated from its theological context in the first half of the 17th century. While the notion of nature was still closely tied to God in Renaissance, for scientists in Baroque, natural phenomena could only be explained by mathematics (Steenbergen and Reh, 1996). This scientific interpretation of nature entitled and justified a great power to human, with which the physical nature was transformed dramatically for the sake of human or even a man. The formal garden at that time demonstrated this centralized power, with its artificial form and careful maintenance in an impressive scale. The wild nature there was taken as a measurement of this power.

The 18th-century picturesque garden has a background of the Enlightenment. Science explained most of the natural phenomenon so well, which evoked a believe that everything should have a practical reason. "Nature was recognized as a cosmological system to which society was also in principle subordinate. It was, therefore, a mirror image of the social order"(Steenbergen and Reh, 1996). Thus, people should follow the evolutionary rules, responding to their feeling and intuition, which were given by nature, instead of religious or political structure. "Nature was idealized as the source of good in man (the true civilization)" (Steenbergen and Reh, 1996). Reason, freedom, and equality in nature became the new ethic. That was where natural form got its romantic aesthetic in the picturesque garden. Nature is beautiful because it's reasonable.

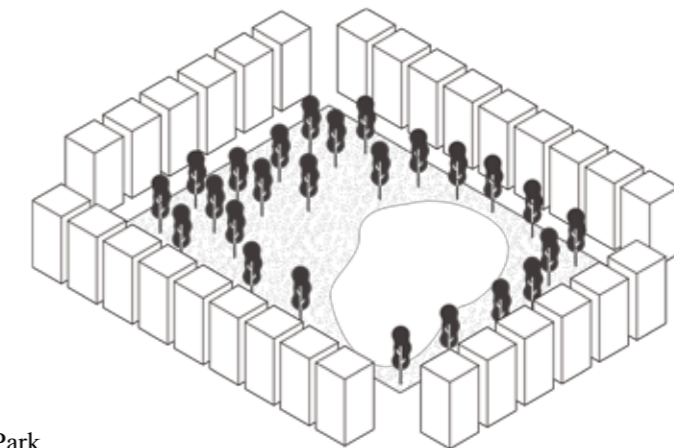
The Enlightenment pushed humanism and science to the mainstream of history, followed by industrialization and urbanization where the knowledge we gained about nature finally showed its power in transforming nature. Forests were turned into farmlands and cities; rivers were blocked or canalized; air was polluted. In the 19th century, by suffering from the low life quality in cities, people realized nature's recreational value and ecological value apart from the aesthetic one. Urban parks became the new approach for landscape architects, "as a green remedy, a compensation for the pressures of modern life" (Prominski, 2005). From then on, the hate-and-love relationship between nature (landscape) and culture (city) was intensified.



Formal Garden  
Nature: A measure of power  
Aesthetic & Ethic: Shape and maintain nature



Picturesque Garden  
Nature: The source of goodness in man  
Aesthetic & Ethic: The reasons in wildness



Urban Park  
Nature: Functional component of city  
Aesthetic & Ethic: Health and recreatio





[http://farm6.staticflickr.com/5711/30548669265\\_2fa795b0b8\\_o.jpg](http://farm6.staticflickr.com/5711/30548669265_2fa795b0b8_o.jpg)

Formal Garden  
(Versaille, Paris)



[https://upload.wikimedia.org/wikipedia/commons/e/e4/Stourhead\\_garden.jpg](https://upload.wikimedia.org/wikipedia/commons/e/e4/Stourhead_garden.jpg)

Picturesque Garden  
(Stourhead, Warminster)



[http://traveltousa.nl/filemanager/images/Central\\_Park\\_Vogelperspektive.jpg](http://traveltousa.nl/filemanager/images/Central_Park_Vogelperspektive.jpg)

Urban Park  
(Central Park, New York)

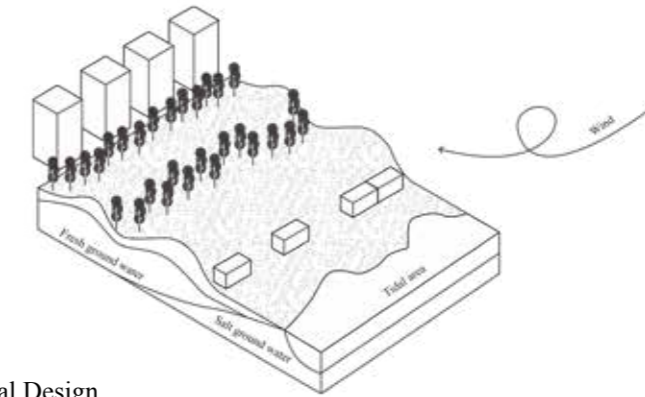


When it came to the 20th century, the nature notions in landscape architecture became conflicting, since the modern establishment of the profession rooted itself in several disciplines: agriculture (gardening, horticulture, forestry), engineering, architecture, fine arts and science (ecology). Frank Lloyd Wright took landscape as an imperfect manifestation of an ideal inner nature. Thus his natural design was to abstract and express the essence of the regional landscape. To Jens Jensen, "nature talks more finely and more deeply when left alone" (Jensen, 1990), and the local landscape will shape the characteristics of the local people. Thus designer should imitate the appearance of the local landscape to maintain the spiritual connection between people and the place. Although the understandings of nature deferred, both Wright and Jensen regarded nature as an ideal image.

However, in 1969, Ian McHarg's *Design with Nature*, ended the debate temporarily by announcing ecology is "not only an explanation but also a command" (McHarg and Mumford, 1969). This ecological approach captured a large following and became a mainstream. For McHarg and his followers, ecology is the ethic, the aesthetic and nature itself.

Despite the "deterministic and doctrinaire view of what is 'natural' and 'beautiful'" embodying a "chilling, close-minded stance of moral certitude" (Olin, 1988), the ecological approach contribute to change our perception

of nature from ideal images to a complex network. As James Corner points out, "dynamic relationships and agencies of process become highlighted in ecological thinking, accounting for a particular spatial form as merely a provisional state of matter, on its way to becoming something else" (Corner, 2006). On the other hand, with everything changes so fast around us, an ideal image becomes meaningless. Uncertainty, process, and relationship get to be appreciated. Rooted in them, resilience becomes the new ethic.



Ecological Design  
Nature: Ecology  
Aesthetic & Ethic: Ecology



Natural Design  
Nature: An ideal image  
Aesthetic & Ethic: Interpret the image of nature



Resilient Design  
Nature: Dynamic process  
Aesthetic & Ethic: Relationship and uncertainty





Natural Design  
(Humboldt park, Chicago)

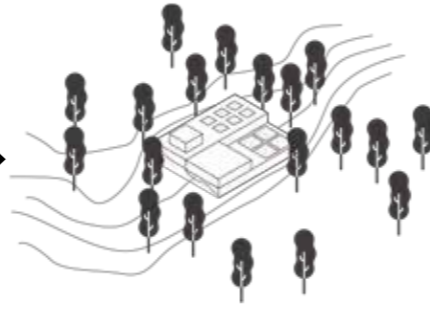
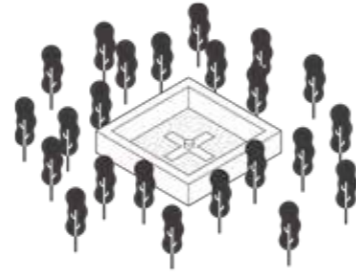
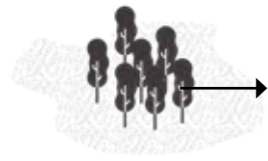


Ecological Design



Urban Park  
(BIG U, New York)





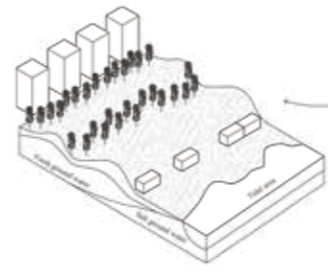
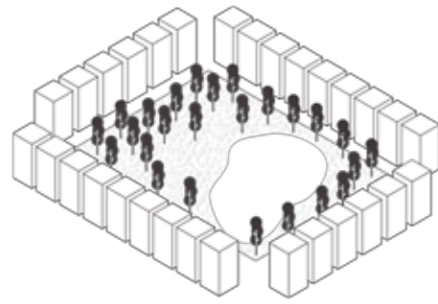
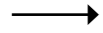
Clearing & Oasis  
Nature: Danger & Resource  
Aesthetic & Ethic: Surviving

Enclosed Garden  
Nature: God's presents and punishment  
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Rational Garden  
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Formal Garden  
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Picturesque Garden  
Nature: The source of goodness in man  
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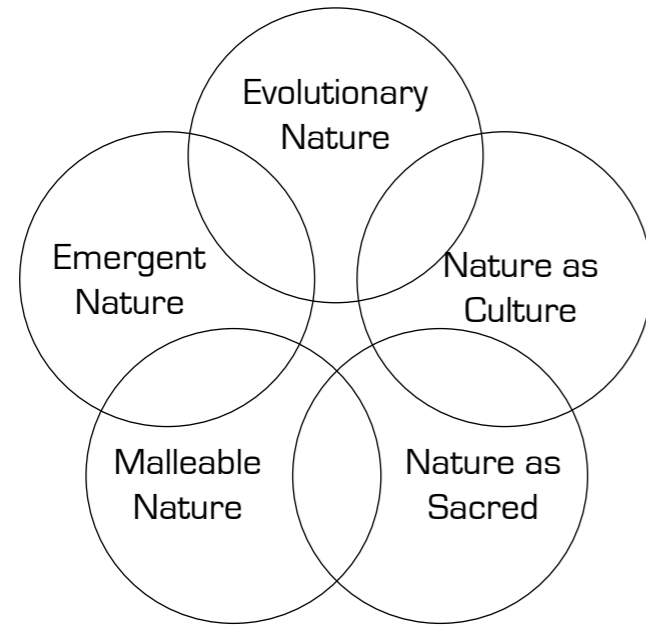
Urban Park  
Nature: Functional component of city  
Aesthetic & Ethic: Health and recreation

Natural Design  
Nature: An ideal image  
Aesthetic & Ethic: Interpret the image of nature

Natural Design  
Nature: An ideal image  
Aesthetic & Ethic: Interpret the image of nature

Resilient Design  
Nature: Dynamic process  
Aesthetic & Ethic: Relationship and uncertainty

### 1.3 A glimpse of future



5 notions of nature  
in *New Visions of Nature, Science and Religion*

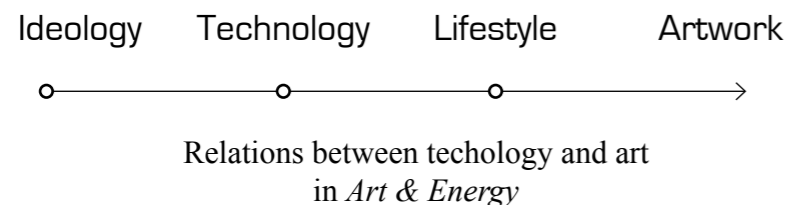
After the examination of history, the next step is to question how long could this resilience fashion last? If not long, what will be our future notion of nature? As a Sci-fi fan, I got some original inspiration from science fiction movies, by film reviewing and filmmaking. (see Appendix 1&2) However, the ideologies predicted in those artworks are too fragmented and imaginary. I started to look for reference from the existing works of philosophers and historians.

The first reference I found useful is an academic research program titled *New Visions of Nature, Science, and Religion*, where five notions of nature were summarized. "In order from the most scientific to the most humanistic, the five included evolutionary nature, emergent nature, malleable nature, nature as sacred, and nature as culture" (Drenthen et al., 2009). I found it useful, in the sense that all the nature notions I identified from historic landscape praxes can be classified into them five, as well as the new notions I speculated later. However, it failed in predicting future.

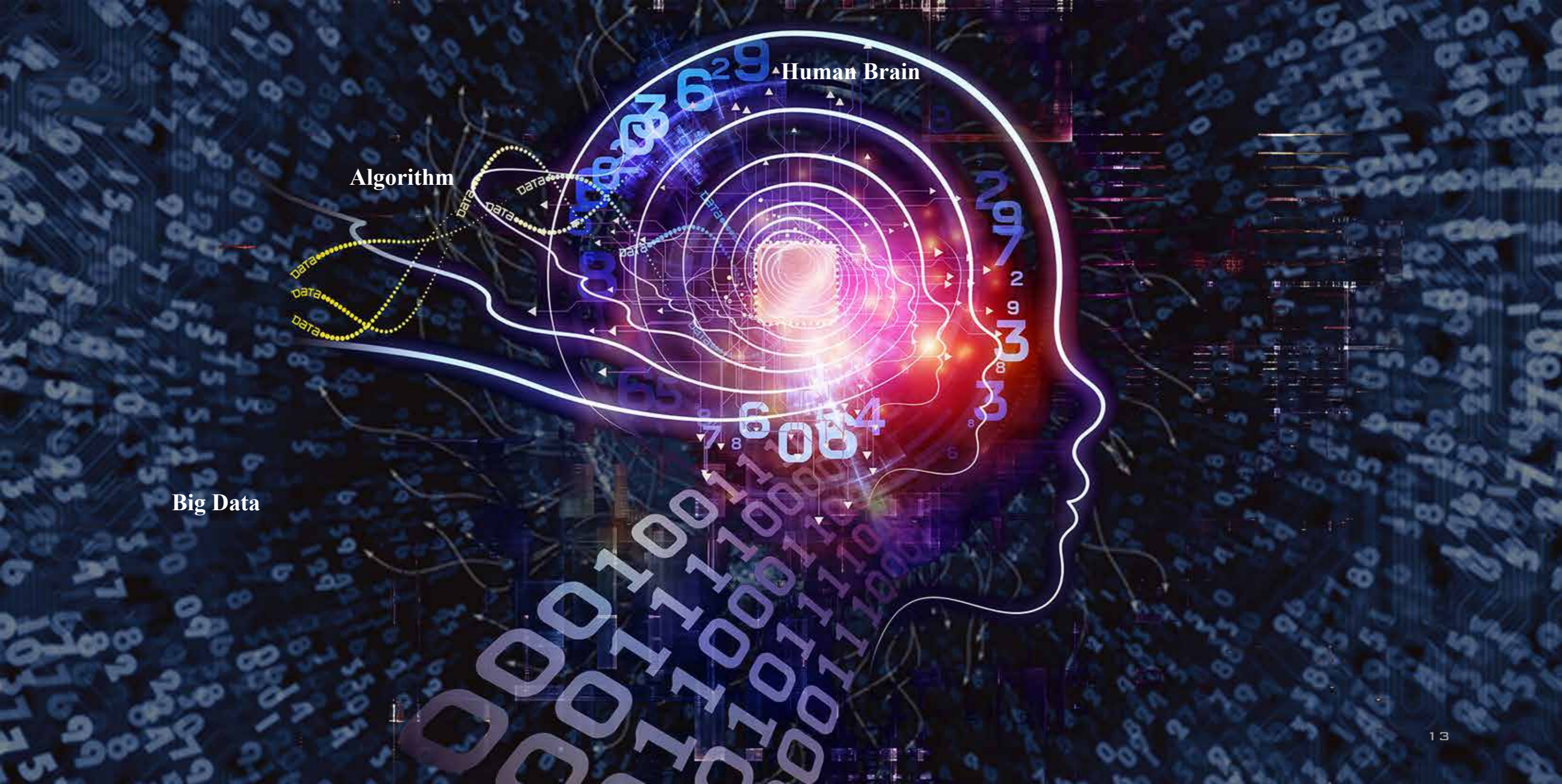
Hints came from historians' prediction. The first historic viewpoint I encountered is Barry Lord's *Art & Energy: How culture changes which attributed the changes of aesthetics and ethics in human culture to energy transition*.

Lord suggested coal fostered a culture of production, oil, and gas led a culture of consumption while renewable energy will shape a culture of "stewardship", where conservation and protection are the main ethics (Lord, 2014). Lord's historic review could match my research, but the future prediction of renewable culture is nothing more than the concept of resilience today. Nevertheless, his depiction of the history suggested that it is not the energy sources themselves shaped our world but the ability we gain from new technology fueled by them.

Later, after all the historians' predictions I approached to, Yuval Noah Harari's *Homo Deus: A brief history of tomorrow* became the most important reference, which gives a relatively holistic review on human evolution rooted in the interrelation between technology and ideology. Harari briefly phased the history of mankind into three periods, the animism period, the theism period and the humanism period, suggested data-ism will be the next dominant ideology (Harari, 2016). Since all the arguments are based on life science and theory of evolution, Harari's description of technology and ideology already touched the periphery of nature notions. Despite the commercialized writing style, Harari's interpretation of history can explain the nature notions through history quite well, and his proposal of data-ism can be an ideological start point for the future nature notions. Then, what is Data-ism?







Human Brain

Algorithm

Big Data





Google AlphaGo defeated Lee Sedol in Game of Go

<http://gameranx.com/wp-content/uploads/2017/02/Pokemon-GO-APK-DOWNLOAD-for-Android-Latest-Version-and-PC.jpg>

## 2 FASCINATION: UPCOMING DATA-ISM

### 2.1 Big data & Data-ism

Data-ism is a newly coined term describing the philosophy driven by the intensive use of Big Data which is enabled by the advanced technology of collecting, storing and processing data in a scale that beyond the ability of human's organic brain.

It is allegedly first coined by David Brooks, formulated by Steve Lohr (2015), and sublimated to the next fundamental belief after humanism by its radical follower, Yuval Noah Harari (2017).

Lohr, in his book *Data-ism: The Revolution Transforming Decision Making, Consumer Behavior, and Almost Everything Else*, described how data-ism was incubated from Silicon Valley, is prevailing in Wall Street and will march into everywhere and any industry by changing the way of making decision. The core statements were, with the access to big data, human will gain holistic views on things; the unknown relations and correlations between data will be revealed by algorithms; the abilities of human will be improved to the next level with more efficient, innovate and accurate decision making. On the other hand, the book pointed out the two risks of Data-ism, namely,

how should we manage data and how much should we trust it. Last but not least, Lohr suggested: "big data stumbles when a decision requires an intuitive step outside the data sandbox—beyond the range of data" (Lohr, 2015).

While Lohr was giving an overview of Data-ism as a prevailing phenomenon in economy and academy, Harari started from both life science and computer science, argued both bio-chemical world and the electronic world can be described as data flow, then speculated a future where Data-ism becomes a religion with supreme doctrines. They are:

1. "A Data-ist ought to maximise data flow by connecting to more and more media, and producing and consuming more and more information."
2. A Data-ist ought to "link everything to the system, including heretics who don't want to be plugged in."
3. "The greatest sin would be to block the data flow." (Harari, 2016)

In such a world, the authority and priority of human are delivered to data completely. This sounds depressing, but the arguments come from the lessons of history. Human-being was justified as God's creation in theism, then was justified as the winner of natural selection in humanism. Man should trust his experience and intuition, and find reasons because that's how the evolution goes. Now, the data-ists stand out, and say, feeling, intuition and whatever

in nature is only data flow and algorithm. From this perspective, the purpose of evolution is only to maximize the data-flow. Thus, life has no meaning itself. Human can only be justified by devoting ourselves to the data-flow.

In facts, data-ism has shown the potential to sublimate itself into religion due to the blind belief in data. Let's take chess game as an example. "In the 1990s, Campbell says, a major obstacle (for artificial intelligence) was setting chess-playing knowledge into the computer" (Lohr, 2015). However, in 1997, IBM's Deep Blue defeated the world champion chess player Garry Kasparov (Campbell et al., 2002); In 2016, March, Google's AlphaGo defeated champion player Lee Sedol in the game of go, then kept the record of 60 continuous victories in challenging all the top players around the world. Two details are frustrating. Professional players could not understand AI's single move until it revealed its intention hundreds moves later. And when Lee Sedol took an innovative move, which was praised as "God's Touch" by professionals, AlphaGo detected that and assumed the possibility for Lee to win by this move was 0.007%, rather than 0 (Hassabis, 2017). The game of go was once ironically regarded too intuitive for AI to understand. The fact tells the otherwise. What's more? In December 2016, Deepstack from University of Alberta defeated professional poker player in Texas Hold'em, which is a game of imperfect information thus depends more on intuitive decision (Moravčík et al., 2017).

Hence, here comes the question. If AI can always make the better decision which we can not understand, if AI can know us better than ourselves, shall we believe it? If we choose to believe in something we do not understand, isn't it a superstition which against our reasonable humanism?

AI is only one of the dozens of technologies that fueled by Data-ism, and there are other examples to illustrate Data-ism's revolutionary meaning. Self-driving car and other automation technologies are changing the job market. With virtual reality and augmented reality, the new generation could experience roller coaster at home or hunt Pokemon in their neighborhood. And the advanced algorithm enables us to forecast the weather in the accuracy of minutes, which is very much influencing the schedule of our daily life.

I don't want to go as extreme as Harari to a religious level. In this project, data-ism refers to the ideology in an age when human get the ability to access to and process big data with the help of algorithm. The focus and contribution of this project will be how this revolution could change our notion of nature, then the landscape praxes fundamentally.





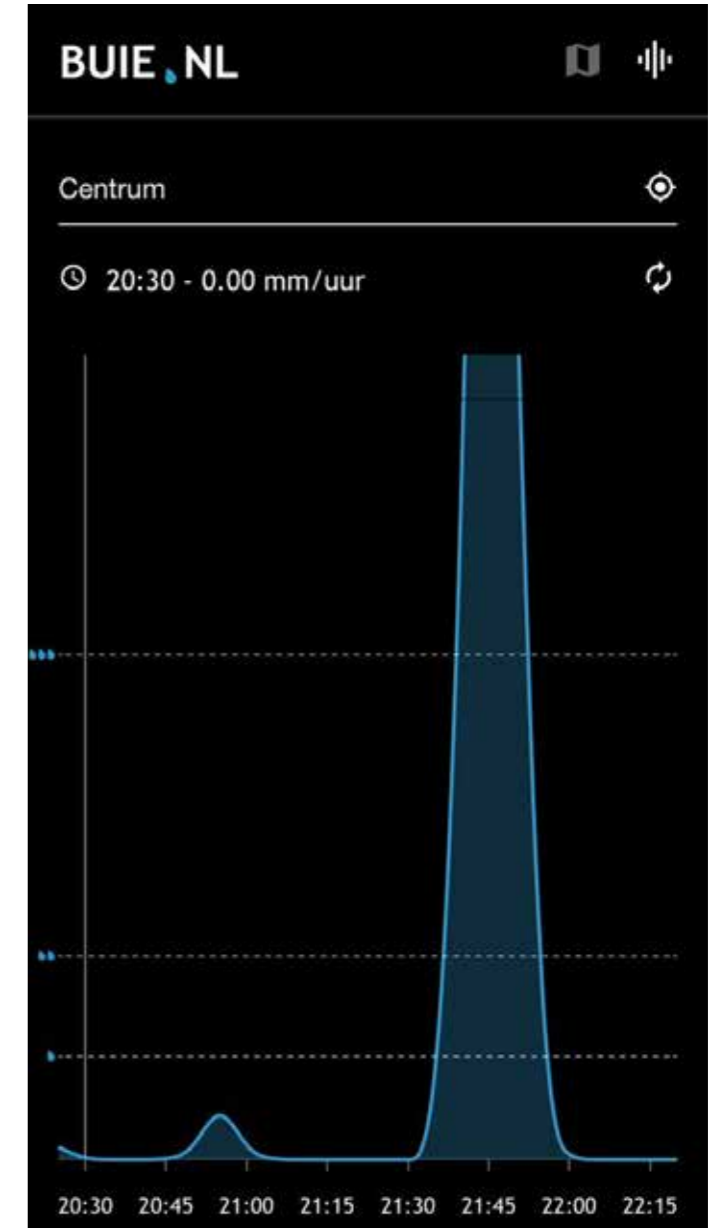
IBM Watson outperformed doctors in lung cancer diagnosis

<http://gameranx.com/wp-content/uploads/2017/02/Pokemon-GO-APK-DOWNLOAD-for-Android-Latest-Version-and-PC.jpg>



Pokemon Go adds a digital layer in landscape

<http://gameranx.com/wp-content/uploads/2017/02/Pokemon-GO-APK-DOWNLOAD-for-Android-Latest-Version-and-PC.jpg>



Big data in weather forecast

[https://pbs.twimg.com/media/DEEm\\_w4WAAEteEd.jpg](https://pbs.twimg.com/media/DEEm_w4WAAEteEd.jpg)





## 2.2 Nature & Ideology

Data-ism is not only a concept. There is a historical theory behind. As I mentioned before, in Harari's (2017) interpretation, the existing history of human-being could be distinguished as four main periods, namely, animism period, theism period, humanism period and the upcoming data-ism period. When I overlapped this division and the pre-research I did on nature notions in landscape architectural praxes, I find them fit into each other quite well.

In the animism age, primitive humans didn't distinguish themselves from anything else in nature. Human could only survive by following the rule of nature (settling down in clearings and oases). Nature had the absolute authority.

During the recognition revolution, many fictional notions were invented, such as country, money, and marriage, etc. One of the most important fictional notions is God, a sovereign authority that justified the relationship between human beings and nature. Various notions of nature and forms of landscape architecture emerged, depending on how we interpreted the scriptures. In the enclosed garden, nature is the gift and punishment to human; in the rational garden, nature contains the hidden

instruction of God in its chaotic appearance; in the formal garden, human, especially the emperor, becomes the representative of God, while nature becomes the counterpart to demonstrate human's power.

When it came to the humanism age, human realized our sovereign authority from the evolution, while nature was positioned wherever we require. In the picturesque garden, nature represented our rationality and free spirit. In the urban park, nature offered cities with recreations and green compensations as a functional component. In the natural design, nature became an imaginary ideal image expressed by artists. In ecological design, nature means the ecological system with specific value for human society.

How about today? Well, although the humanistic beliefs are still the mainstream in the world, we start to show the tendency to sacrifice the authority of human to nature (for human's sake), because nature has been realized to be so uncertain as a dynamic process. From a data-ism worldview, resilience could be explained as our success in data collection and failure in data processing. With the technological development, we got more than enough data from nature to reveal its complexity, which is far beyond ability to process. Thus, we fear and react to the uncertainty, by shifting the authority from human to nature.

Assuming the theoretical frame of Data-ism is credible, is our resilience effort only a start for new data-ism notions of nature, where data will play important roles in the relationship between human and nature?

As a test of this assumption, this project aims to answer the following research question:

*What will be the new notions of nature and new forms of landscape architecture in a data-ism age?*

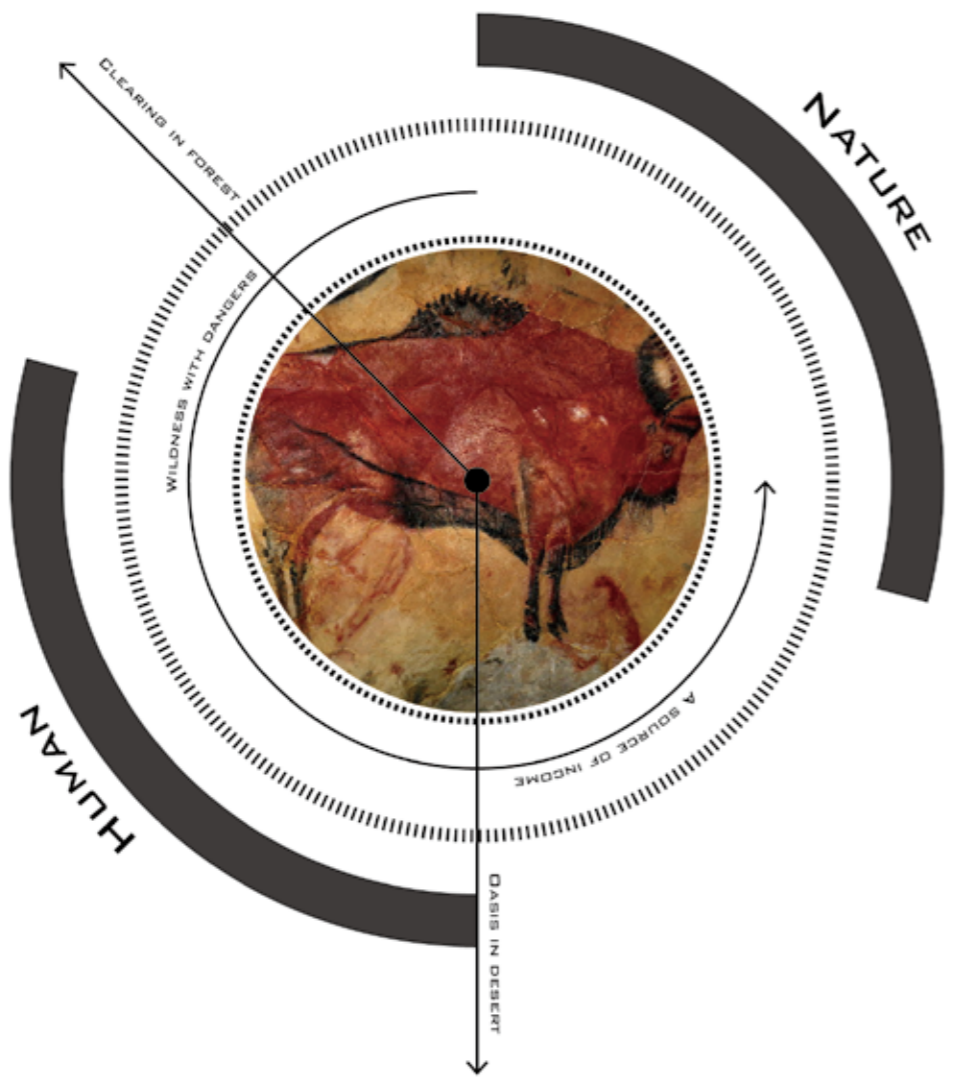


Speculation of future urban landscape in a data-ism age

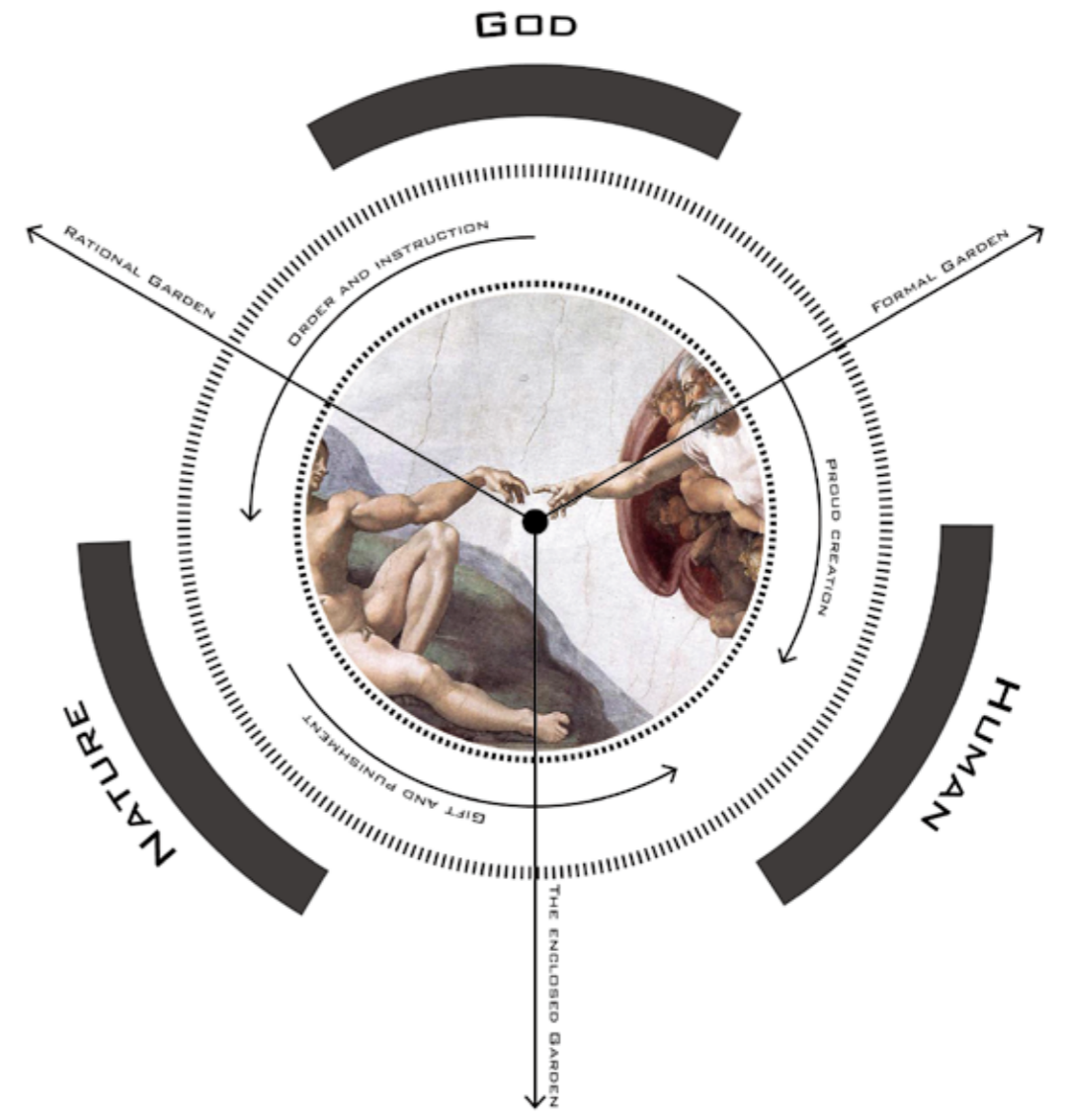


Notions of nature in landscape architecture fit in the theoretical frame of Data-ism

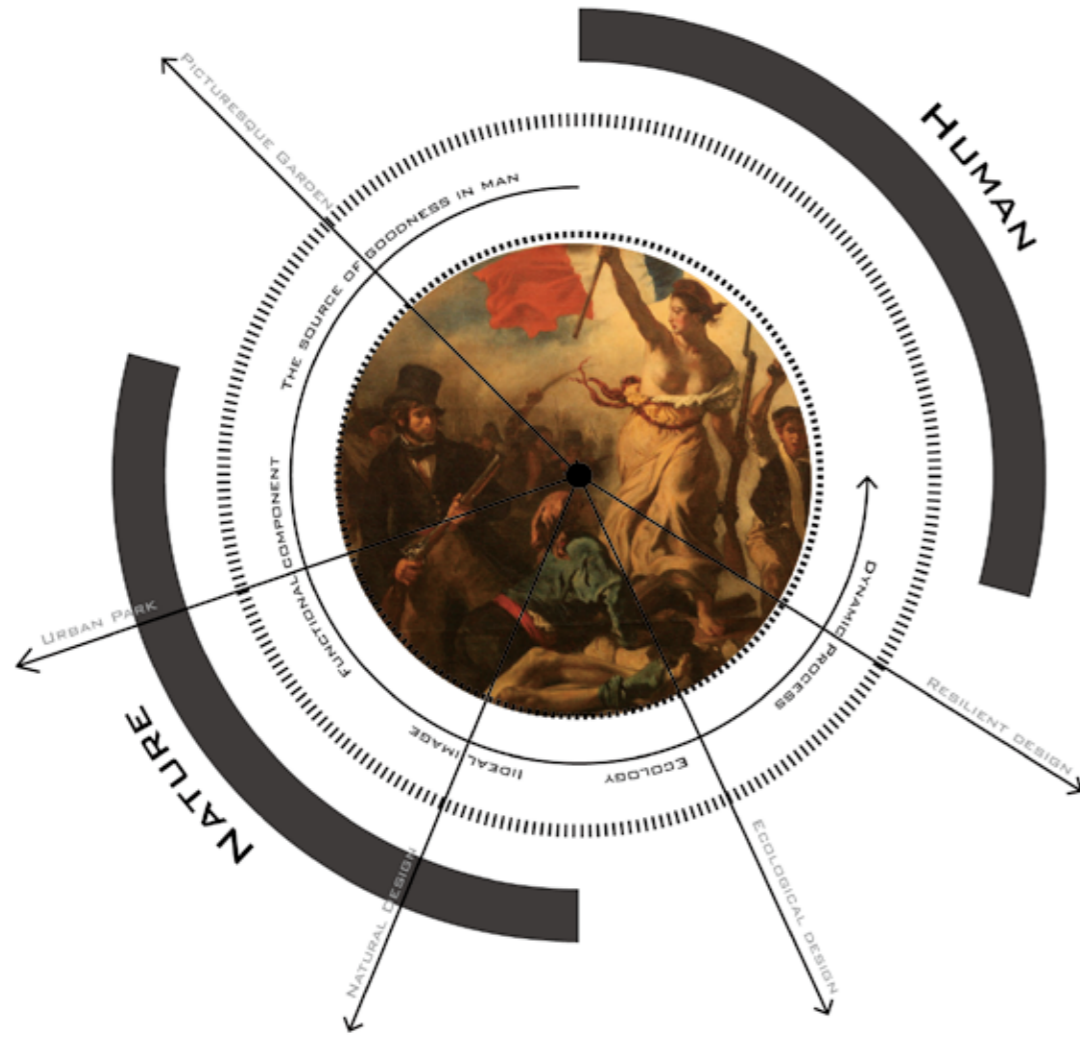




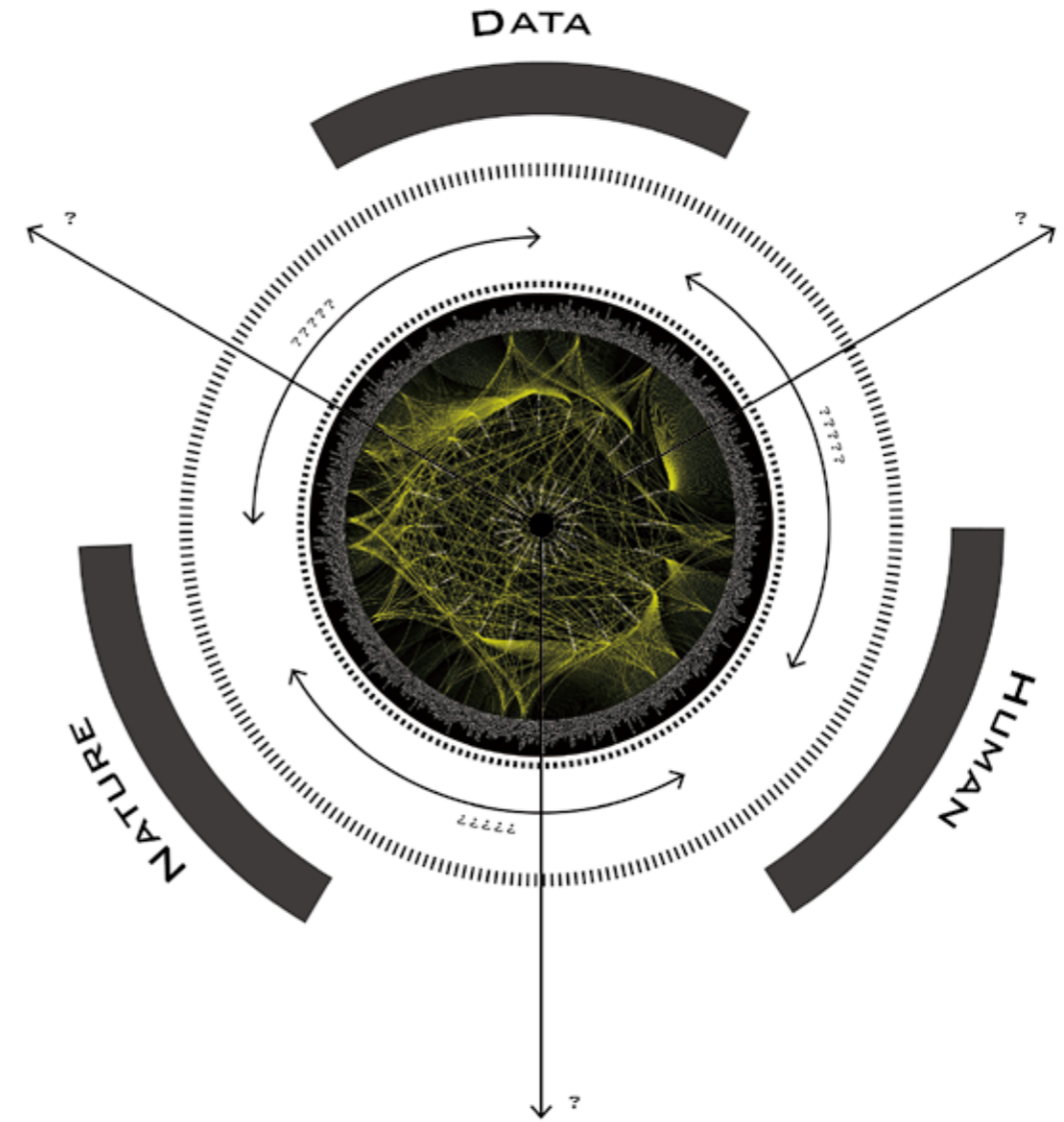
**ANIMISM**  
NATURE JUSTIFYING HUMAN



**THEISM**  
GOD JUSTIFYING HUMAN AND NATURE



**HUMANISM**  
HUMAN JUSTIFYING NATURE

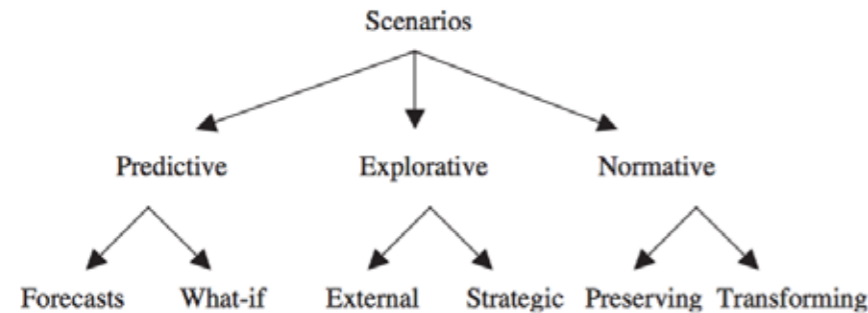


**DATA-ISM**  
DATA JUSTIFYING HUMAN AND NATURE?

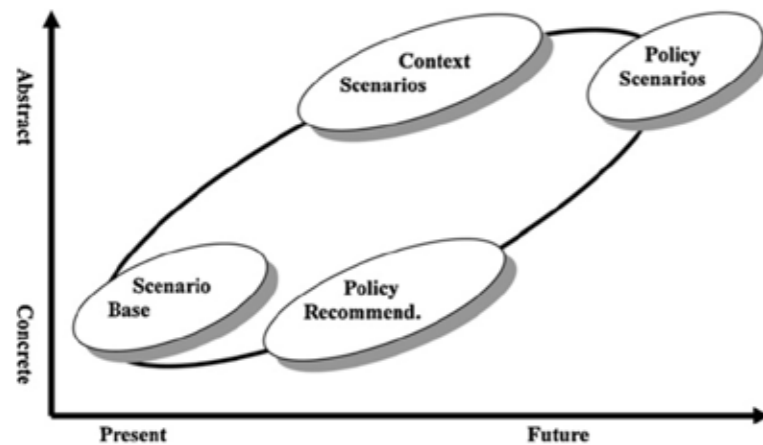


### 3 METHODOLOGY: REFLECTIVE SCENARIO

#### 3.1 Scenario Making



Three typologies of scenario  
(Borjeson, L., Hojer, M., Dreborg, K.,  
Ekvall, T. and Finnveden, G. 2006)



Cyclical Scenario approach  
(Dammer, E. 2010)

The research question is based on theoretical hypothesis and related to far future. On one hand, it means extremely explorative and creative. On the other hand, it also implies the dangers of boundless possibilities and unreliable speculations. To evoke my imagination and, at the same time, limit it in a scientific frame, an experimental research and design method is needed. I drew lessons from scenario making

Futures studies consist of a vast array of studies and approaches and the area has been called a 'very fuzzy multi-field'. (Marien, 2002) One of the most basic, although contested, concepts in this field is 'scenario'. (Borjeson, Hojer, Dreborg, Ekvall and Finnveden, 2006).

#### **Scenario typology**

Borjeson, Hojer, Dreborg, Ekvall and Finnveden (2006) identified three typologies of scenario. They are predictive scenario, explorative scenario, and normative scenario. And respectively, they aim to explore the probable, possible and preferable future. Along with typology identification, Borjeson and his colleagues proposed a set of technics that can be used in several phases in each type

of scenario.

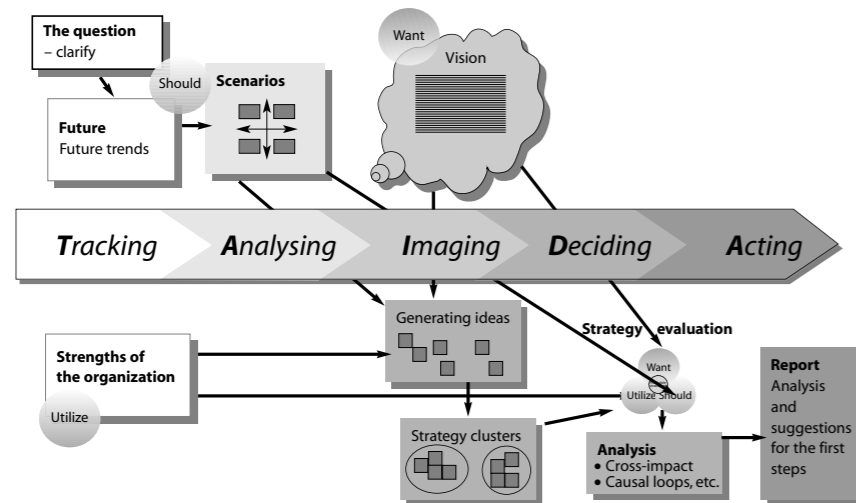
#### **Scenario model**

Three paradigmatic traditions of scenario-building can be seen to exist. The model approach with its roots in American military scenarios of the 1950s, the design approach in French urban and regional development of the 1960s, and the strategic conversation approach in scenarios made in the private sector since the 1970s. In order to maximize the quality and the usability of scenarios, the three approaches are integrated into a more comprehensive approach, cyclical approach, in the territorial scenarios for Europe. (Dammer, 2010). The scenario cycle consists of four building blocks: scenario base, context scenario, policy scenario and policy recommendations. At the same time, several methodological lessons are pointed out by Dammers, which influenced my project. They are:

- The practice of first developing a set of thematic scenarios and then building integrated scenarios.
- Significant contrast between the scenarios can be realized by ensuring that they are not too closely related to current policy debates.
- The combination of qualitative techniques (writing essays, organizing workshops) and quantitative techniques (building models), appeared to be fruitful.
- The cyclical approach appears to be helpful in organizing and to evaluating scenario projects.

### Scenario making technics

Lindgren and Bandhold (2003), in their book Scenario Planning-The link between future and strategy, proposed another scenario making model, TAIDA, containing tracking, analyzing, imaging, deciding and acting, these five steps. However, for my project, the most meaningful input from their work, is the elaborated categorization and description of the scenario making technics (methods). The technics are categorized into media-based methods, interview-based methods, timeline-based methods, intuitive, generative methods, actor-oriented methods, consequence-focused methods, system methods. The specific methods I experimented are shown in the list.



TIADA process  
(Lindgren, M. and Bandhold, H. 2003)

### List of Methods for Scenario Making (Lindgren, M. and Bandhold, H. 2003)

#### Media-based methods

- Media scanning
- Trend-tracker groups
- Media watch
- Keyword analysis
- Content analysis

#### Interview-based methods

- Delphi surveys
- Delphic conversation: structured interviews
- Opinion polls
- Long-range data
- Focus groups
- Expert panels
- Guruing
- Executive panels
- Creative future groups
- Future dialogue
- Participatory future studies

#### Timeline-based methods

- Archetypal development patterns
- Trend extrapolation through time-series analysis
- Multivariate analysis and multivariate time series analysis
- Analogies
- Long wave
- S-curve analysis
- Paradigm shifts

#### Intuitive, generative methods

- Brainstorming
- Intuitive timeline construction
- Headlines and posters
- Imaging
- Future history

- Paradoxes

#### Actor-oriented methods

- Actor analysis / competitor analysis
- Competitor watch
- Value-chain analysis

#### Consequence-oriented methods

- Issues management
- Single-impact analysis (SIM)
- Consequence tree
- Future event production
- Probability effects

#### Systems methods

- Complexity and uncertainty analysis
- Cross-impact analysis (CIM)
- Four-field analysis
- Systems analysis
- Causal mapping / causal-loop diagrams
- System analysis as a tool for learning
- Systems modelling / dynamic simulation



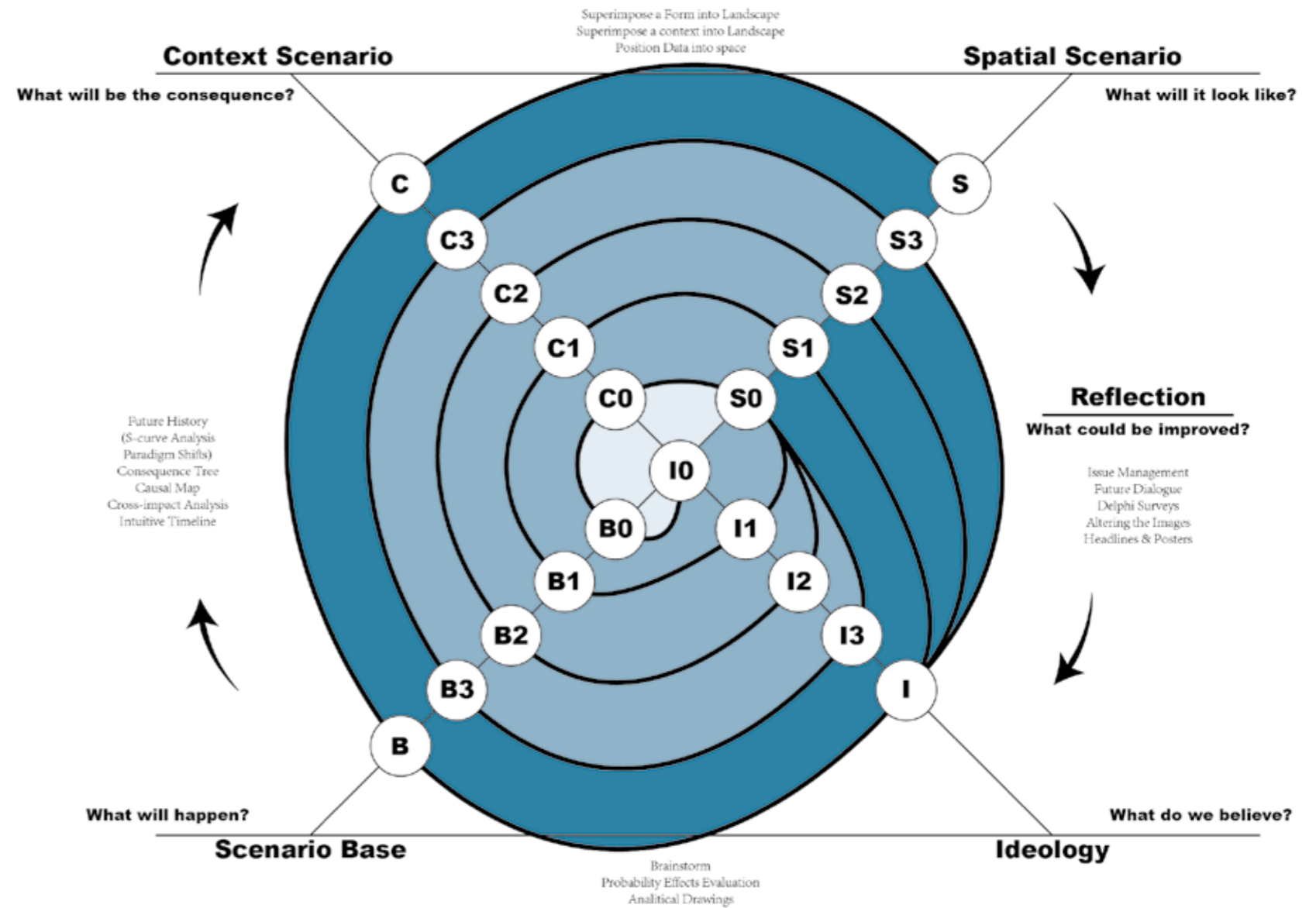
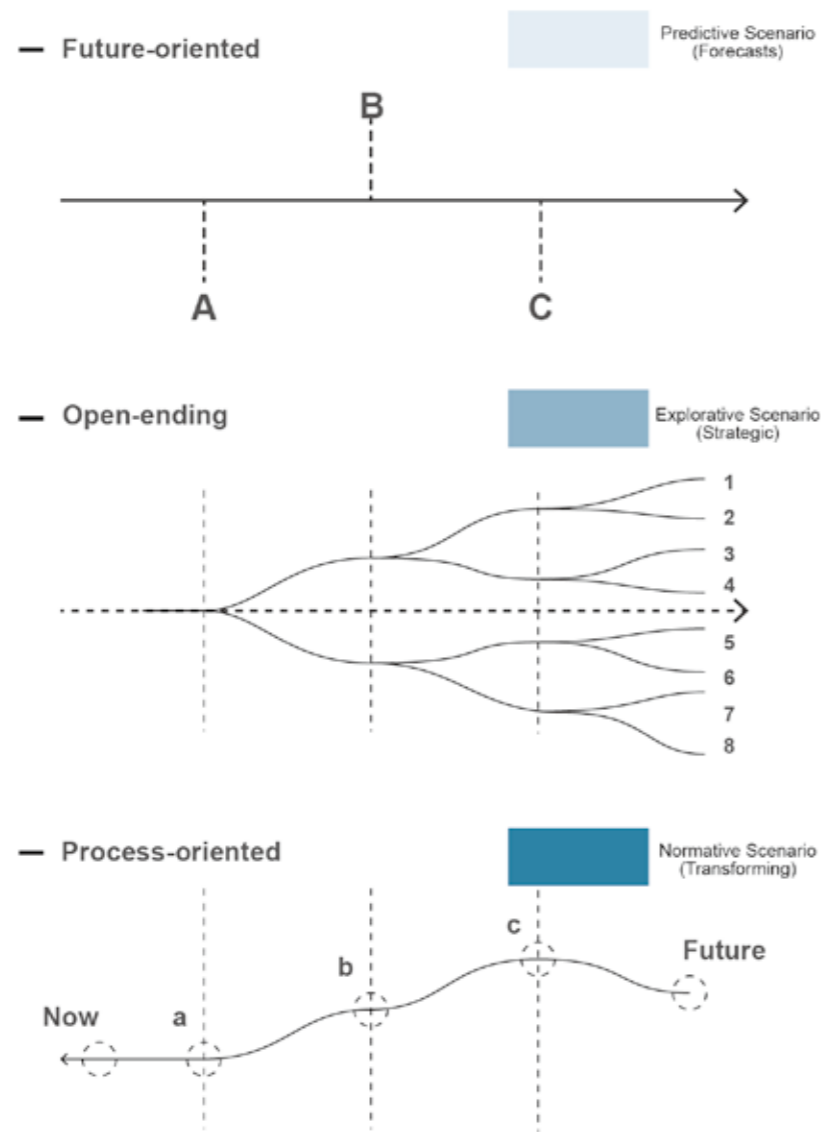
### *3.2 Reflective Scenario*

My research methodology is built upon the cyclical approach described by Dammer (2010). However, the existing scenario making model is not qualified to structure my research. First of all, scenarios are usually made for exploring processes over a period of 10–30 years, while my research is related to far future in the scale of decades or even centuries. The farther future we are dealing with, the more uncertainties and possibilities there will be. Thus, intuition and speculations have to be involved in a way to guide the research scope. Secondly, the existing model emphasizes on policy and its consequences in various aspects, between which direct relationship could be identified. But my research starts from ideology (notions of nature) and ends with spatial qualities, between which the link is built upon several steps of deduction. Additionally, ideologies could influence space differently in different scales or time periods. Therefore, I established my own methodology, namely reflective scenario, based on the methodological lessons I elaborated in the previous section. It enables the research to integrate scientific deduction and intuitive speculation, to work through different scales in time and space, through constant reflection.

The complex system consists of 3 cyclical phases, the predictive scenario, the explorative scenario and the normative scenario. Each phase contains 4 building

blocks: ideology, scenario base, context scenario and spatial scenario.

The first round, predictive scenario starts with current ideological belief and predicts the scenario base, which is the way we react to the foreseen driving forces under a certain ideology. The scenario base will be developed into context scenario in an abstract level, describing the coherent consequences of the driving forces and scenario base. The spatial quality of the context scenario will be visualized. Then finally, reflecting on the results, the alternative ideologies are proposed, which will trigger the next round, explorative scenario. Following the same process, explorative scenario circle could run for unlimited times, and produce countless new ideologies generated and guided by reflection and speculations. The results of the explorative scenarios could be selected and integrated to a preferable or most likely one, which becomes the last round, normative scenario.



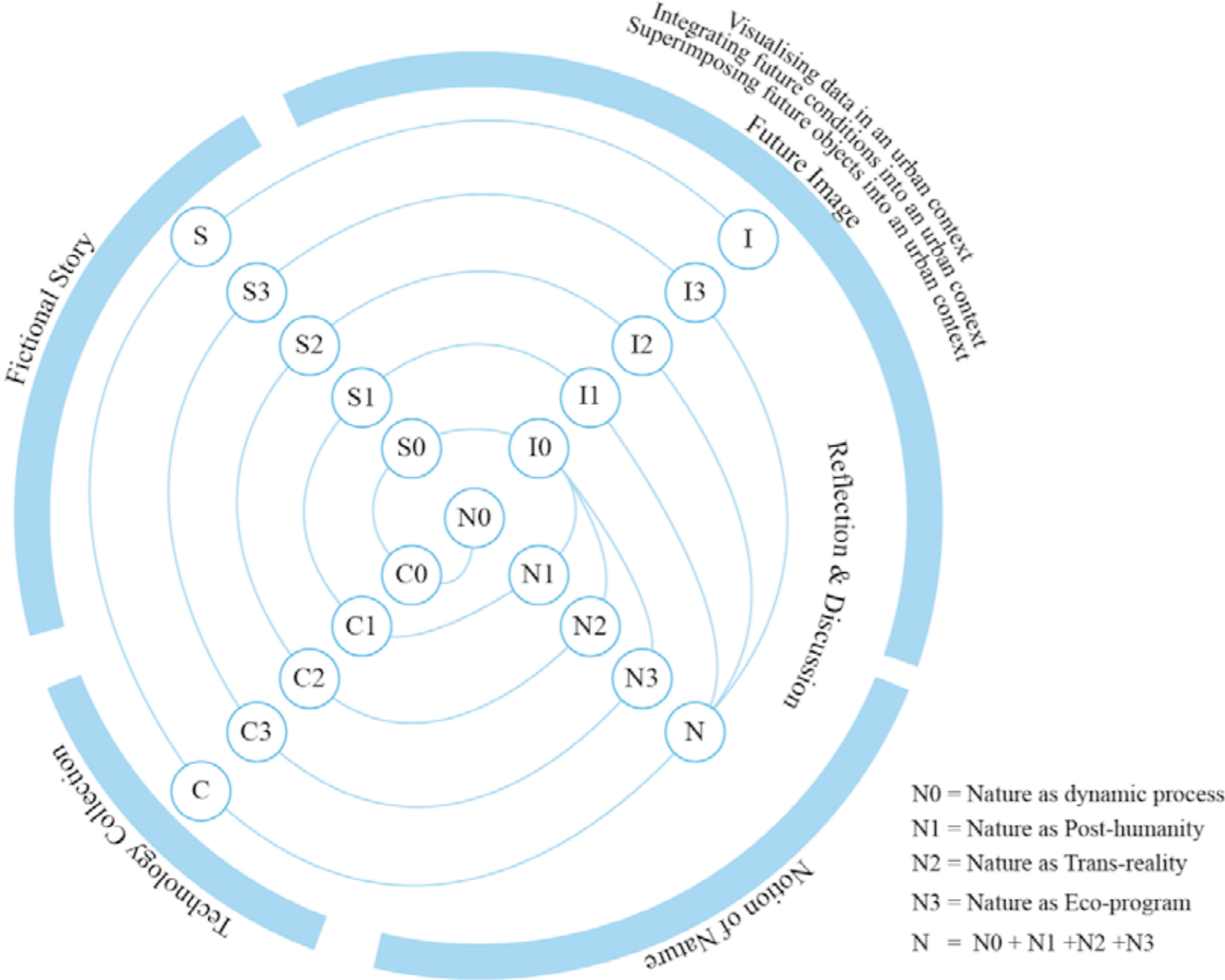


### 3.3 Adjusted methodology

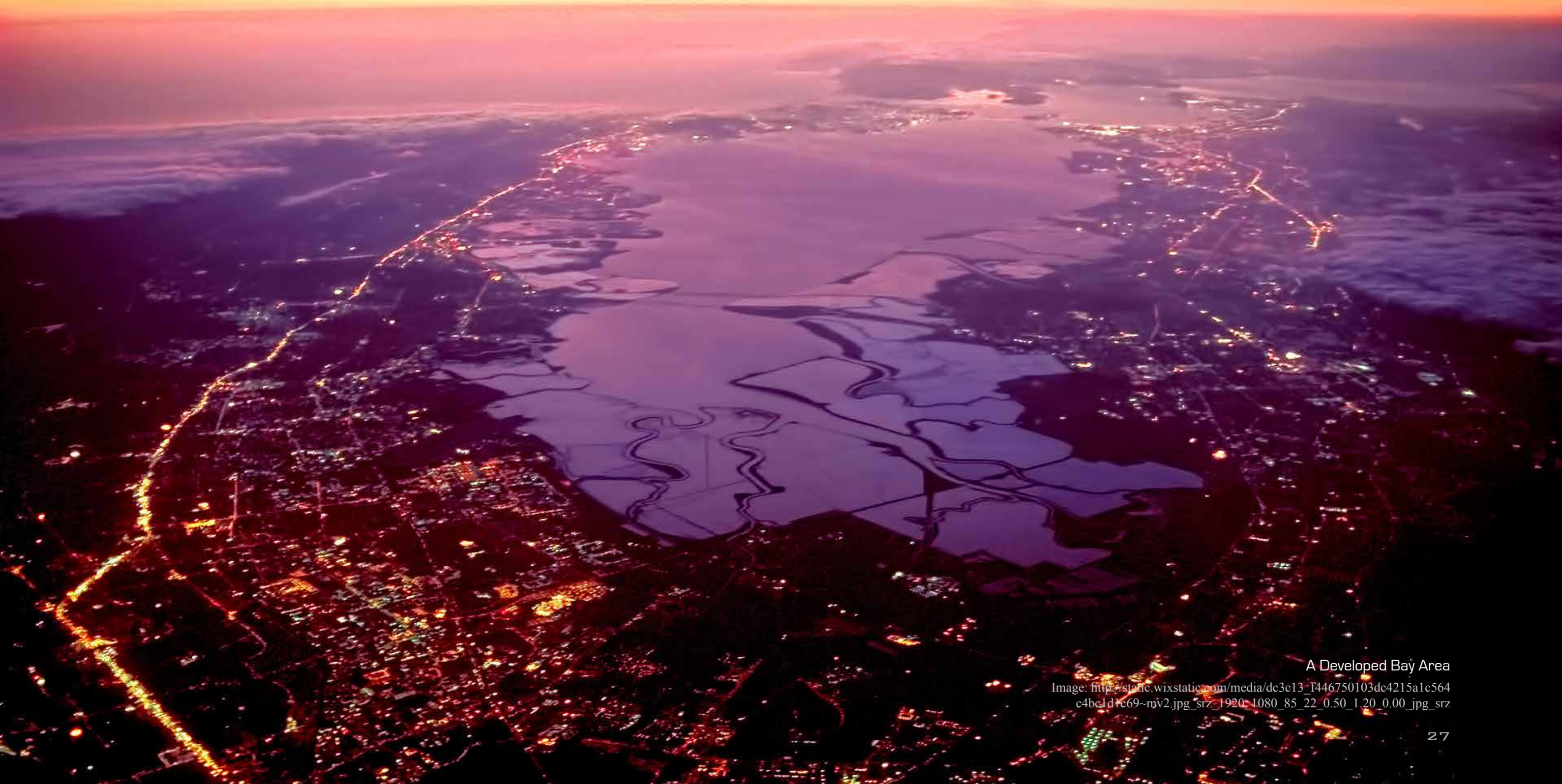
In this project, considering the feasibility, the complex methodology is adapted to a simplified version. In the adapted method, ideologies mean particular the notions of nature. And the predictive scenario will start with the current notion, nature as dynamic process (resilience) and push it to an extreme. And since we are talking about data-ism, the scenario base is the collection of technologies fueled by big data, responding to the predicted environmental risks (driving forces) in the future. The context scenario is presented in the form of fictional story with collage, which imagines the future lifestyle with the selected technologies. Then future images are depicted to illustrate the corresponding spatial quality in the extreme resilient urban landscape. Reflecting on the results, new notions of nature will be proposed and examined by the same process in the explorative scenario. And finally, integrating the new notions, a probable future will be illustrated through the last round, normative scenario.

During the process, novel is written (in progress) as a research tool to study the influence of an ideology through time and space. (See Appendix 3)

And a methodology paper, *Imagining by Imaging*, which describes the typology and usage of the future image as a research method, is developed. (See Appendix 4)







A Developed Bay Area

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**4 SITE ANALYSES:  
SAN FRANCISCO**

*4.1 City in the Bay*

San Francisco (SF), officially the City and County of San Francisco, is the cultural, commercial, and financial center of Northern California. The consolidated city-county covers an area of about 124 km<sup>2</sup> at the north end of the San Francisco Peninsula in the San Francisco Bay Area. It is the fourth-most populous city in California, and the 13th-most populous in the United States, with a 2016 census-estimated population of 870,887.

As a popular tourist destination, San Francisco is known for its cool summers, fog, steep rolling hills, eclectic mix of architecture, and landmarks, including the Golden Gate Bridge, cable cars, the former Alcatraz Federal Penitentiary, Fisherman's Wharf, and its Chinatown district. San Francisco is also the headquarters of five major banking institutions and various other companies such as Levi Strauss & Co., Gap Inc., Fitbit, Salesforce.com, Dropbox, Reddit, Square, Inc., Dolby, Airbnb, Weebly, Pacific Gas and Electric Company, Yelp, Pinterest, Twitter, Uber, Lyft, Mozilla, Wikimedia Foundation, Craigslist and Weather Underground.

#### *4.2 Monument and frontier*

I choose San Francisco as a test tube for the new notions of nature in the data-ism age, because of its glories in the last two centuries and its leading power in data technology. In another word, San Francisco is the monument for the past humanism and the frontier for the upcoming data-ism.

The earliest archaeological evidence of human habitation dates back to 3000 BC in the territory of the city of San Francisco. The Yelamu group of the Ohlone people resided in a few small villages when an overland Spanish exploration party, arrived in 1769, the first documented European visit to San Francisco Bay. Seven years later, in 1776, the Spanish established the Presidio of San Francisco.

From 1769 to 1849, the area has been ruled by Spain, Mexico and United States in succession. And the name of the place has been changed from Yerba Buena to San Francisco, with its land being privatized from mission system. Despite its attractive location as a port and naval base, San Francisco was still a small settlement with inhospitable geography.

The first wave of development was brought by the California Gold Rush. With the accumulation of the prospectors, the population of the city rose from 1,000

in 1848 to 25,000 by 1849. The arriving vessels formed a forest of masts in San Francisco harbor. Some of these approximately 500 abandoned ships were used at times as store ships, saloons and hotels; many were left to rot. By 1851 the harbor was extended out into the bay by wharves while buildings were erected on piles among the ships. By 1870 Yerba Buena Cove had been filled to create new land. Buried ships are occasionally exposed when foundations are dug for new buildings. In this age the main traffic in the bay area is by boat, forming a pattern of harbor-city.

The wealth generated by the Gold Rush attracted the entrepreneurs to capitalize. Development of the Port of San Francisco and the establishment of overland access to the eastern U.S. rail system helped make the Bay Area a center for trade. During the civil war, the rail system was developed for military supplies. The city expanded along the railway and formed the rail-city pattern. By 1890, San Francisco's population approached 300,000.

In 1906, the historic earthquake struck San Francisco and destroyed three-quarters of the city. Over half of the city's population of 400,000 was left homeless. Against calls of remaking the street grid, San Franciscans rebuilt the city following exactly the same grid for the sake of time. During the rebuild, the western neighborhoods were developed.

In World War II, San Francisco was an important naval port for the Pacific Ocean Theater. Fort Mason became the busy port of embarkation for military and the Hunters Point Naval Shipyard became a hub of activity. This resulted in a job and population explosion.

After the war, with the reduction of military industry, the containerization of cargo and the widespread of the freeway, San Francisco lost its industrial importance and based its economy on tourism. The suburbs expanded rapidly along the Bay. And the city began to show a pattern of today's car-city.

From 1969 to late 1980, San Francisco experienced a wave of "Manhattanization". Extensive high-rises are erected in downtown, the formerly filled creek. The 1989 Loma Prieta earthquake severely damaged the infrastructure of the city and resulted in the demolition of many freeways, among which, the demolition of Embarcadero Freeway allowed the city to reclaim The Embarcadero as its historic waterfront.

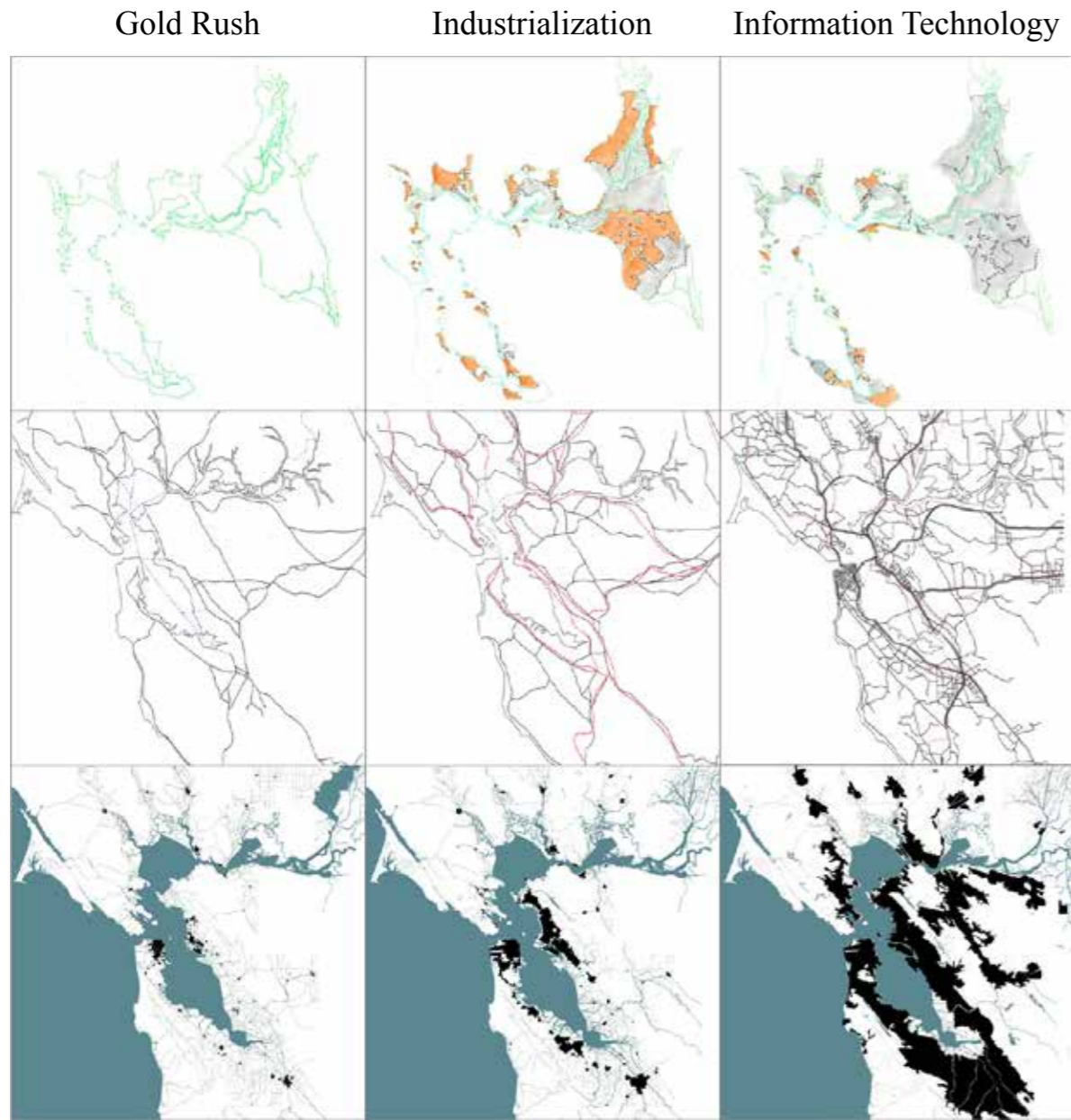
The recent decades have witnessed the continuous boom of San Francisco driven by information technology. In the late 1990s, the first wave, the dot-com boom invigorated the San Francisco economy with large numbers of start-up companies. Demand for new housing and office building ignited the second wave of high-rise development in South of Market district. By the



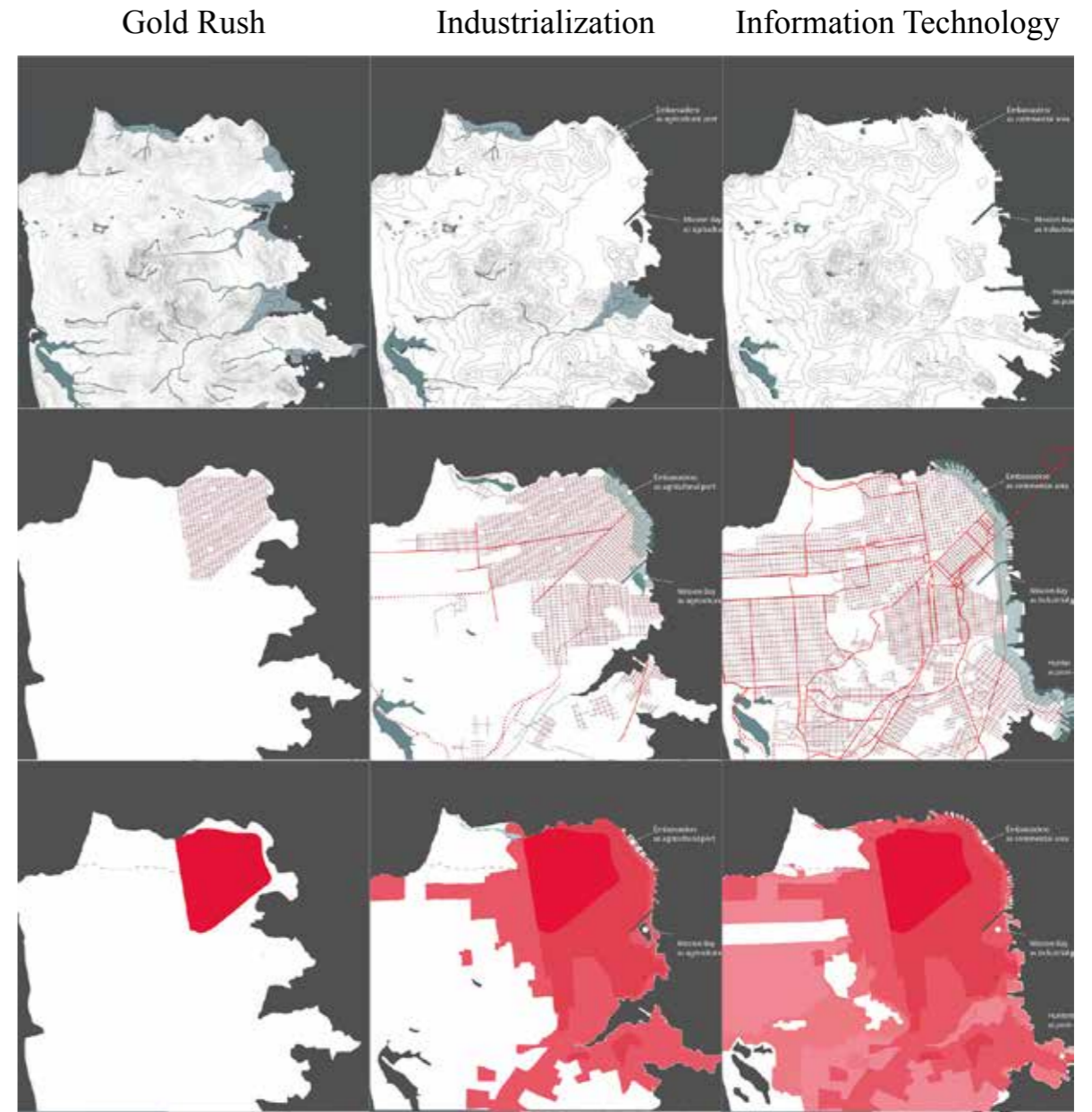
*mid-2000s, in the second round of information boom, the social media boom, San Francisco accommodated more tech offices and employees working in Silicon Valley companies such as Apple and Google. Now, there is the third round of boom showing up, the algorithm boom. Automated restaurant (Eatsa), robotic pharmacy (UCSF medical center), drone delivery (Amazon), self-driving car (Google), those futuristic ideas have already come true technically in San Francisco. And a bunch of other ideas, like Hyperloop (Tesla), Space traveling (Space X), flying cars (google), are being incubated in Silicon Valley. This round of boom with new technologies fueled by data is going to renew the infrastructure fundamentally instead of just increasing the population or expanding the suburb.*



Study model of San Francisco  
(Made together with Jeroen van der Kwaak, Zhuting Li and Menghan Fu)



3 x 3 x 3 analyses in bay-scale  
(Made together with Seul Lee, Sumanth Rao and Licheng Wang)



3 x 3 x 3 analyses in city-scale  
(Made together with Seul Lee, Sumanth Rao and Licheng Wang)



1880



1905



1920



1936



1941



1943



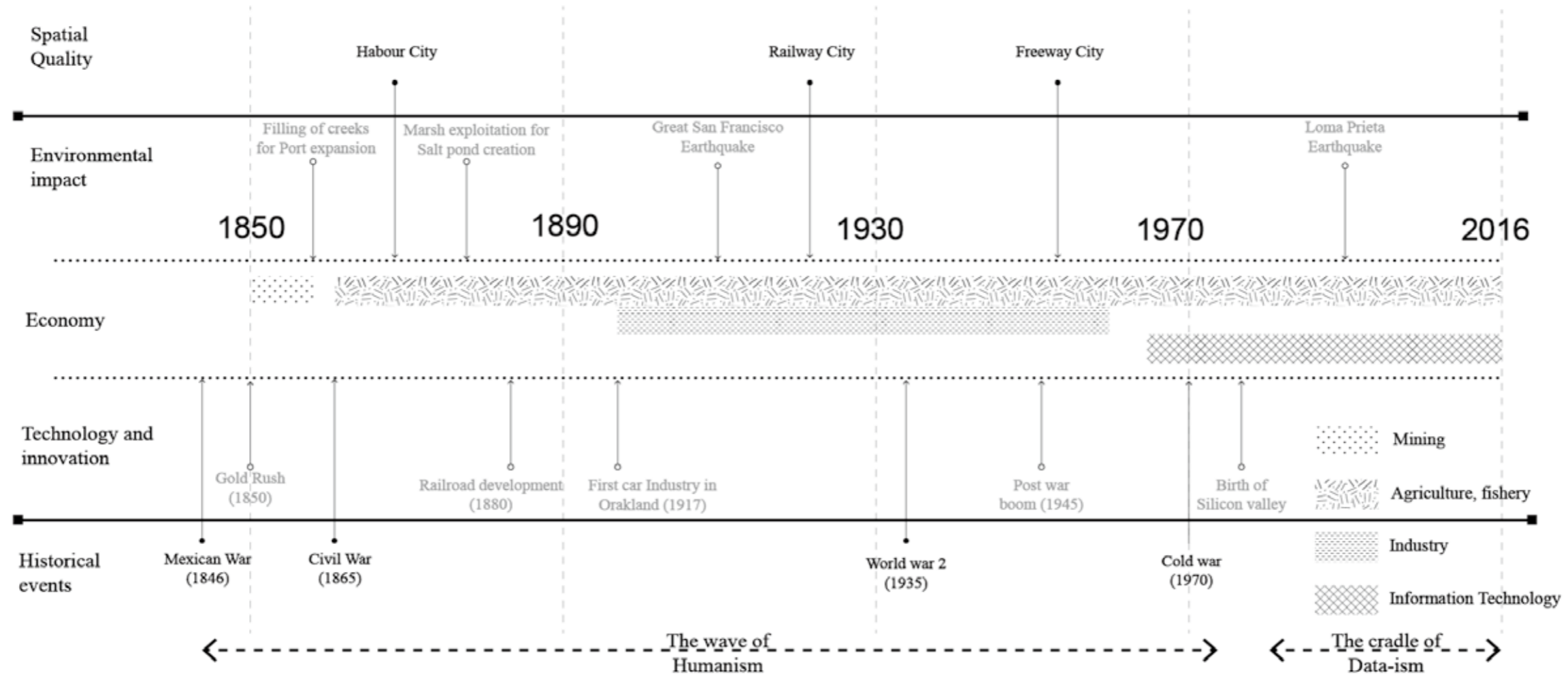
1980



2016



Cityscape changes every 30 years

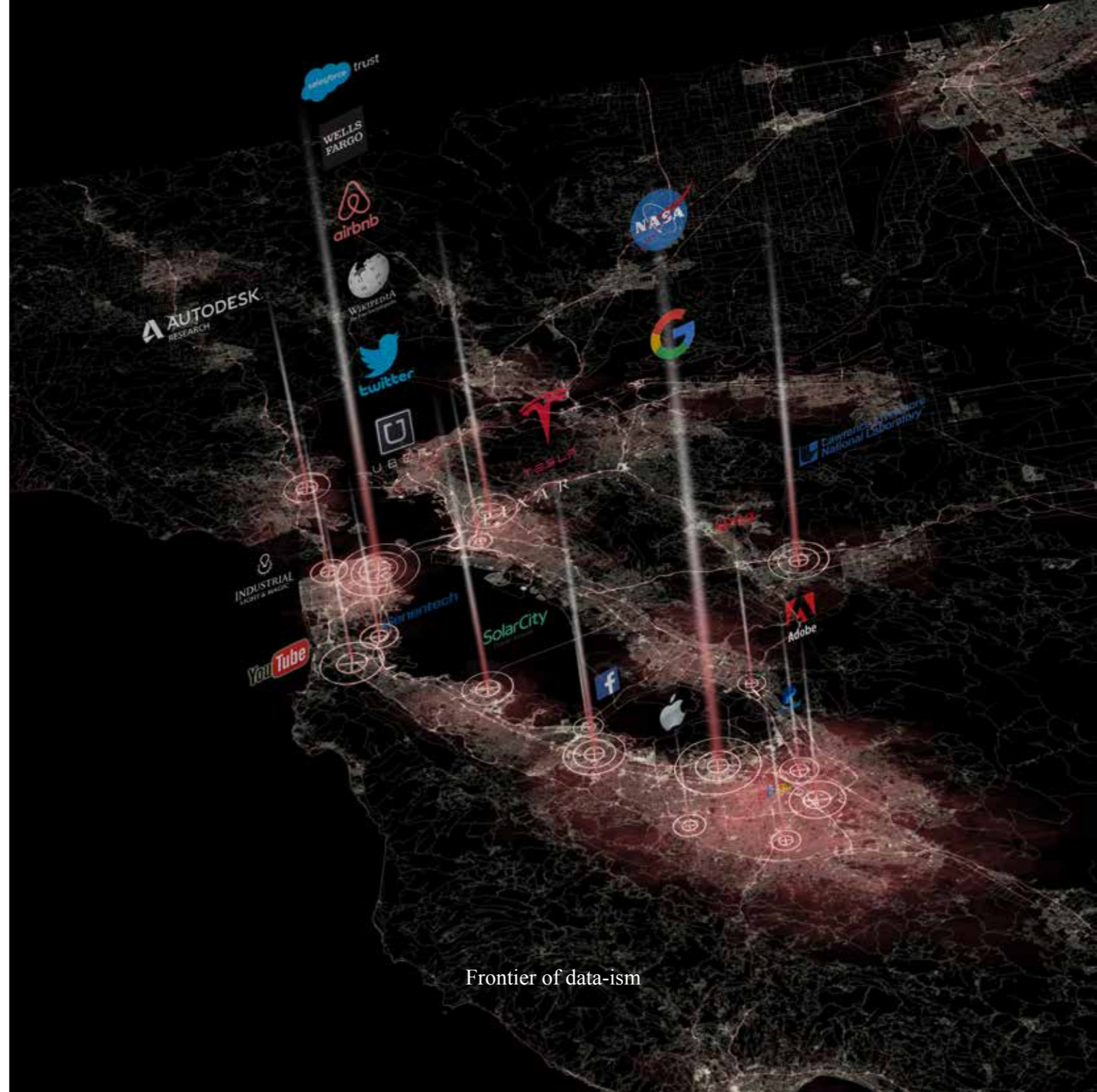


Timeline of San Francisco  
(Made together with Seul Lee, Sumanth Rao and Licheng Wang)





Monument of humanism



Frontier of data-ism





San Francisco has long way to go to reach its greenhouse gas reduction goals by 2025, through 0 waste, 50% of all trips on sustainable transportation and 100% renewable sources of energy.



Bay area is one of the most productive region in California. But food production will decrease 30% by 2070 due to global warming and sea level rise.



Six environmental risks in San Francisco  
(Made together with Qiao Yang)

### 4.3 Environmental pressures

San Francisco experienced rapid development as a monument for humanism and is changing fast as a frontier of data-ism. At the same time, under pressures of the future environmental risks, it is inevitable for the city to change adapting to them.

Six environmental risks are identified for the future San Francisco. They are flood, earthquake, energy, traffic, housing, and food.

As a coastal city, San Francisco will suffer from the global sea level rise. The financial district, the most capitalized area on the waterfront, is only 2 meters above sea level. In the last century, sea level has risen 0.2m around the San Francisco Bay and Pacific Coast. By the end of this century, they are most likely to rise an additional 0.9 m up to 1.8m. This is only mean sea level. High tide, king tide, and 100-year coastal flood would result in additional 0.6m, 0.9m and 1.8m. Hence, a total 3.6 m sea level rise should be considered for planning, which could inundate the whole financial district. (estimate of National Research Council)

However, long before the inundation caused by the 100-year sea level rise. the city is currently suffering from run-off water inundation in the every-two-year king tide,



which will paralyze the discharge of run-off water by submerging the outlets of the sewage. (City and county of San Francisco, 2016)

Located on San Andreas Fault, surrounded by several other faults. San Francisco was constantly bothered by earthquakes, among which the 1906 Great San Francisco Earthquake and the 1989 Loma Prieta Earthquake changed the cityscape dramatically. The past frequency of big earthquakes in San Francisco Bay Area shows a pattern of occurring every 30 years. However, San Francisco experienced a 68 year "quiet period" with no earthquakes over magnitude 6.0 from 1911 to 1979. It is explained that the 1906 M7.8 earthquake released some strain between the plates. It has been more than a century since the 1906 earthquake, and the strain has probably been accumulated. Thus, San Francisco Bay Area is predicted to face an earthquake-frequent period in the next 60 years, with 75% possibility of an over M 7.0 big one within 30 years. (USGS, 2008)

Reacting to global warming and sea level rising, San Francisco formulated a greenhouse gas reduction goals by 2025, through zero waste, 50 percent of all trips on sustainable transportation and 100 percent renewable sources of energy. (Resilient San Francisco, 2016) Here the "100% renewable sources" is only applied for electricity production. However, among the total energy consumption of San Francisco, only 20% are electricity

energy. Even though, only 15% electricity is produced by renewable energy. (Fossil Free Bay Area) The city has a long way to go to achieve its goal. And even if the goal is achieved, it is not sufficient to mitigate the city's greenhouse gas emission.

Transportation (private and public) and industrial consumption contain the most energy consumption in San Francisco. Thus the 50% sustainable transportation goal sounds might be effective. Although this goal looks completed from the statistics, more than 50% residents commuting by foot, bike or public transport (2015 SFMTA Factsheet), it only involved San Francisco citizens. However, the number of the commuters coming in and through San Francisco every day is three times bigger than the number of its citizens. And most of the arrivers come by cars. (Census Transportation Planning Package, 2010) That's why the Bay Area is among the most congested urbanized areas in the nation. In a 2007 regional poll conducted for a study, almost 90 percent of travelers characterized downtown San Francisco as congested. (San Francisco Mobility, Access, and Pricing Study, 2010)

San Francisco is one of the densest city in the United States with one of the highest land price. For 45% renters in San Francisco, over 30% household income is spent on rent. By 2040 the San Francisco Bay Area is projected to add 2.1 million people, with the total regional

population increasing from 7.2 million to 9.3 million. The increase in the senior population and the increase in the Latino and Asian populations will be the significant demographic change. The growth of population will result in 700,00 more households and the demand for 660,00 more housing. The new housing project is mostly built on the coast. (ABAG, 2013) However, considering sea level rise, densification of the inland area will be a wiser choice.

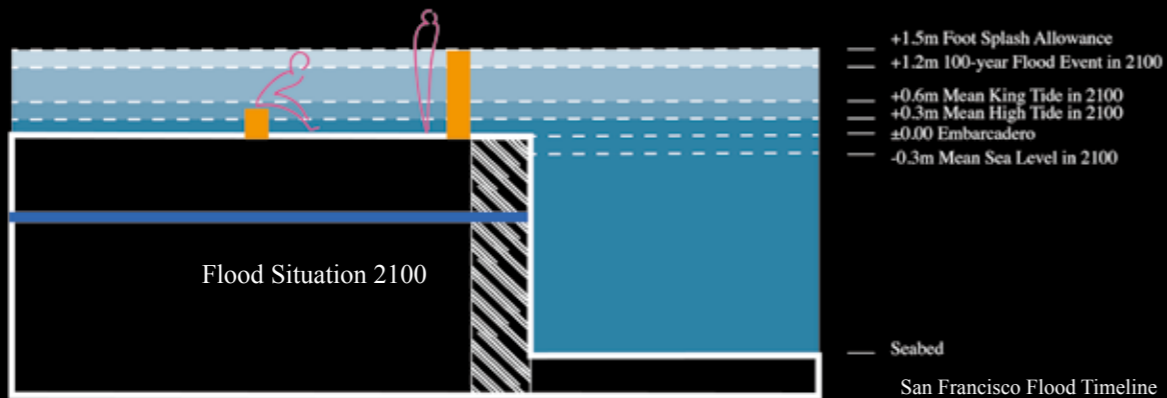
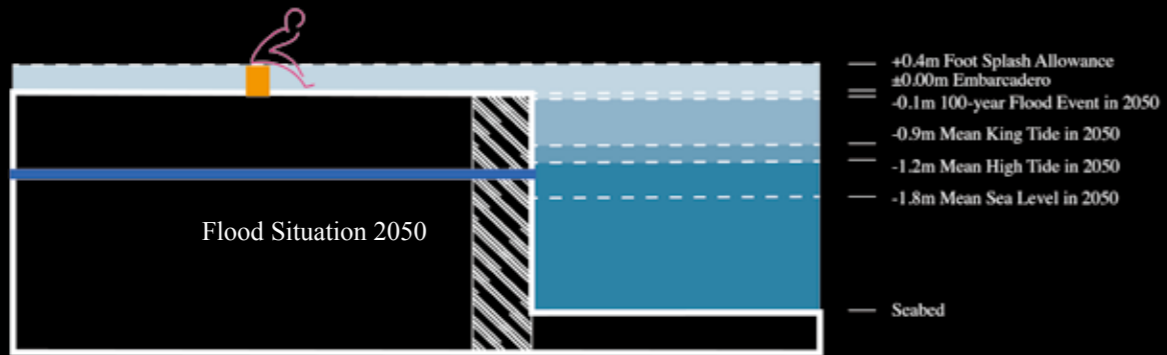
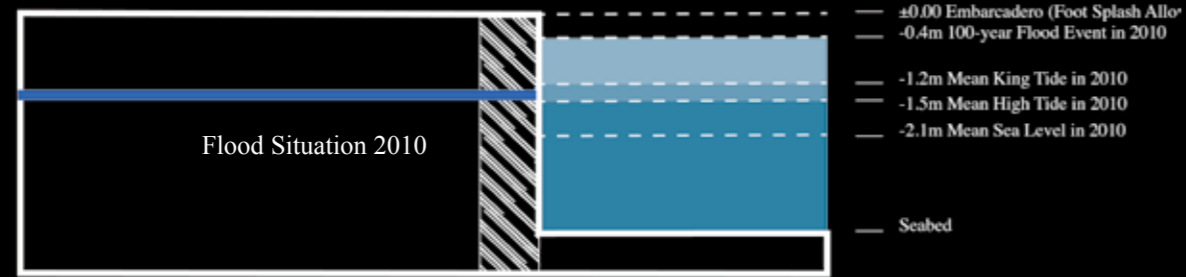
"No place in the United States, and perhaps the world, is as blessed as San Francisco by the amazing cornucopia produced on farmland within only 100 miles of the Golden Gate. " (Source: Farmland Mapping & Monitoring Program 2004 & 2006) However, 20% of the fertile farmlands are about to be flooded in the 1.8m sea-level-rise scenario (an estimate based on NOAA data). And the food production will decrease by 70% due to climate change (an estimate based on data from UCSUSA). To compensate this reduction, urban farming is far less than enough, unless 50-meter-high food production buildings could be built over every existing building in San Francisco (Whiny Maas, 2010).

These six environmental risks will happen in sequence and in different scales, pinpointing out the crucial moment that the city has to change. They are the driving forces for every hypothetical action I take in research and design. At the same time, the deep analysis of the

six environmental risks allows me to identify their uniqueness in San Francisco. In this way, the research becomes site specific.



100 years to be inundated, every  
2 years to be **Flooded!**



San Francisco Flood Timeline

Inundation Map 100-year coastal Flood in 2100



Source: Resilient San Francisco, 2016; San Francisco Sea Level Rise Action Plan, 2016; NRC (2012); NOAA (Online Data); Climate Central (Online Data)





Image: <https://i.ytimg.com/vi/9drqrbx1qI/maxresdefault.jpg>

Inundated Drainage Outlet, 2012

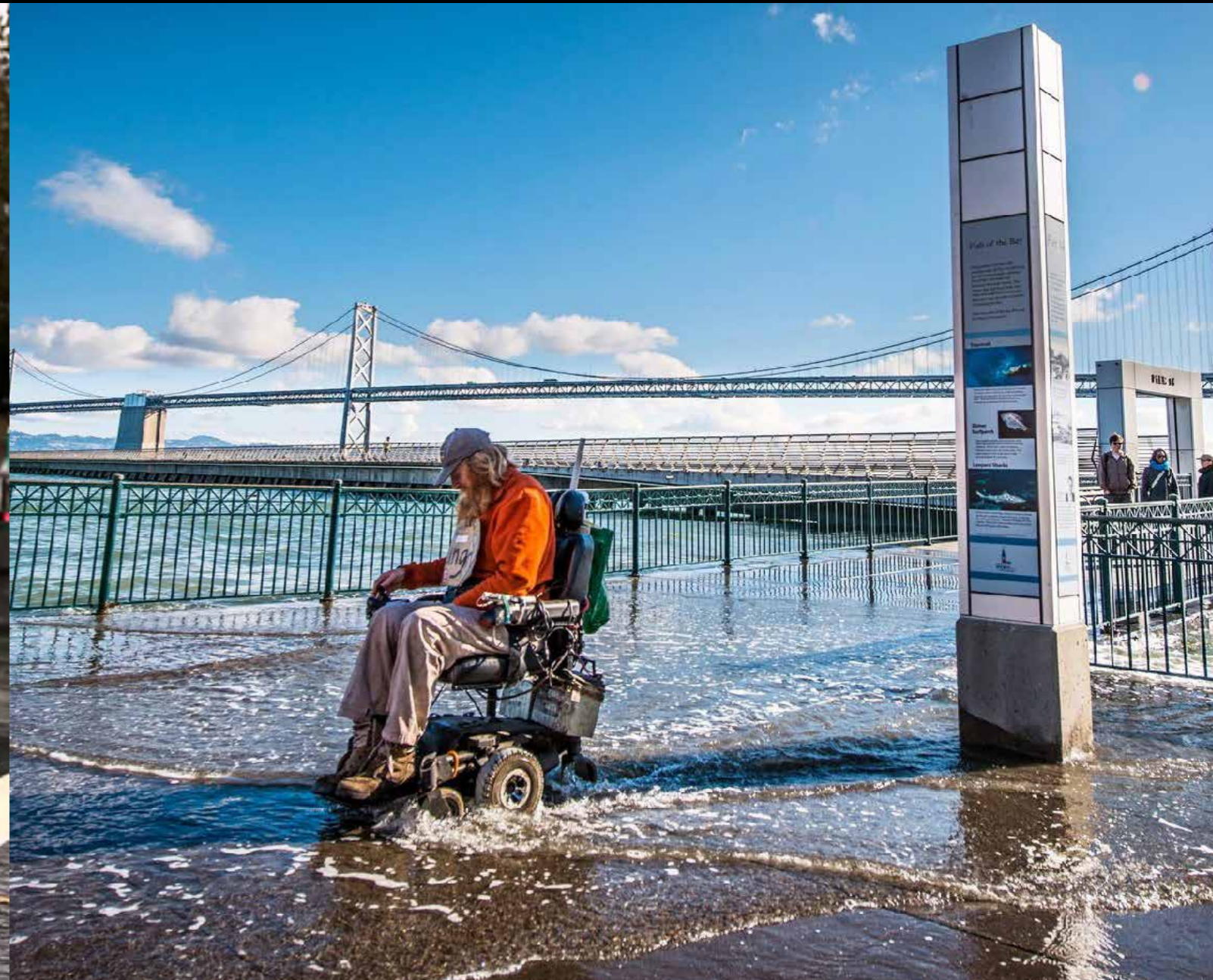


Image: <http://www.bayareacouncil.org/wp-content/uploads/2013/11/Bay-Flooding-by-Michael-Filippoff.jpg>

King Tide Splash, 2013



# 75% possibility of a over 7.0 M Earthquake in the next 30 years !

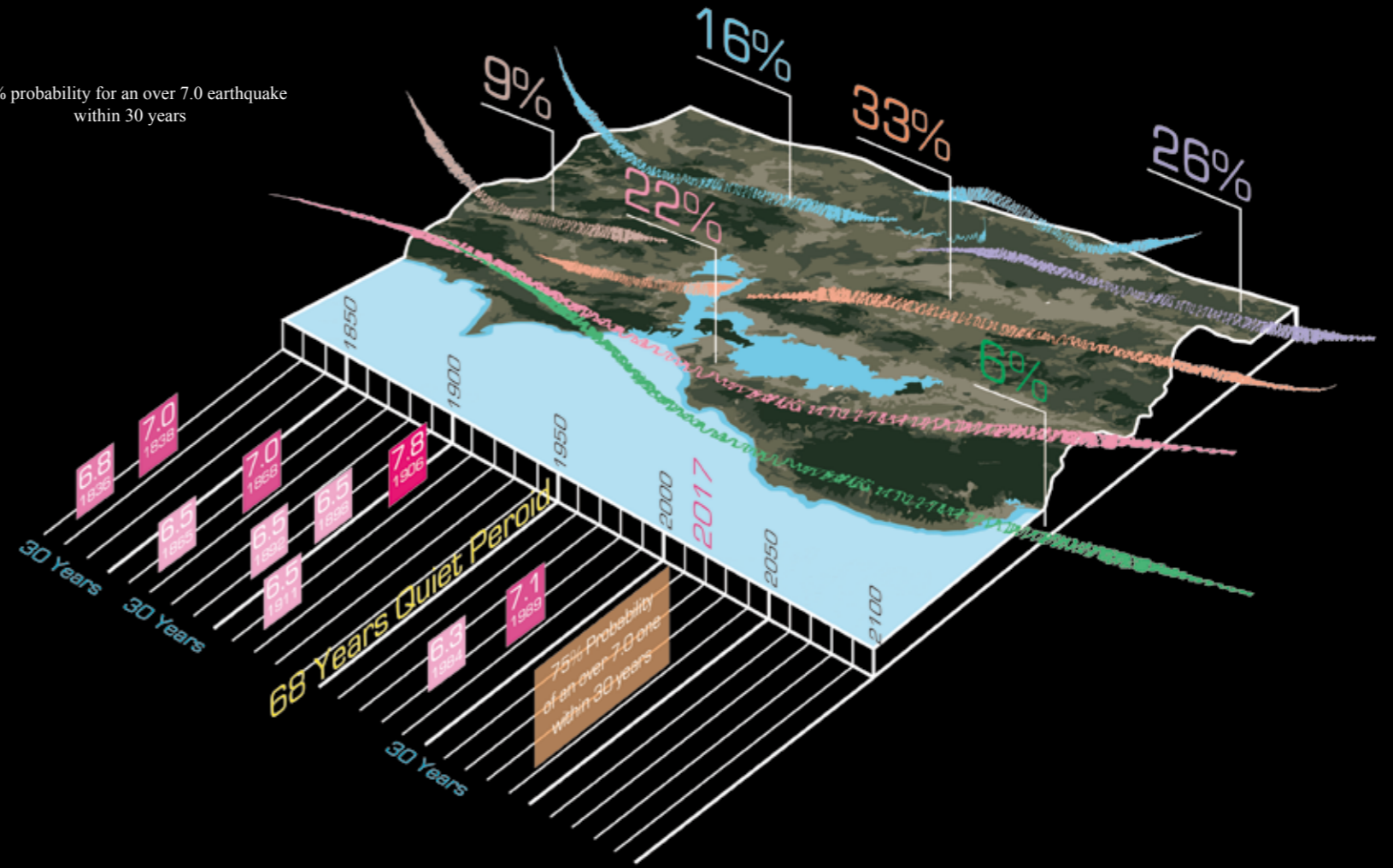


Liquefaction Susceptibility

Liquefaction susceptibility map



75% probability for an over 7.0 earthquake within 30 years



Source: USGC (2014); Earthquakesaftey (Online Data).





Image: <http://www.steelcactus.com/files/OLDSANFRAN09.jpg>

Great SF Earthquake, 1906

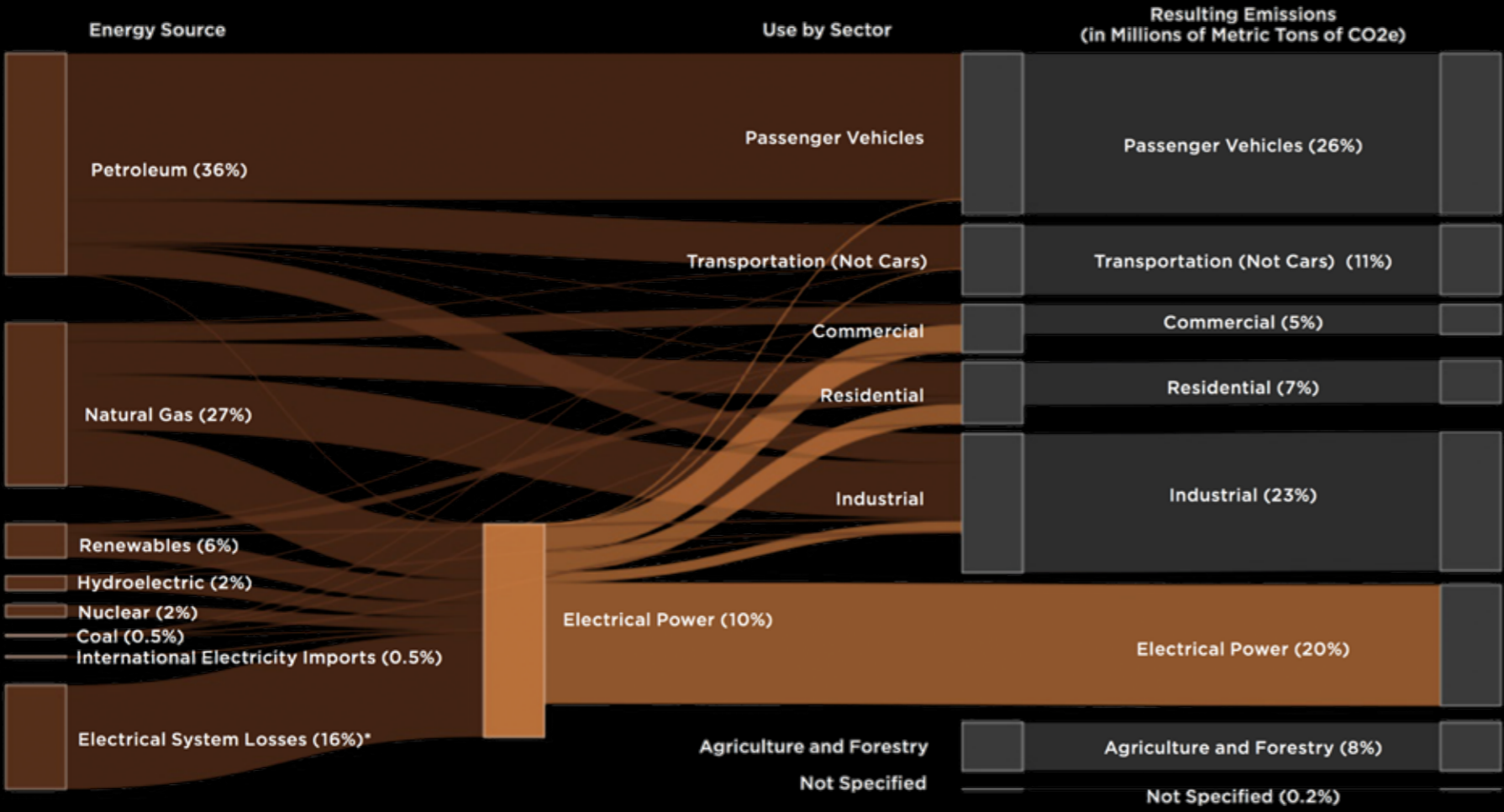


Image: [http://cdn.abclocal.go.com/content/kgi/images/cms/LP\\_QUAKE%20GALLERY\\_1280X720\\_01.jpg](http://cdn.abclocal.go.com/content/kgi/images/cms/LP_QUAKE%20GALLERY_1280X720_01.jpg)

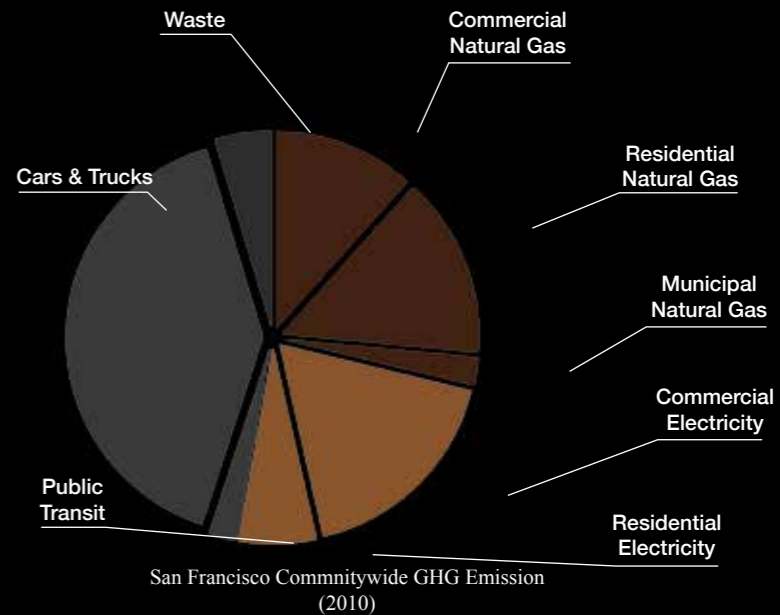
Loma Prieta Earthquake, 1989



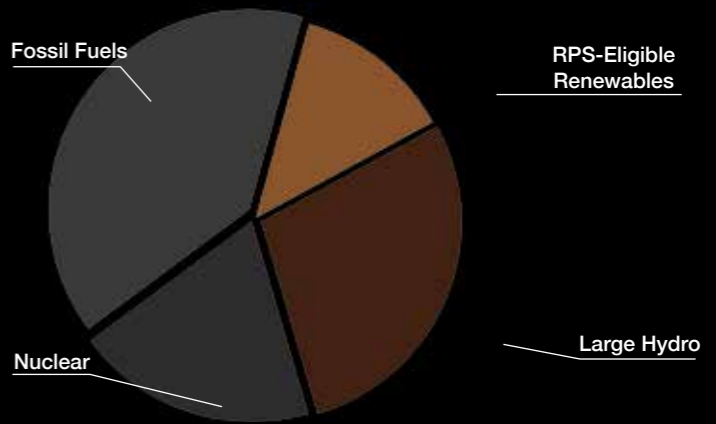
# Mayor's 100% Renewable Energy promise is a Trick!



California Energy Flow (2013)



San Francisco Communitywide GHG Emission (2010)



San Francisco Electricity Supply Mix (2010)

Source: Fossil Free Bay Area, 2016; San Francisco Mayor's Renewable Energy Task Force Recommendations Report, 2012





Image: [https://upload.wikimedia.org/wikipedia/commons/0/09/O%27Shaughnessy\\_Dam.jpg](https://upload.wikimedia.org/wikipedia/commons/0/09/O%27Shaughnessy_Dam.jpg)

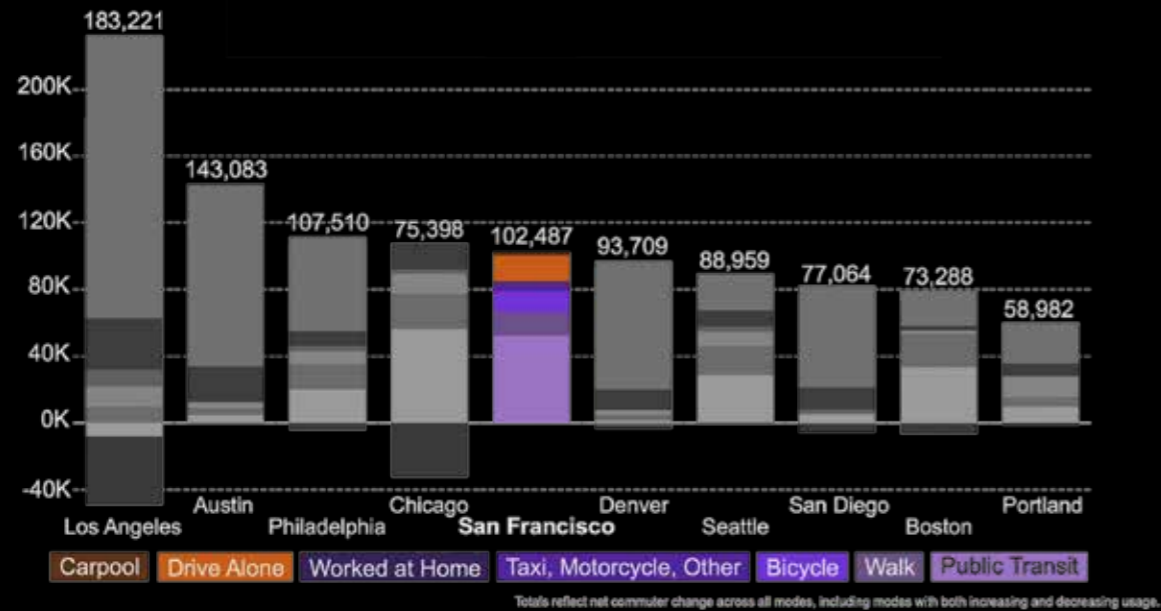
O' Shaughnessy Dam



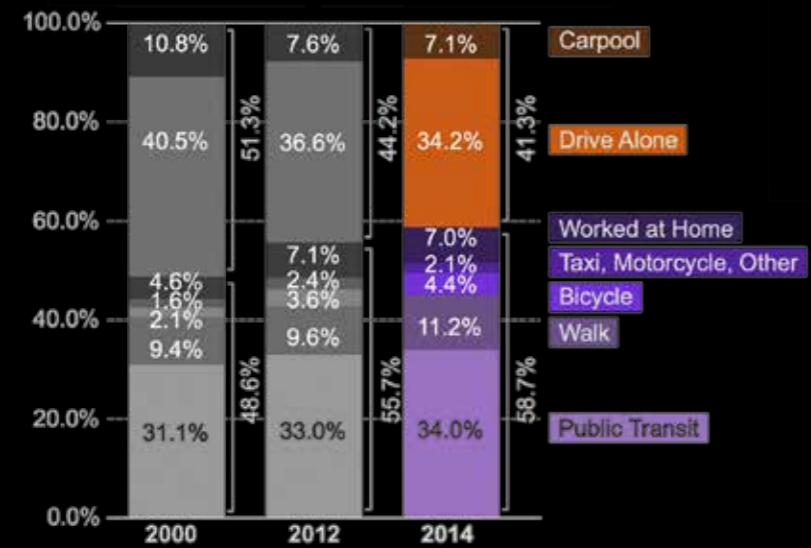
Image: [https://sfenvironment.org/sites/default/files/editor-uploads/sfe\\_ee\\_solar\\_credit\\_luminalt\\_9\\_russianhillresidence.jpg](https://sfenvironment.org/sites/default/files/editor-uploads/sfe_ee_solar_credit_luminalt_9_russianhillresidence.jpg)

Rooftop Solar Installation



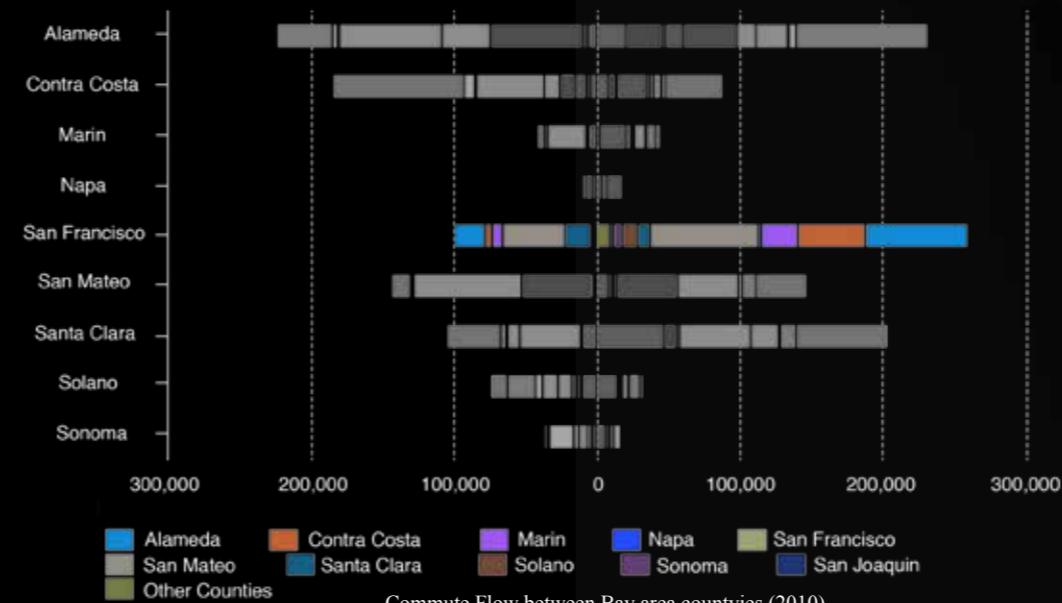


Commuter Growth from 2006 to 2015



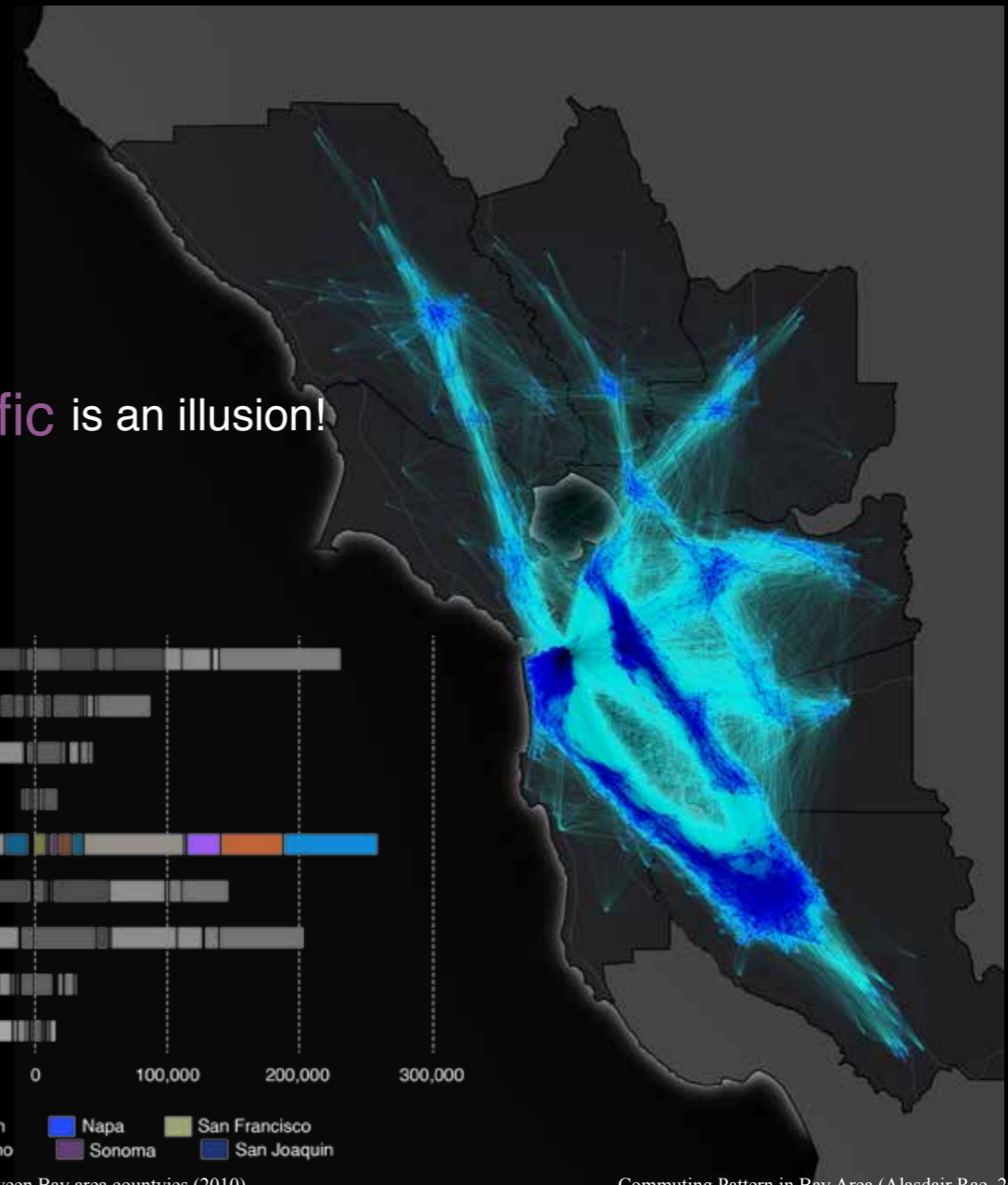
Commuting Means from 2000 to 2014

52% green Traffic is an illusion!



Commute Flow between Bay area counties (2010)

Source: SFMTA Factsheet, 2015; American Community Survey; U.S. Census Bureau: Census Transportation Planning Package (2010)



Commuting Pattern in Bay Area (Alasdair Rae, 2015)





Image: [https://upload.wikimedia.org/wikipedia/commons/0/09/O%27Shaughnessy\\_Dam.jpg](https://upload.wikimedia.org/wikipedia/commons/0/09/O%27Shaughnessy_Dam.jpg)

San Francisco Bike Path

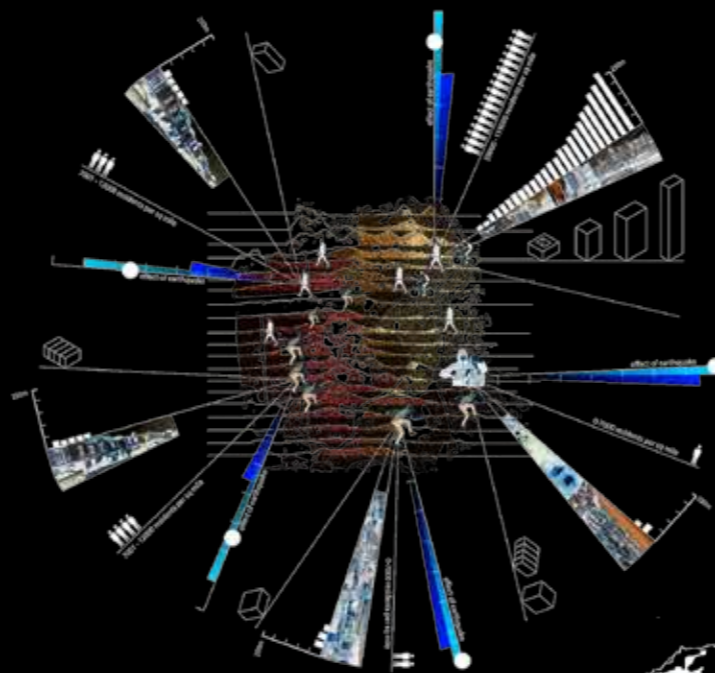


Image: [https://idrivefiles.wordpress.com/2014/08/sf\\_traffic\\_jam.jpg](https://idrivefiles.wordpress.com/2014/08/sf_traffic_jam.jpg)

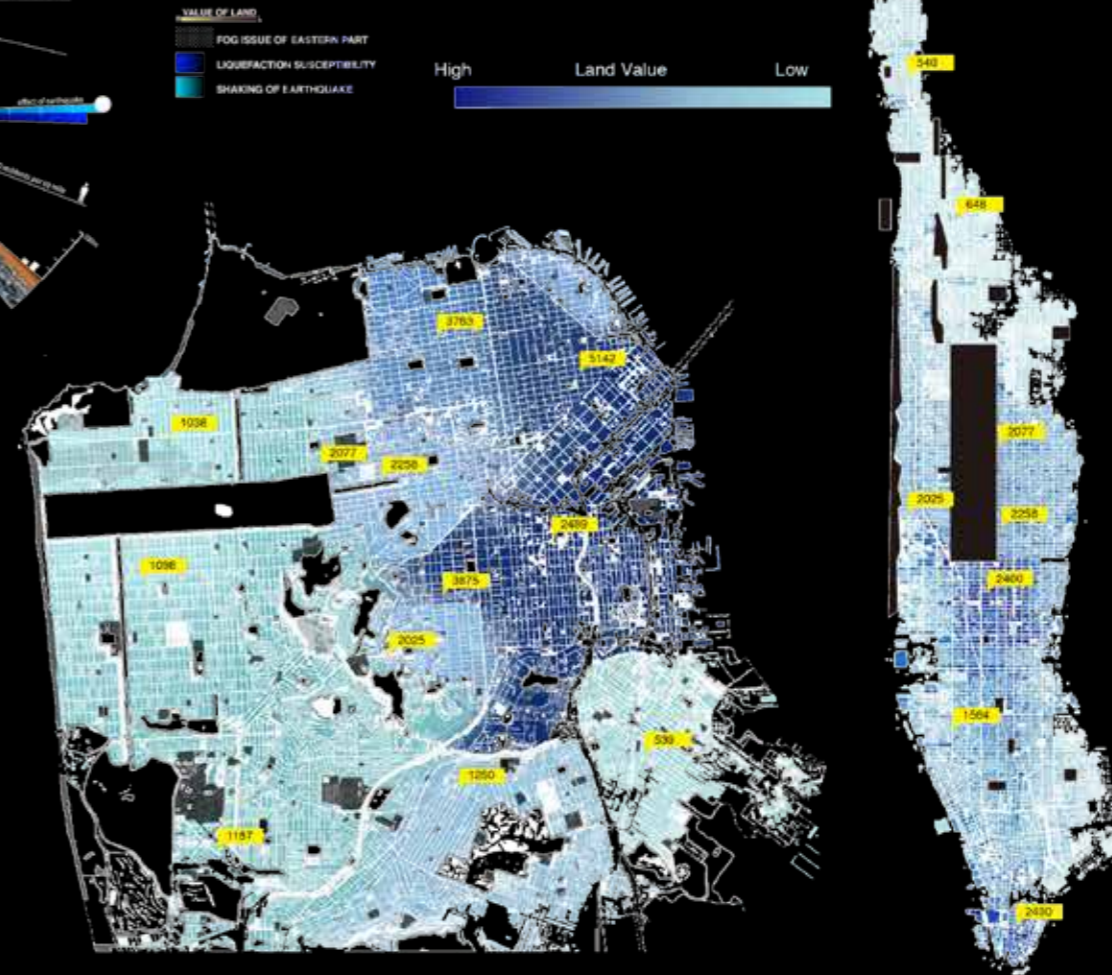
Traffic on Freeway



Population is growing (old)!



Building Typology Analysis  
(Ruojin Wu, Jie Yang)



Land Value Comparison San Francisco vs Manhattan

Source: Census Bureau; ABAG, Projections 2013; Trulia.com



Population Trends and Age Distribution to 2040





Image: [https://cdn2.vox-cdn.com/uploads/chorus\\_asset/file/6455073/overall-visionary-aerial.0.jpg](https://cdn2.vox-cdn.com/uploads/chorus_asset/file/6455073/overall-visionary-aerial.0.jpg)

Hunter's Point



Image: [https://portal.oakwood.com/profiles/images/0943/32861/Photos/Exterior\\_of\\_Building.jpg](https://portal.oakwood.com/profiles/images/0943/32861/Photos/Exterior_of_Building.jpg)

100 Van Ness

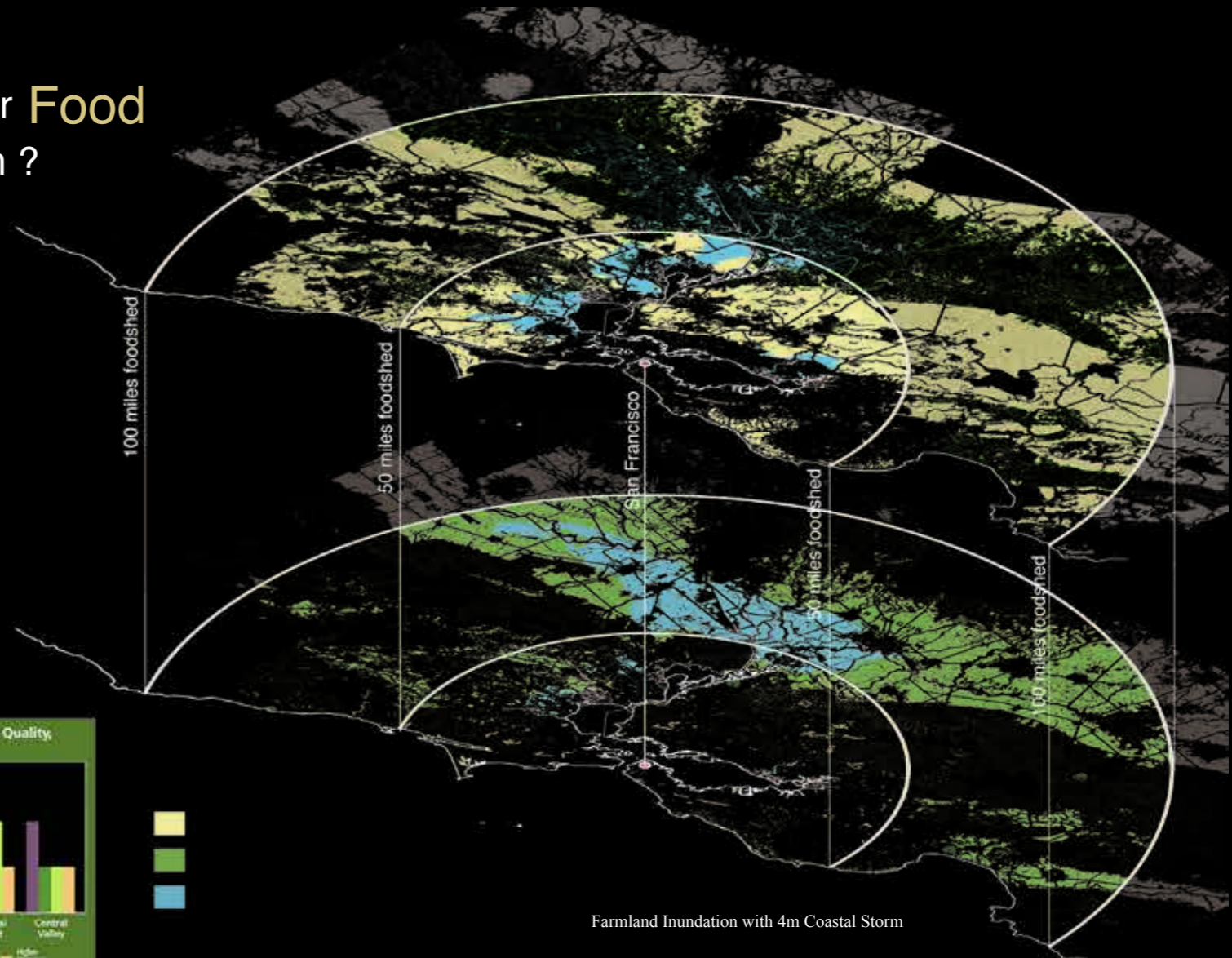


# Can we keep our Food production ?

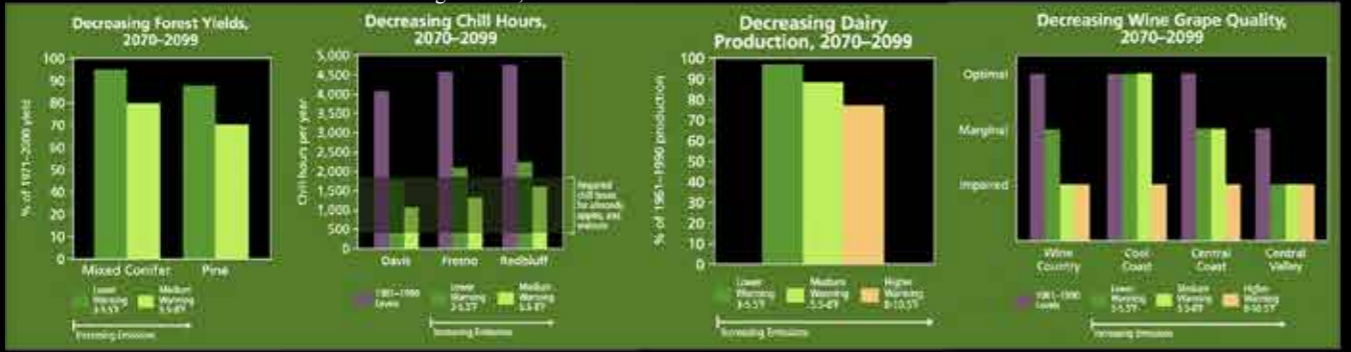


- Public Land (non-school) existing location
- Public Land (non-school) pending location
- Private Land existing location

San Francisco Urban Agriculture, 2012



Farmland Inundation with 4m Coastal Storm



Global Warming and California Agriculture (UCSUSA)

Source: SPUR, 2012; UCSUCA; San Francisco Foodshed Assisment, 2008.





Image: [http://media.npr.org/assets/img/2014/09/09/urbanfarm\\_wide-755060884e1d03ea379ecee4bf274f43ea398929-s900-c85.jpg](http://media.npr.org/assets/img/2014/09/09/urbanfarm_wide-755060884e1d03ea379ecee4bf274f43ea398929-s900-c85.jpg)

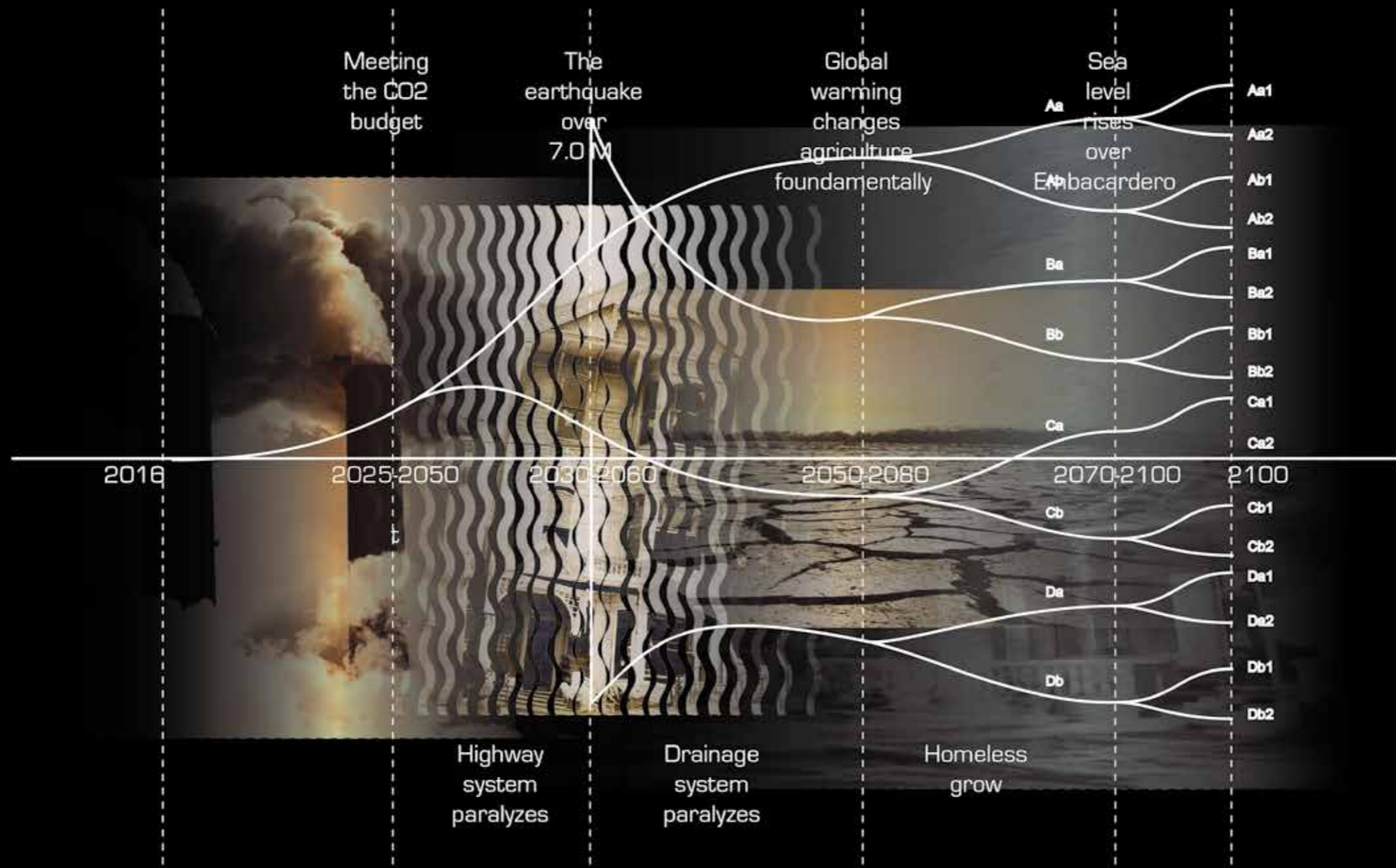
Urban Farmers Occupying Vacant Lot



Image: <http://i2.cdn.cnn.com/cnnnext/dam/assets/170219115308-01-california-weather-0218-super-169.jpg>

Napa Valley Farmland Flooded







BIG U, Bjarke Ingels Group, Manhattan



Soul of Nørrebro, SLA, Copenhagen

## 5 ROUND 1:

### TODAY'S RESILIENCE TOMORROW

#### *5.1 Nature as dynamic process*

As I mentioned before, currently in the field of landscape architecture as well as many other disciplines, nature is regarded as dynamic process, with uncertainty and complexity.

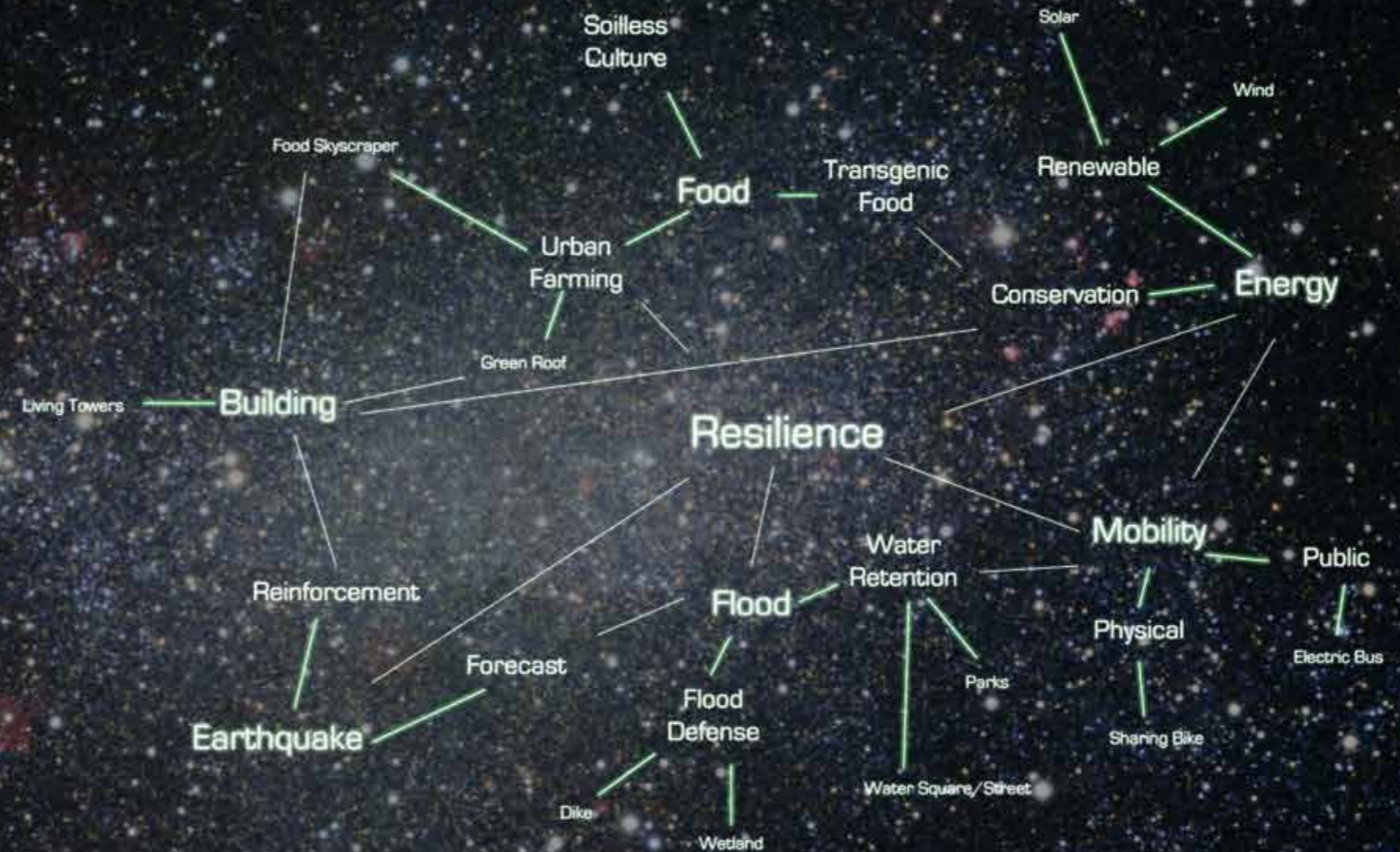
Reacting to this notion, the concept, resilience, aims to create buffer zones in the built environment, tolerating the uncertain processes. By creating these buffer zones, we are actually shifting our sovereign authority to nature. However, with the foreseen dramatic climate change, the question is how much buffer zone could we give to nature, how much authority could we sacrifice, and how resilient could we be?

In this round of scenario making, the long-term consequences of resilience are examined by pushing this concept to the extreme.



## 5.2 Resilient technology

Responding to the six environmental risks, there are certain technologies which are regarded resilient. For flooding, the most popular way today is to design water defense and water retention as public space. The Big U (2014) in Manhattan is actually a multifunctional dike, and the Soul of Norrebro (2016) in Copenhagen is essentially a street which can perform as retention tank temporarily. They are good designs introducing programme and spatial quality into water management. However, with rising sea level and the more frequent extreme weather, their programme and spatial quality will get less and less relevant, and they will eventually become only water management infrastructure, a waterfront with no activity and a street with only water. To survive the earthquake, San Franciscans are encouraged to retrofit their buildings. It means investing more capital to the most earthquake sensitive area. Supporting the mayor's call for 100% renewable energy, enormous infrastructures for energy-producing have been built in San Francisco Bay area, especially hydroelectricity and PV panels. ( Hetch Hetchy Power System). As I pointed out in the previous chapter, over ten times more infrastructures, including a lot of offshore wind turbines, are required to achieve 100% renewable energy. For traffic, efforts are taken in several directions, including physical transportation (walking, biking), public transition and electric car. To gain enough houses within limited space, single-family houses in San Francisco has to be replaced by complex buildings. In the recent year, urban agriculture has become a popular topic. San Franciscans are taking actions to grow their own food. Considering the shortage of land, the most probable way of urban farming is to do it vertically. Thus, food units will be built overlapping the existing buildings.



Technology collection - Resilience



## 5.2 Resilient story

With the six environmental risks and their technical solutions as context, a novel is written to explore the corresponding lifestyle (see Appendix 3). For the sake of easy communication, the 2000-word novel is summarized into a 100-word short story, and illustrated by a collage.

*Sitting on the top of Dike Embarcadero, Jean reads to her daughter,*

*"Laura, nature is a flow; city is a container."*

*It is a popular children's book, a cliché on city's resilience.*

*There are not many people on the dike or behind, although it was designed with shops and playgrounds.*

*Even Jean wouldn't come if Laura didn't insist to see the sea.*

*She didn't finish today's work on her food unit yet. They may not have sufficient food for next week.*

*A mechanic will come to fix the solar panel upon their window at 6:00 pm.*

*She hopes the water street is drained by now, otherwise the bus might be delayed.*

*Closing the book, Jean wonders how a container could hold a flow.*

*When she takes Laura to her arms, she noticed there is a shake coming from the dike.*

A resilient story with collage



5.2 Image of the resilient future



Current situation of Embarcadero





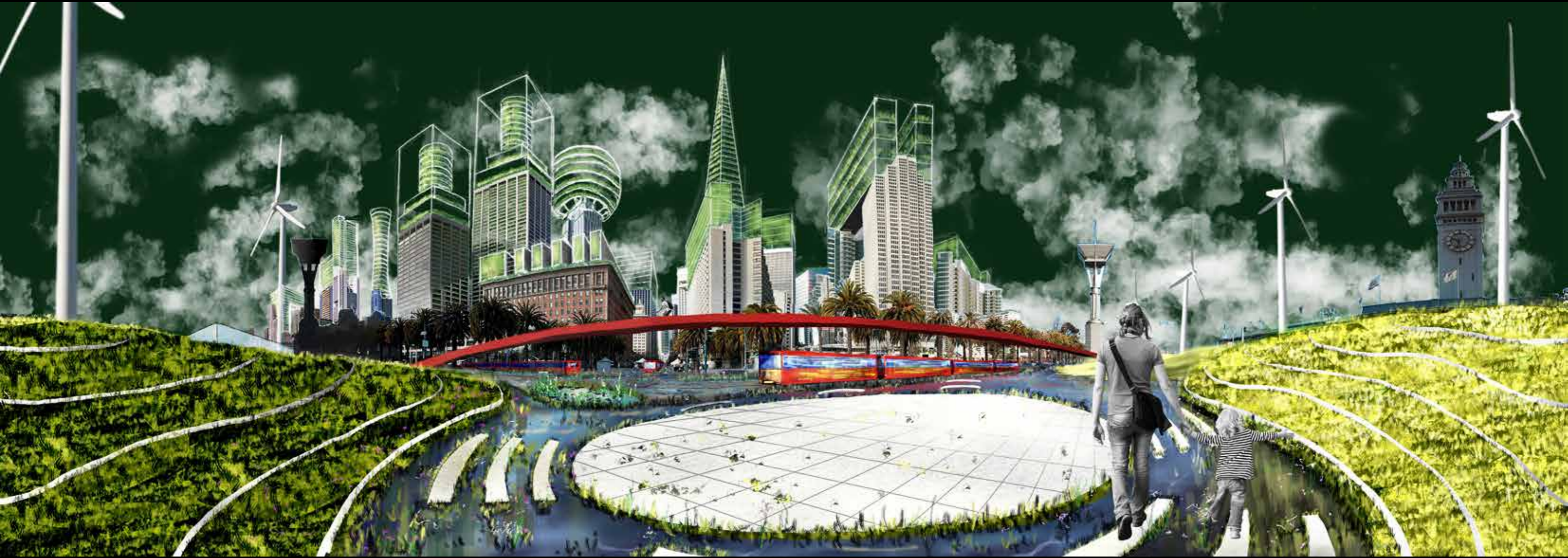
Public transit and water defence





Water retention occupied public space





Food and energy production

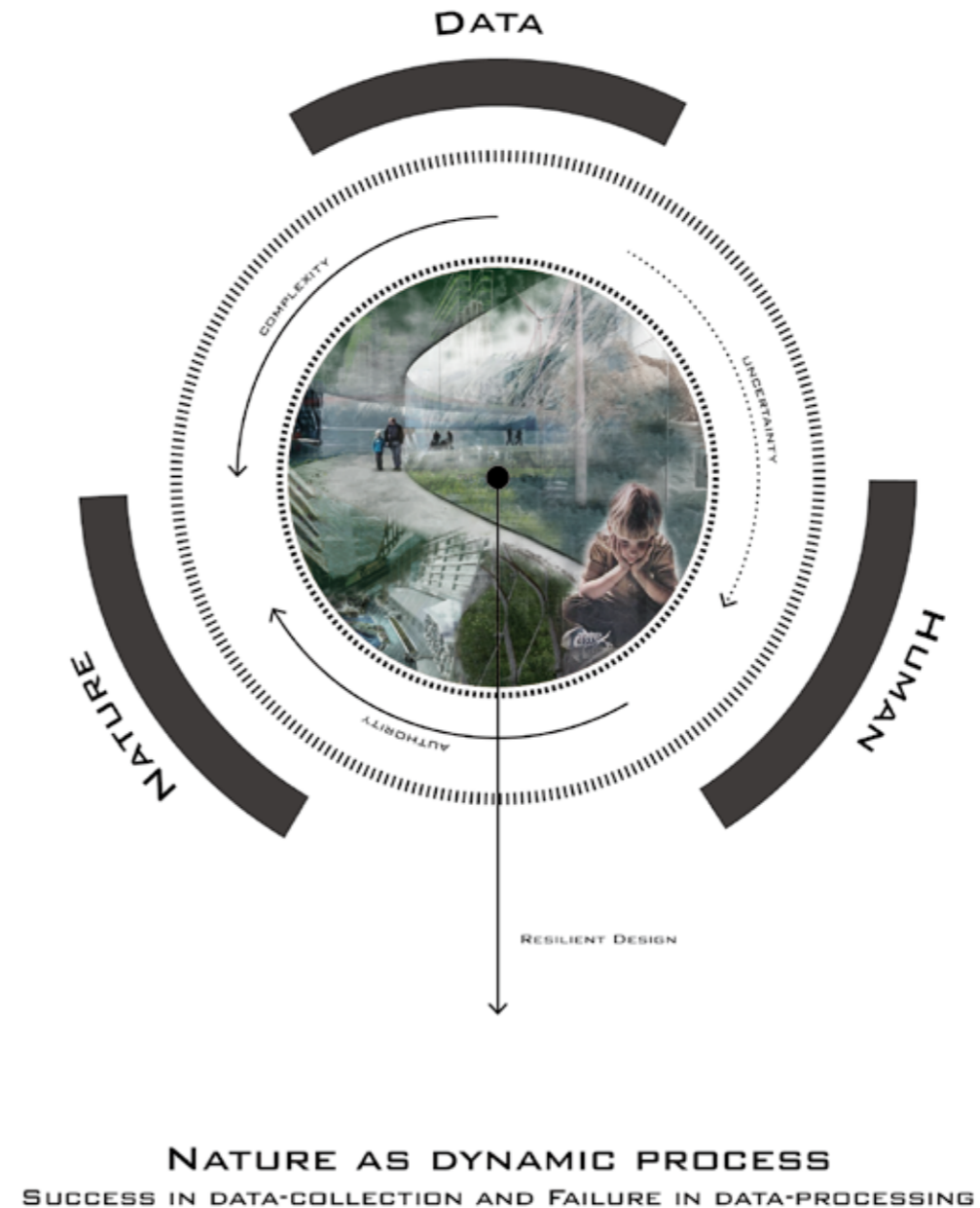


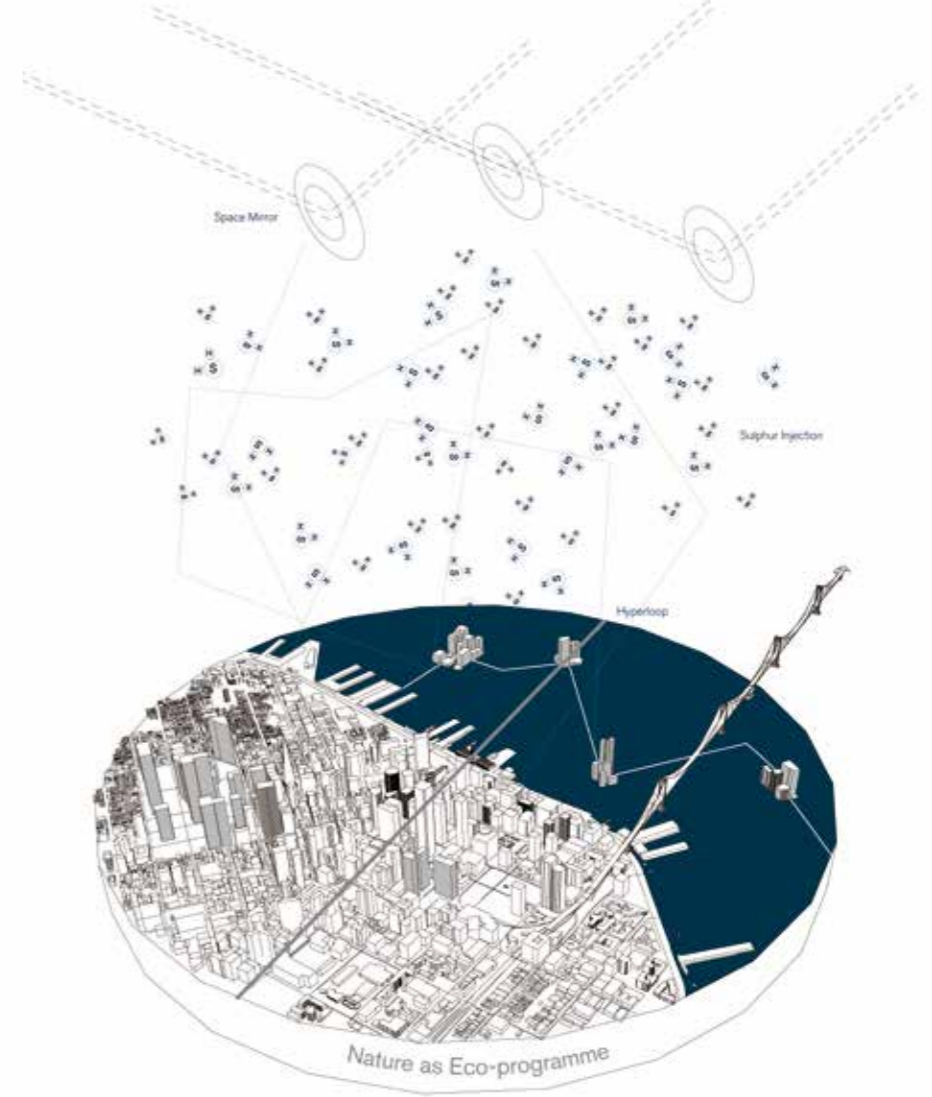
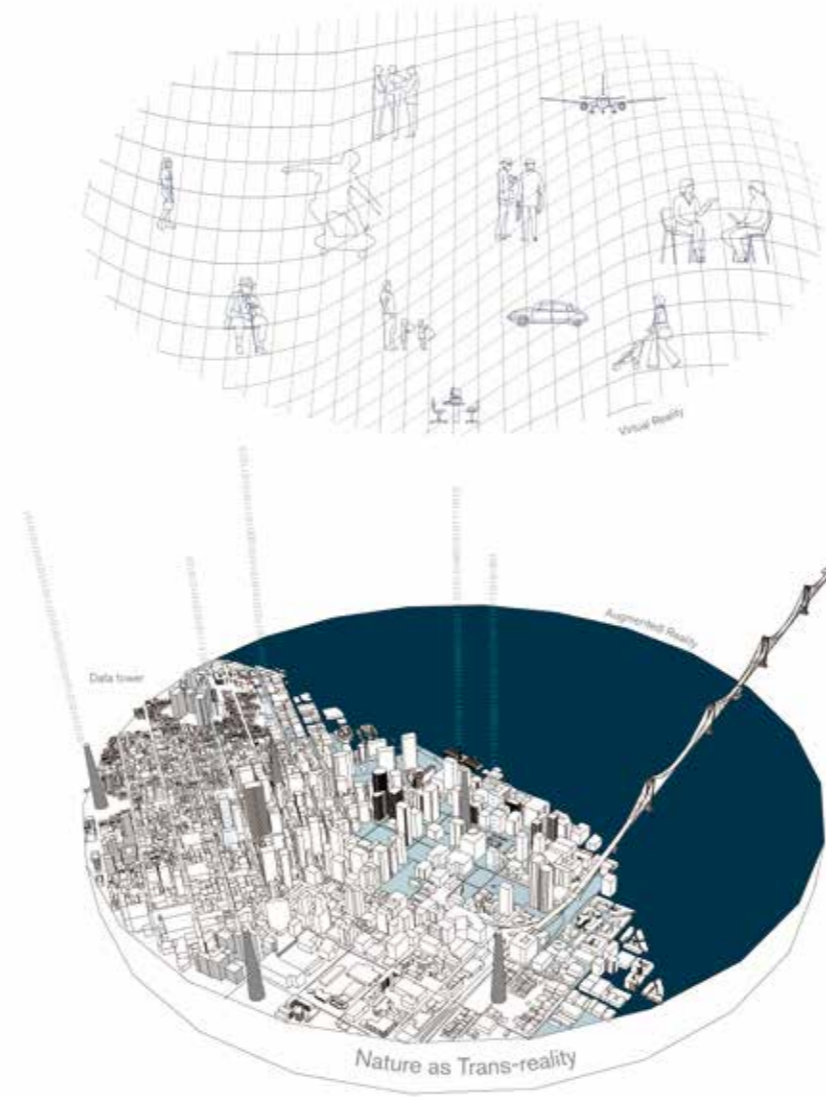
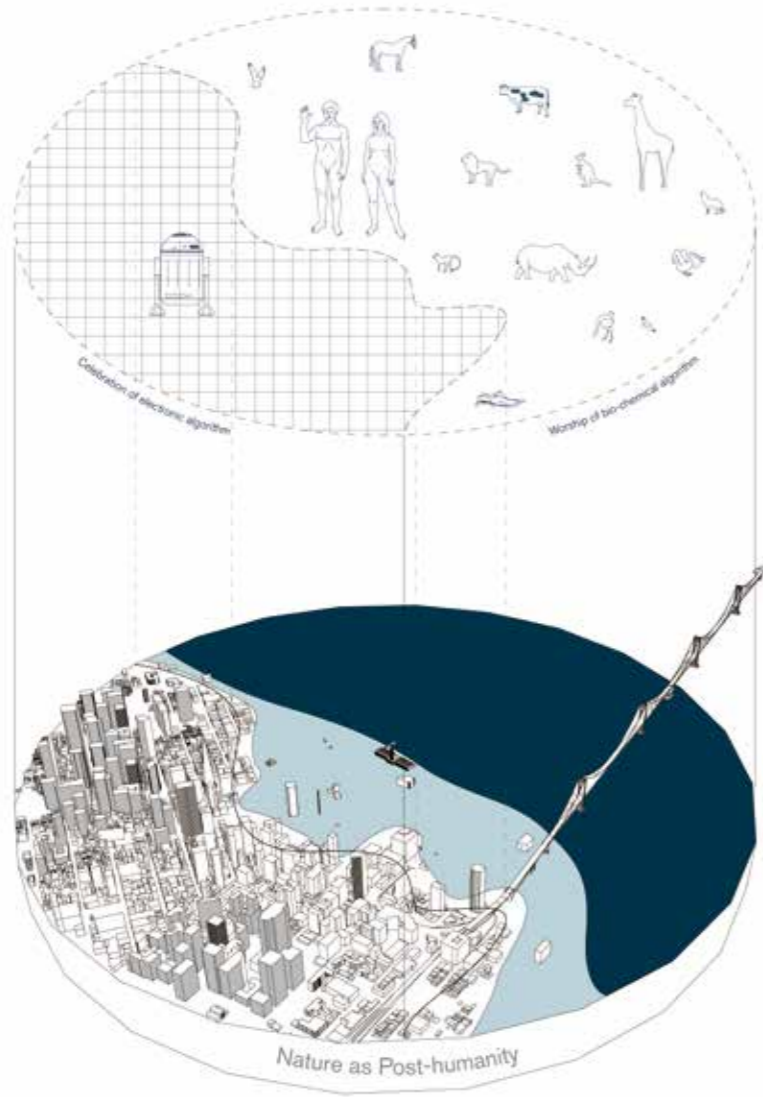
#### 5.4 Reflection on resilience

Resilience believers consider nature as dynamic process. This concept is dominated by our success in data collection and failure in data processing. With the technological development, we got more than enough data from nature to reveal its complexity, which is far beyond our ability to process. Thus, we fear and react to the uncertainty, by shifting the authority from human to nature.

Now with the help of algorithm, the veil of Big-data in nature is being dismantled. What if, one day, nature is not so uncertain anymore? What if nature is proved to be a kind of algorithm? What kind of relationship will there be among Human, Nature, and Data?

Deducing in this way, three new notions of nature are proposed. They are nature as Post-humanity, nature as Trans-reality, and nature as Eco-programme.





Three new notions of nature

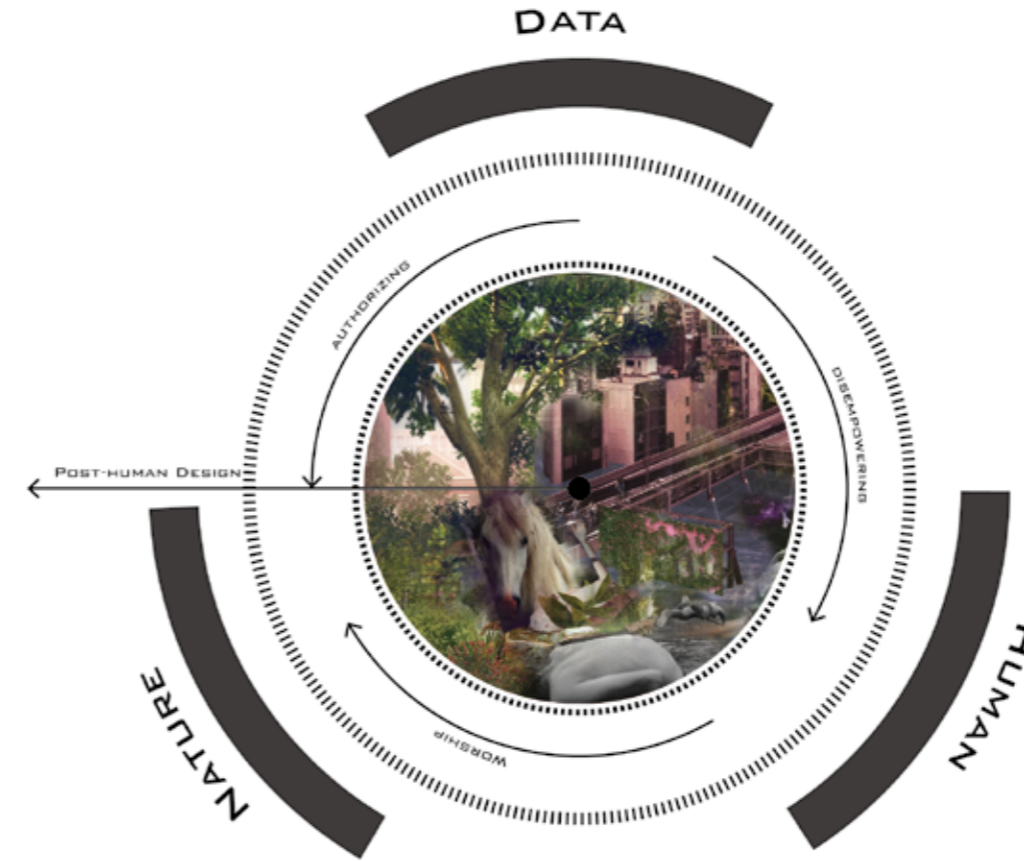


## 6 ROUND2:

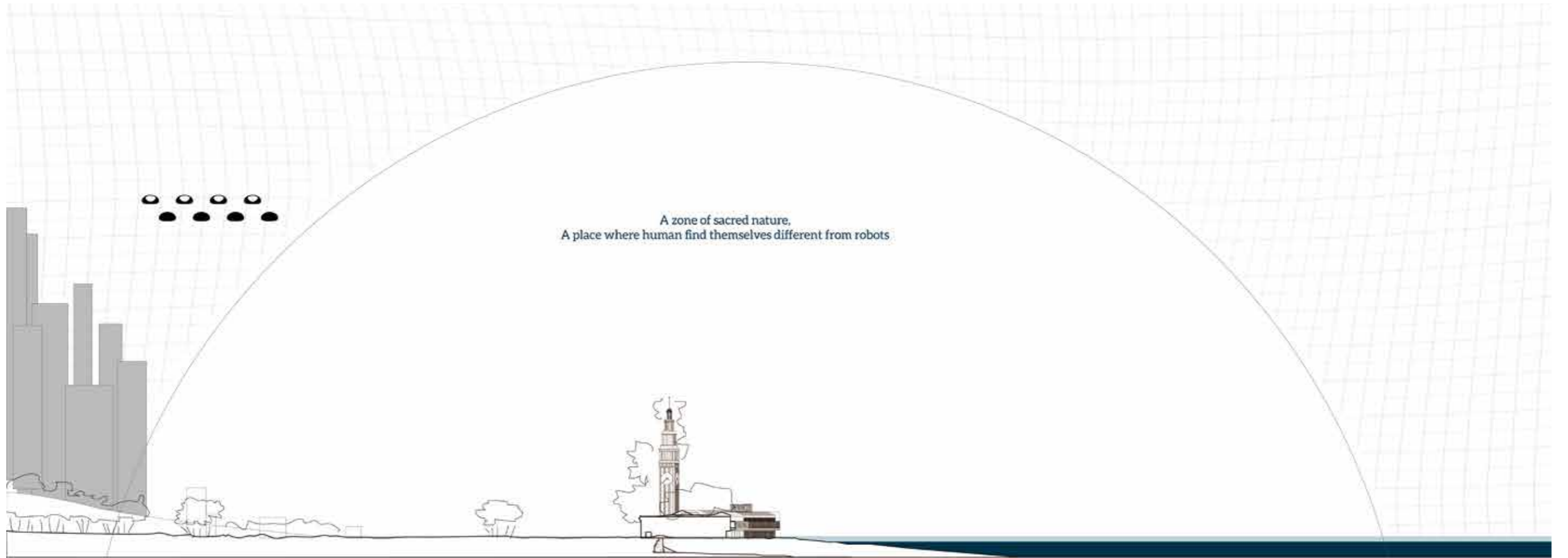
### THREE NOTIONS OF NATURE

#### 6.1 Nature as Post-humanity

This notion keep in line with the concept of resilience. In this scenario, big data could eventually prove that the algorithm of nature is so complicated than we could never decode or understand. What we do know, is that, the more we consume for a high living quality, the more we have to compensate to survive the revenge of nature. It is a vicious circle, and the power of nature appears to be unstoppable. Thus nature will gain the priority over human, and human beings will be willing to sacrifice as much as authority to nature. To some extent, nature as the prime algorithm (especially soul, the most mysterious part of this algorithm) will be worshiped as religion and be appreciated as art. People will live in a slow lifestyle with limit consumption and recreation. The minimal human intervention will become the aesthetic and ethics in this worldview.



**NATURE AS POST-HUMANITY**  
DATA AUTHORIZING THE PRIORITY FOR NATURE





Under this notion of nature, the technologies with high consumption of energy or material will be regarded anti-natural and be restrained. People will stick to the simple, sometimes even primitive, ways of doing things. The current popular concept, sustainability, will be executed strictly as a religious doctrine. Suffering the floods and earthquakes, San Franciscans in vulnerable areas will have to choose either sacrifice their property to settle down somewhere safer or sacrifice their living quality to live with the risk. Fortunately, thanks to the decreasing in consumption, the production of renewable energy will be sufficient and the further climate change would be mitigated to an acceptable level. The footprint of an individual will mostly stay on a neighborhood scale since every necessary programme could be accommodated within the neighborhood. The world's population will go down dramatically, for the first few decades, since nobody wants to bring his/her baby to such a low-life world, with no car, air-conditioning or refrigerator. However, once people get used to it, the population will stay relatively stable, due to the (in)famous birth control. The single-family house will be no longer adorable, as there won't be big families anyway. People will live together in the complex, investing a lot of time chatting with each other as recreation and working in the community farms for daily food supply. There will be future technologies with low consumptions, like droids, VR or gene modification. But under a religious emotion, people dare not to trust them, as we will never know the further consequence.



Technology collection - Posthumanity



With these predictions as context, the story and the collage are created as follow to illustrate the lifestyle and atmosphere in that world.

*Alexander is meditating in "the zone" as every Sunday afternoon. It is the only free time for him away from (house) works.*

*"The zone" is a sacred place coronated by the envoys of nature, flood and earthquake. Anything artificial is expelled here, including droids, devices, and even clothes.*

*People like Alexander call themselves Soulists.*

*They believe the soul is the core code in the algorithm of nature. And human's lusts and the technologies driven by them are viri damaging the code and the algorithm.*

*There are five zones in San Francisco. Embarcadero is the biggest one.*

*He often met some famous artists and religious leaders in the zone. But they never talk.*

*Language is regarded one of the viri for a true Soulist.*

Future images are made as follow to examine the spatial quality under this notion of nature.

A post-humanity story with collage







Current situation of Embarcadero





Space are left to nature





Ruins of earthquake



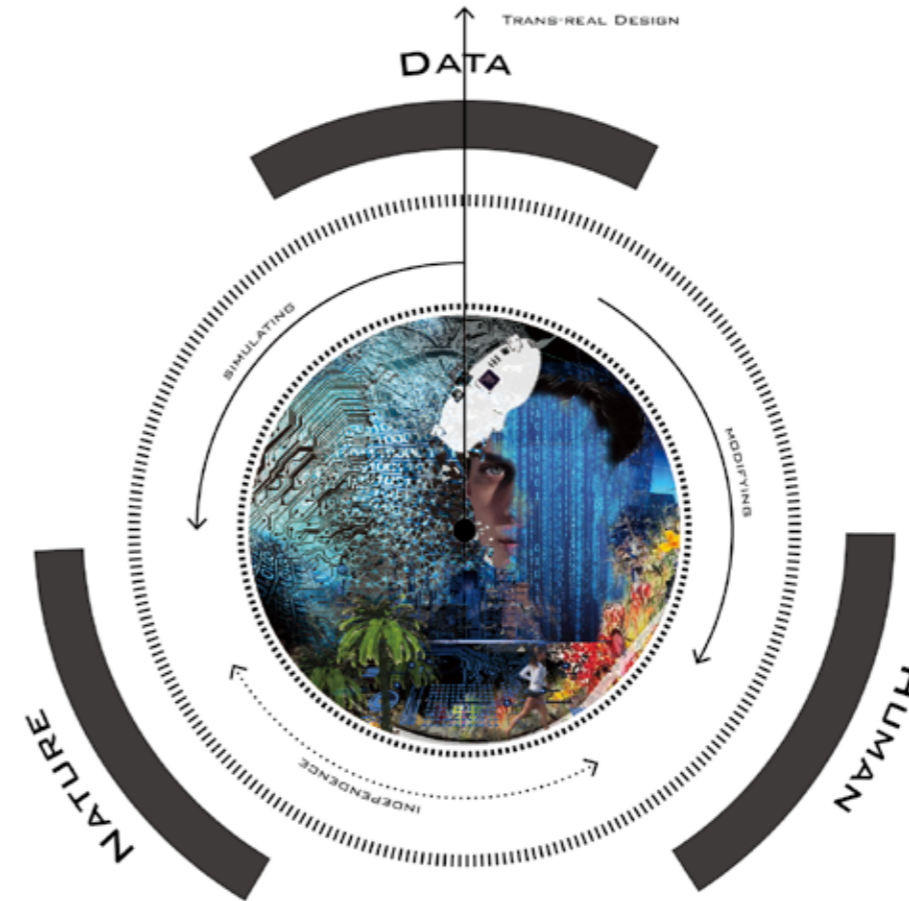


Worship of nature in the ruins

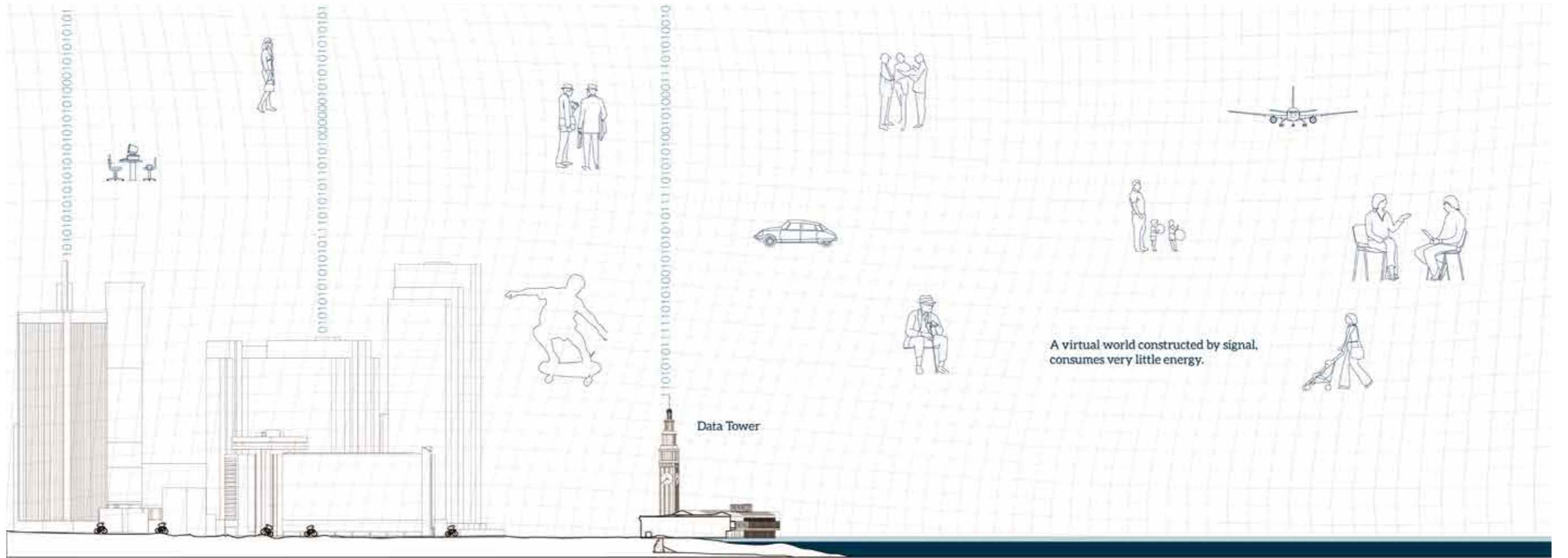


## 6.2 Nature as Trans-reality

This notion is based on the fact that the data technologies are making human beings less and less dependent on nature and even the society. In this notion, big data proves that the natural process could be imitated by certain algorithms. Starting with VR and AR, new technologies will be developed to modify or even alter our sense. Thus human could construct our own reality with the algorithm and become independent on physical nature. Further, an individual could also construct one's own reality and, to a great extent, become independent in the society. Despite, food, energy, and data supply, one could almost be isolated from anything else. In this notion, the aesthetic and ethics will be transferring our civilization to a digital world.



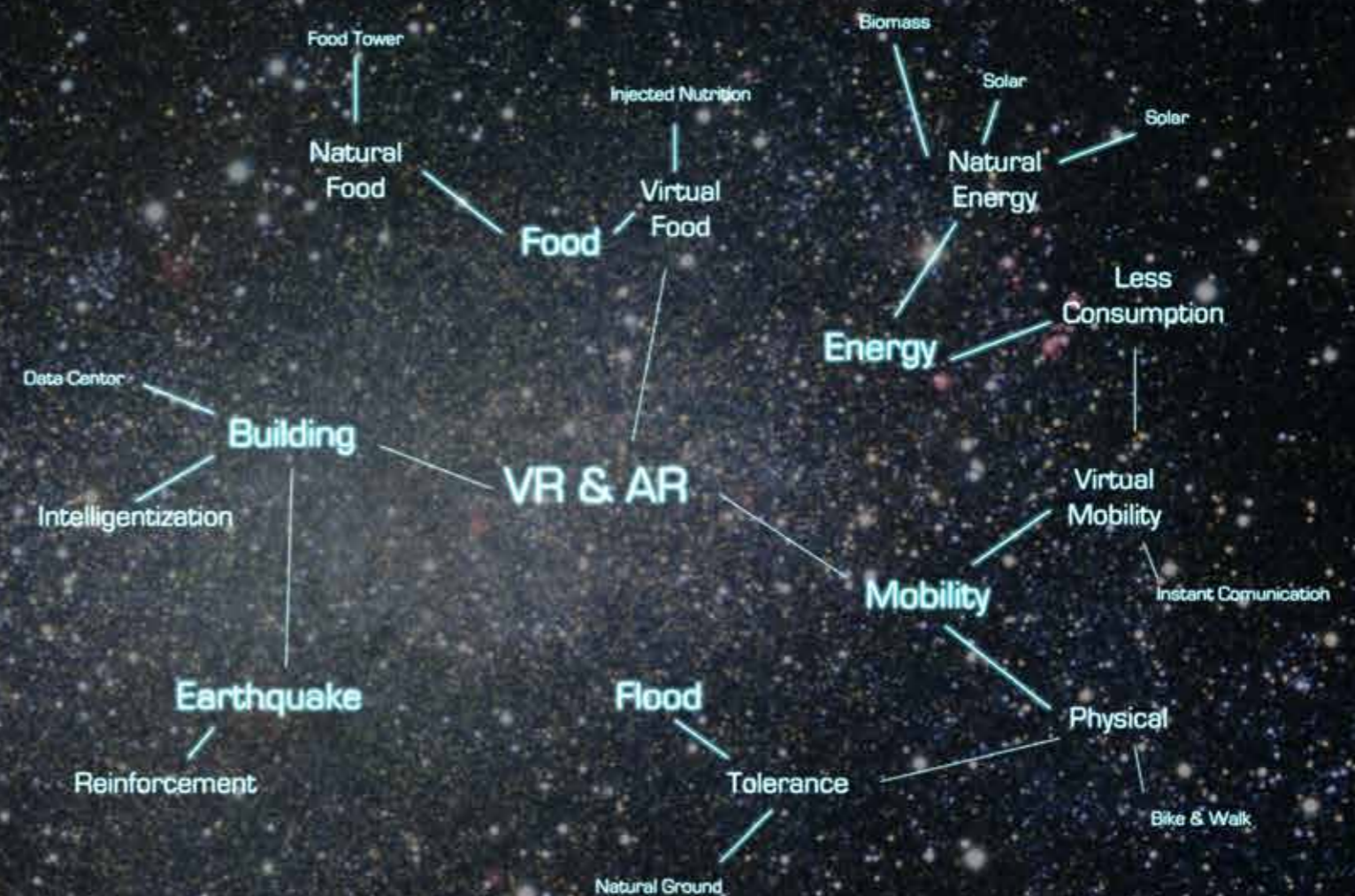
**NATURE AS TRANS-REALITY**  
DATA ISOLATING HUMAN FROM NATURE



A virtual world constructed by signal, consumes very little energy.



Under this notion of nature, technologies will be developed not to change nature but our perception of it. With VR, AR, hologram and other visualization tools, anywhere and anyone in the world could be brought in front one's face and almost every programme could be done online. Thus, physical space, no matter public or private, will lose its relevance. Outdoor space could be completely abandoned to nature, and a 20-square-meter room is sufficient for an individual's daily life. In this case, land and housing won't be scarce anymore. People will live densely in data towers, which contains programmes remained physical, like food and energy production, water purification, data storage, healthcare, sports center and hardly move out. A tower connected to the internet will be a complete world for most people. The towers will be built on bedrocks to survive the earthquake. Flooding or traffic congestion are no longer problems. Nutrients will be produced from factories efficiently but without taste. Their tastes could be adjusted by the users with their sense assistants. Since altering our sense will consume much less energy and material than altering the physical world, nature becomes also independent from humans.



Technology collection - Trans-reality



With these predictions as context, the story and the collage are created as follow to illustrate the lifestyle and atmosphere in that world.

Neo wakes up in the night, surrounded by glowing jellyfishes.

He is not sure if he is waking up in the virtual reality or the argument one.

He turns off the Matrix system. The holographic jellyfishes disappear and the screen walls start to show its opacity.

Looking through the screen, Neo is convinced by the starry sky and the hairy ground that he is in the real world, as nobody would pre-set this old-fashioned scenery as background.

Turning the natural mode on, now he can only see natural things in real, while all the artificial or digital beings are shown as glowing sketching lines.

He planed a jogging with his girlfriend Trinity. It has been a long time after last time they met in nature.

Future images are made as follow to examine the spatial quality under this notion of nature.



A Trans-reality story with collage





Current situation of Embarcadero





A digital layer of landscape





Abandoned out-door space



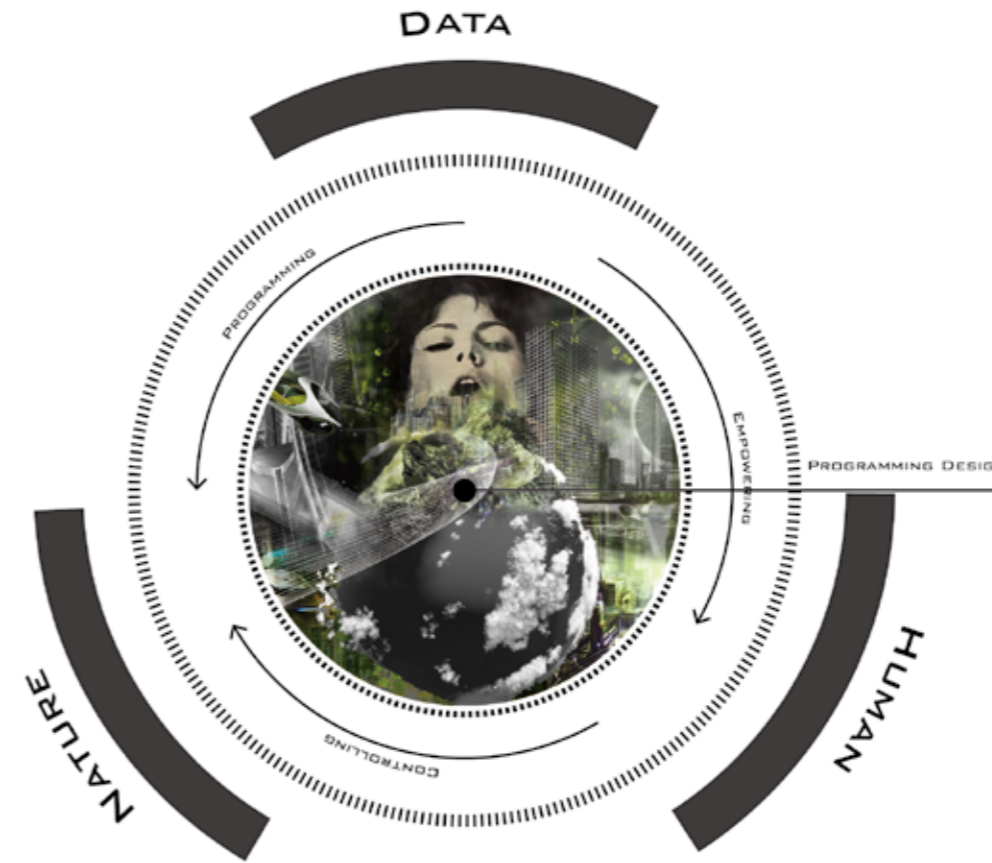


Digitally reclaiming of the outdoor space

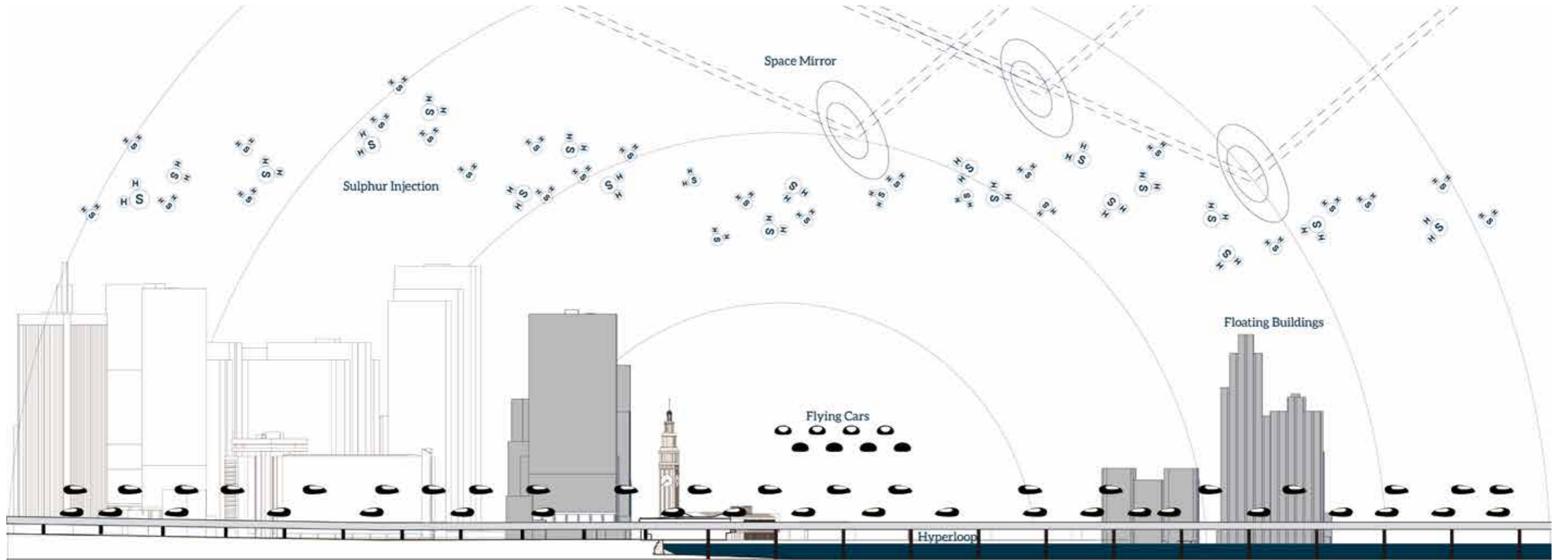


### 6.3 Nature as Eco-programme

In the concept of resilience, big data reveals the complexity and uncertainty of nature. However, with the development of data technology, this complexity might also be comprehended by algorithms and little uncertainty might be left to the computer. Once we could precisely understand the process of nature, it would not remain dynamic and uncertain anymore, but editable and controllable like a computer programme. With this notion of nature, humans could gain the power and authority to totally control nature. Along with the uncertainty, there is also no ethic or aesthetic left in nature itself, but in precisely controlling it. A city with this notion will breed an intensive lifestyle.

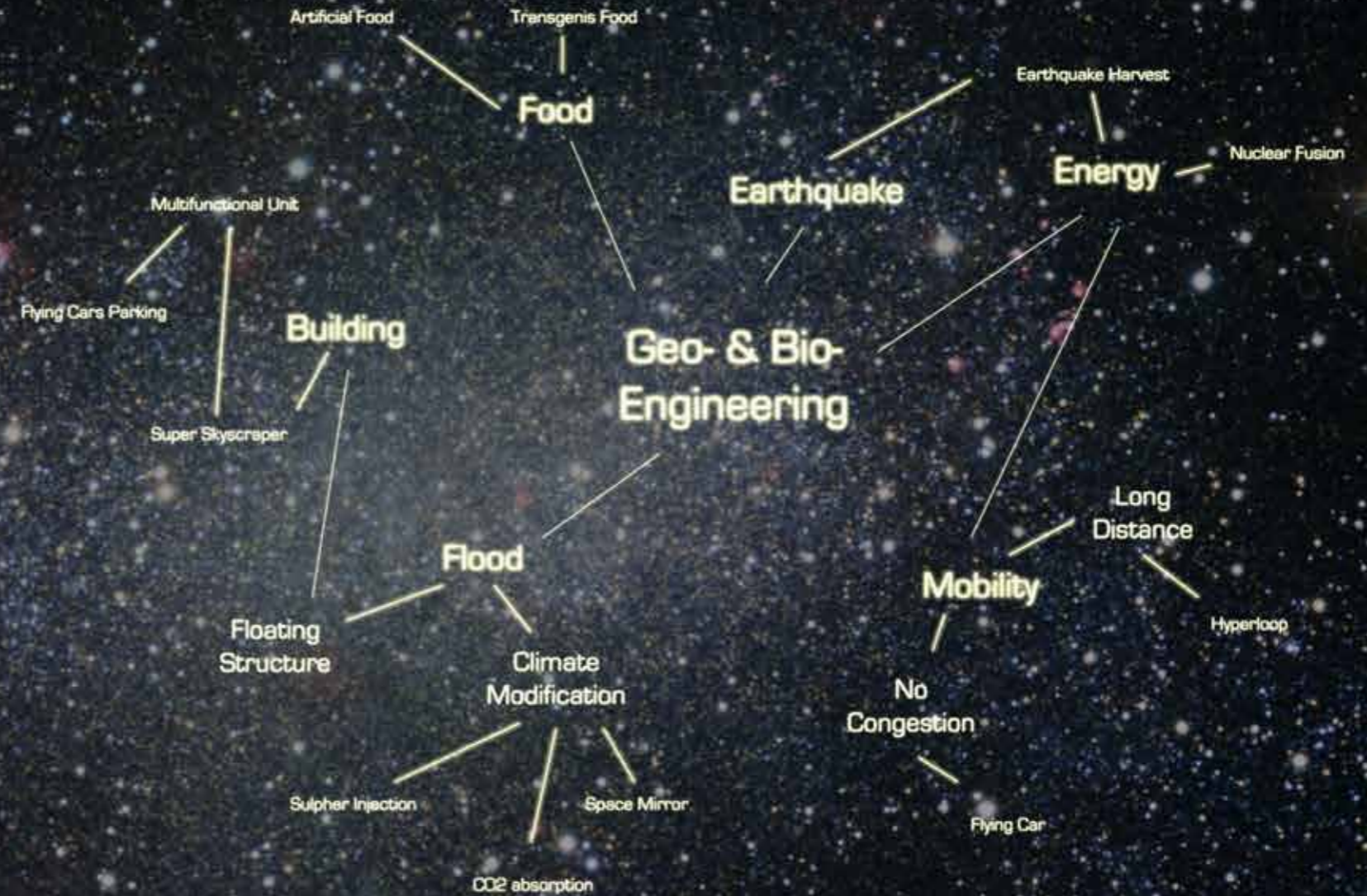


**NATURE AS ECO-PROGRAMME**  
DATA EMPOWERING HUMAN TO PROGRAMME NATURE





Under this notion of nature, humans will seek to stop climate change with physicochemical methods. Geoengineering, such as sulfur injection and space mirror, will become acceptable, then even preferable with suggestions from AI. In this circumstance, floods will be no longer a problem and the vibration of earthquakes will be absorbed as an energy source. Without the concerning of climate change, fossil fuel will be used for another few decades until the controllable nuclear fusion comes into being. Along with the popularity of self-driving cars, and then flying cars, streets and parking lots will be built up. Buildings will be connected to each other in a high density. As the traffic expanded to the third dimension, the vertical location in a building will show a significant value which will lead to the vertical zoning plan. With the detailed control of the natural process, bio-diversity will lose its importance. As the algorithm pointed out, the algae and moss will be the optimum species for nutrients and oxygen production. Thus, artificial food made from these lower plants will popular and feed the large population.



Technology collection (Eco-programme)



With these predictions as context, the story and the collage are created as follow to illustrate the lifestyle and atmosphere in that world.

Arthur asks Siri about "Climate Change". It says, "a doom bubble in the early 21 century, broken by geoengineering and artificial intelligence." For Arthur's generation, it is hard to imagine that humans used to be bothered by water or energy just 100 years ago.

To Arthur, the world is like a bending machine. Just by pressing a button, UN conference can change the sea level or average temperature by 10% on behalf of all mankind.

"Ding-dong!" Here arrives his hyper-loop. Within 5 hours, Arthur will be on Himalayan, where he will witness the natural wonder, the blue sky. He looks out of the window, starring at the man-made sun through the interspace of flying cars. Once again he asks Siri about the ultimate meaning of life. While the personal assistant is calculating, Aauther orders a tube of protein for dinner

Future images are made as follow to examine the spatial quality under this notion of nature.



An Eco-programme story with collage





Current situation of Embarcadero





Mega-structures





Flying cars and cleared ground space





Intensive built and lived city



### 6.4 Reflection on the three notions

With the explorative scenarios of the three notions of nature, the possible futures are framed to a certain range. Relating them to the history, a timeline of the development of landscape architecture could be composed. However, in this timeline one section is still missing, that is, how we are going to approach the three scenarios since they all talk about the extreme situation. Reflecting on that, the normative scenario will build a possible path from now to the future. In the original idea for the methodology, the normative scenario should be a preferable solution in steps. However, in this circumstance, the word "preferable" doesn't make sense, because the preference for each generation could differ and it really depends on the aesthetics and ethics of the time. Thus, in the last round of scenario making, I would like to compose a "tangible" future with concrete designs which make the most sense for me, as a landscape architect. In this way, it could hopefully offer a ground for further multi-disciplinary discussion.



Timeline of Landscape Architecture



## 7 ROUND 3:

### A TANGIBLE FUTURE

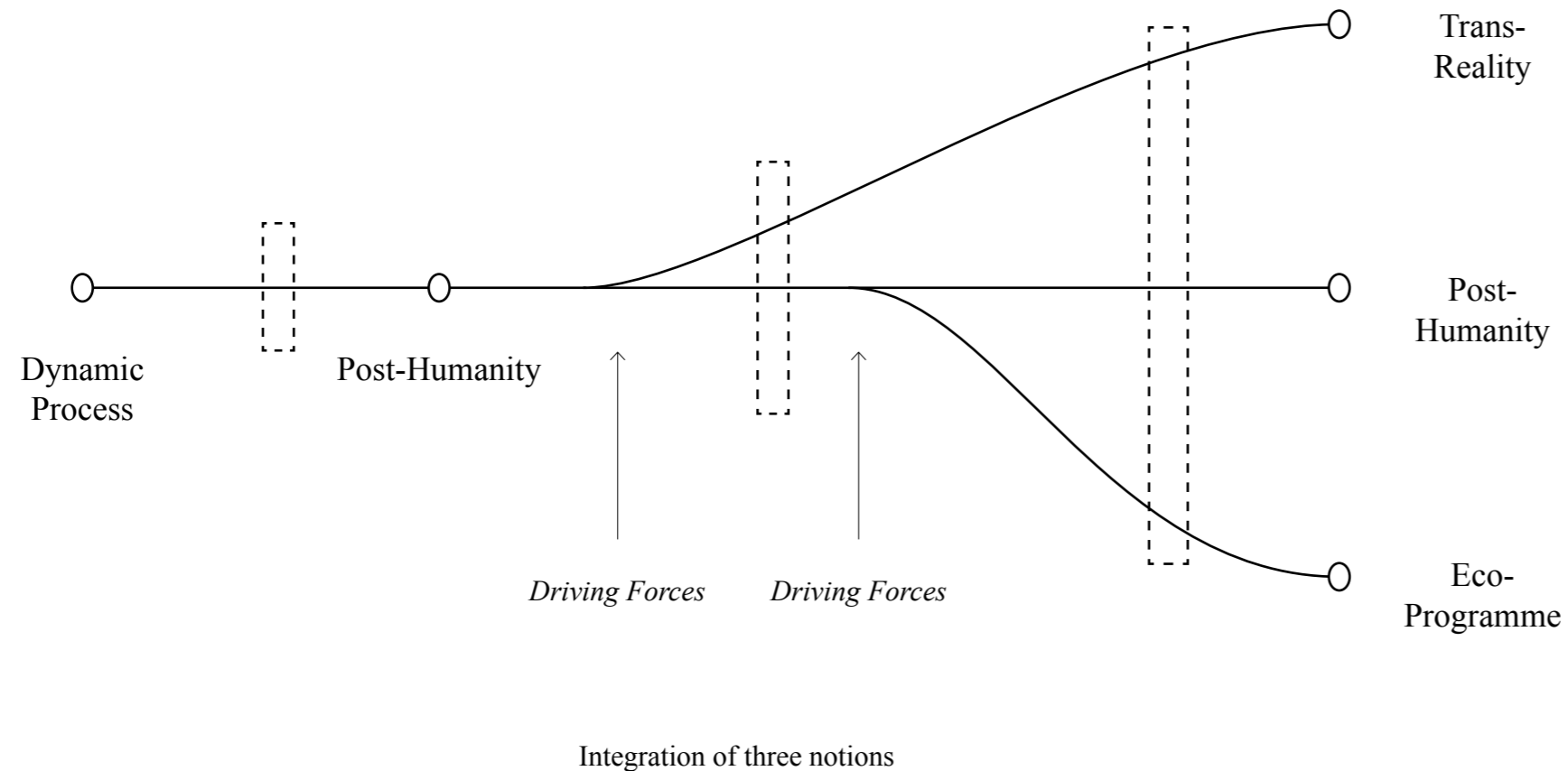
#### 7.1 Three in one

In this tangible future, some rules are pre-set to integrate the three explorative notions of nature.

Firstly, all of the three notions will appear in sequence. Considering the technical difficulties and their relevance with today's resilience, I assume that the order for the three notions to first be on stage will be post-humanity, trans-reality, and eco-programme.

Secondly, an existing notion of nature won't just disappear after the appearance of another notion of nature. Like the formal garden is still appreciated and represented in many private gardens, even though technically we entered an eco-programme age, it doesn't necessarily mean the appeared notion, nature as post-humanity, will be obsolete. Thus the three notions of nature will co-exist and get balance in the end.

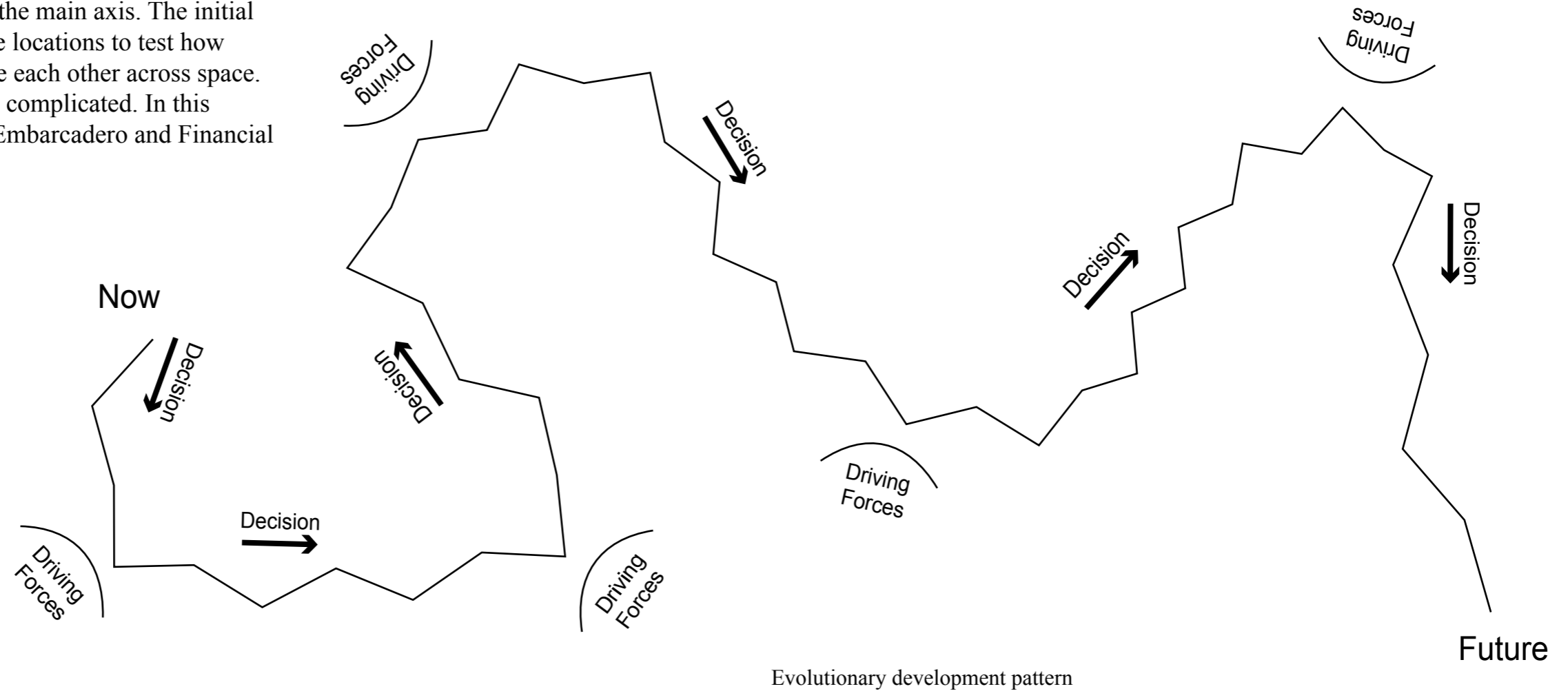
Thirdly, in a long time span, the development of a city will follow an evolutionary pattern. Policies and trends won't change too much unless there comes the new driving force. After a period of execution of one decision, the unexpected dilemmas will be encountered. Then we will

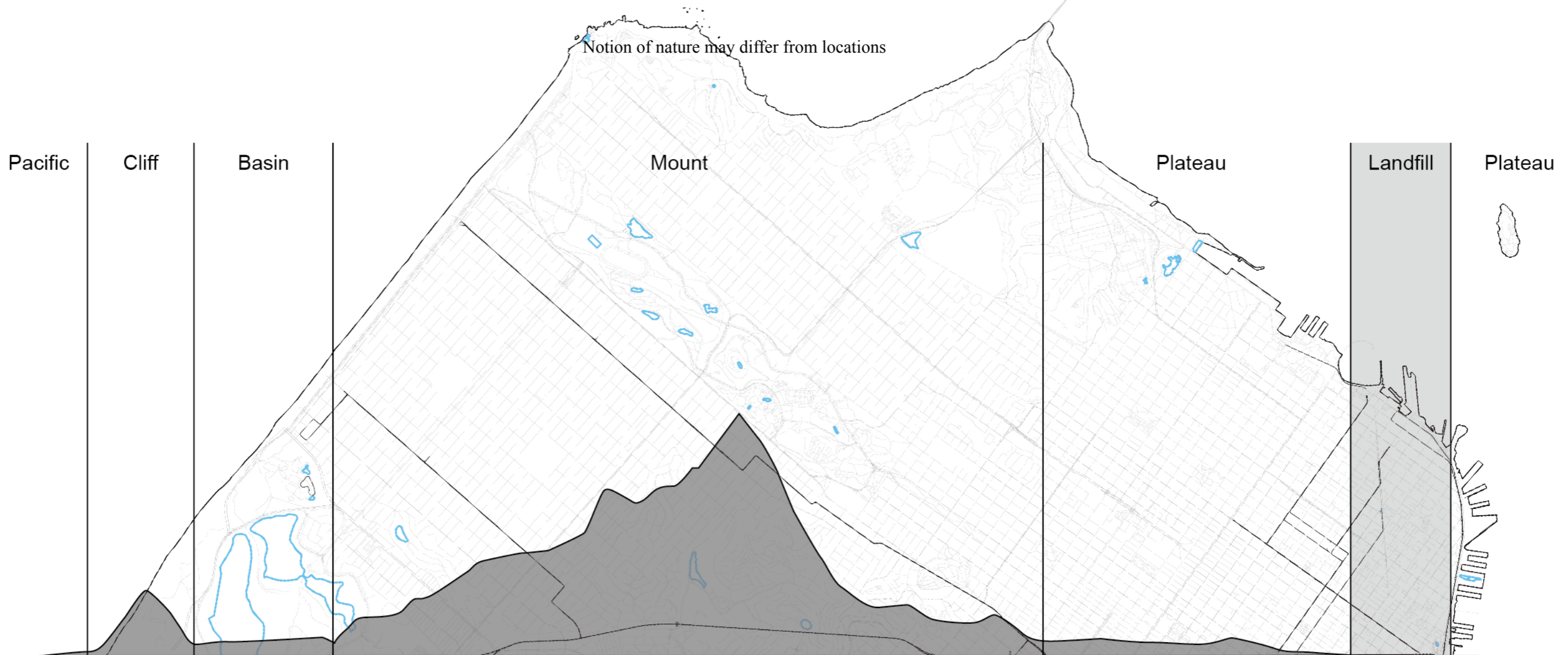




quickly react to it and make new decisions, while the trace of the previous decision remains in its way.

Last but not least, the dominating notion of nature may differ in different location. According to their environmental conditions, I divided the city of San Francisco into five zones along the main axis. The initial idea was to compare three of the locations to test how the three notions could influence each other across space. However, it turned out to be too complicated. In this report, only the floodplain, the Embarcadero and Financial district, is designed.







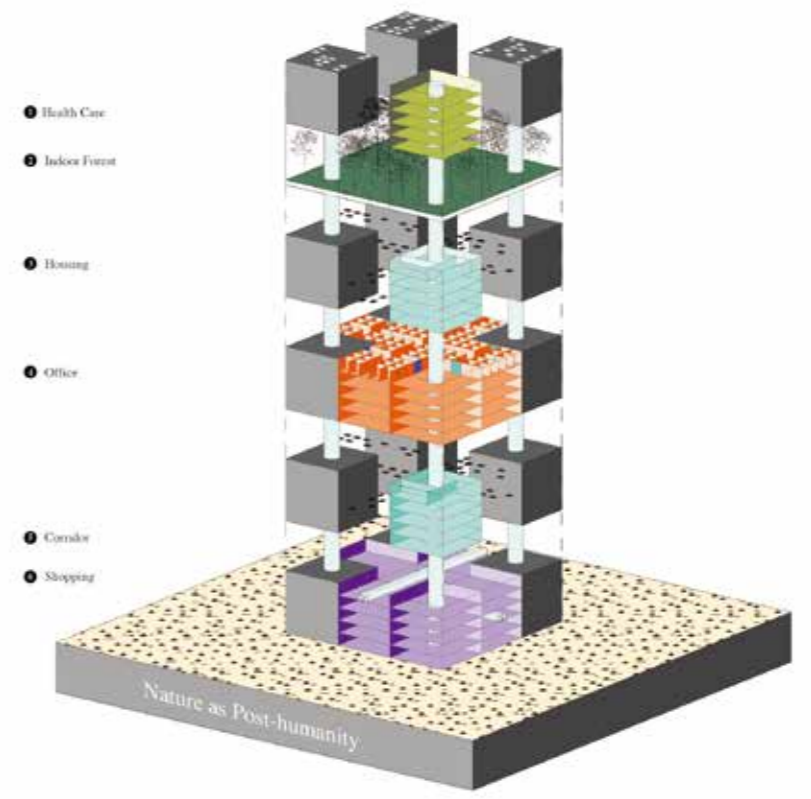
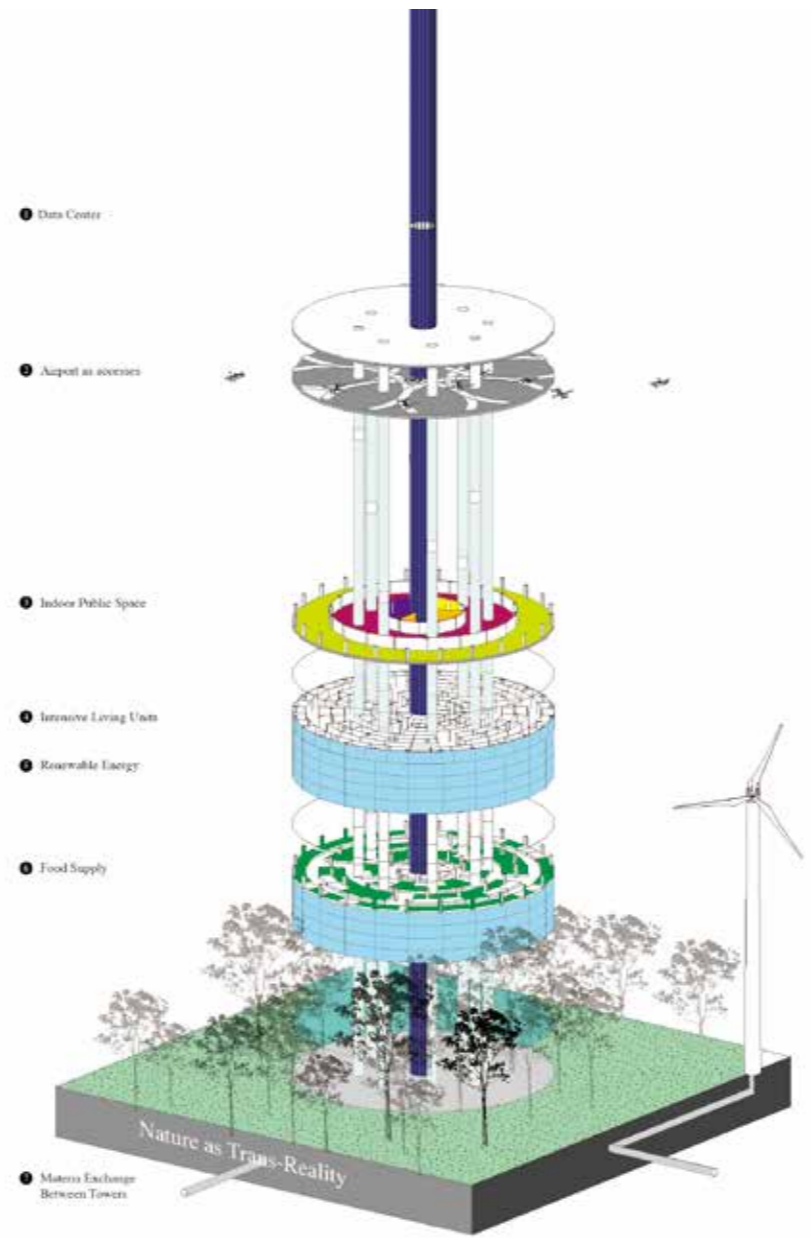
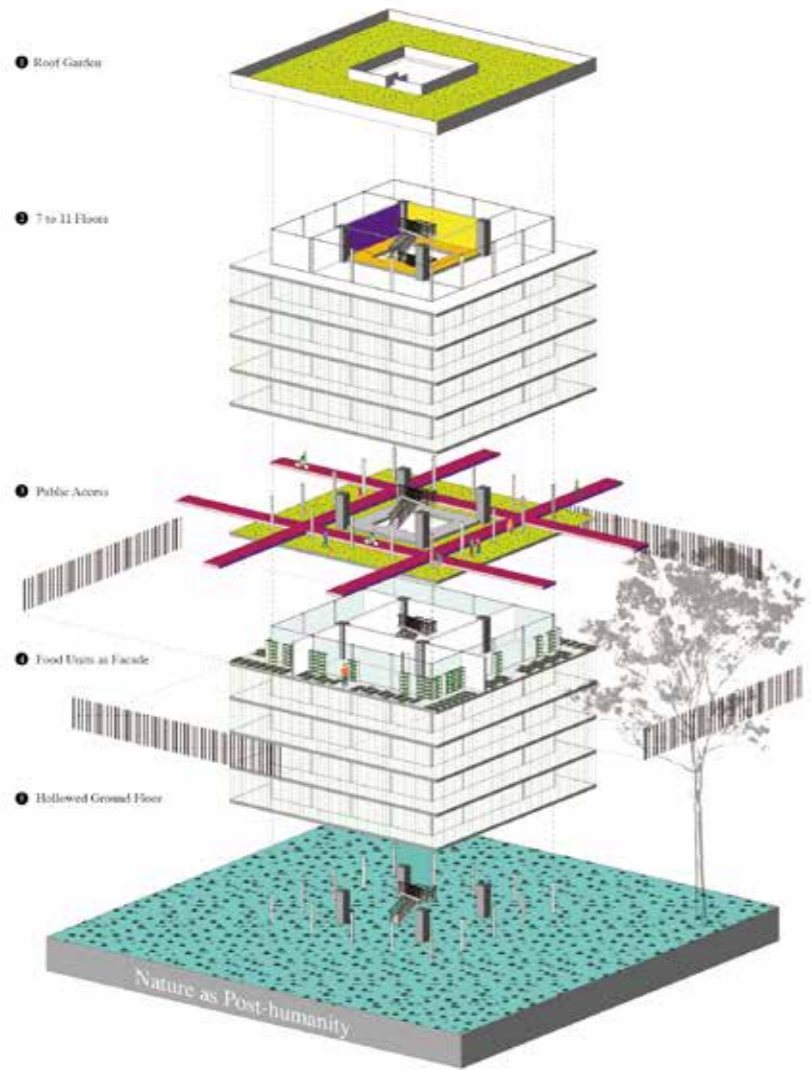
## 7.2 Technology Comparison

To integrate the notions of nature, it is necessary to compare and integrate the technology collections under the three notions.

In this process, three living models are made as a conclusion.

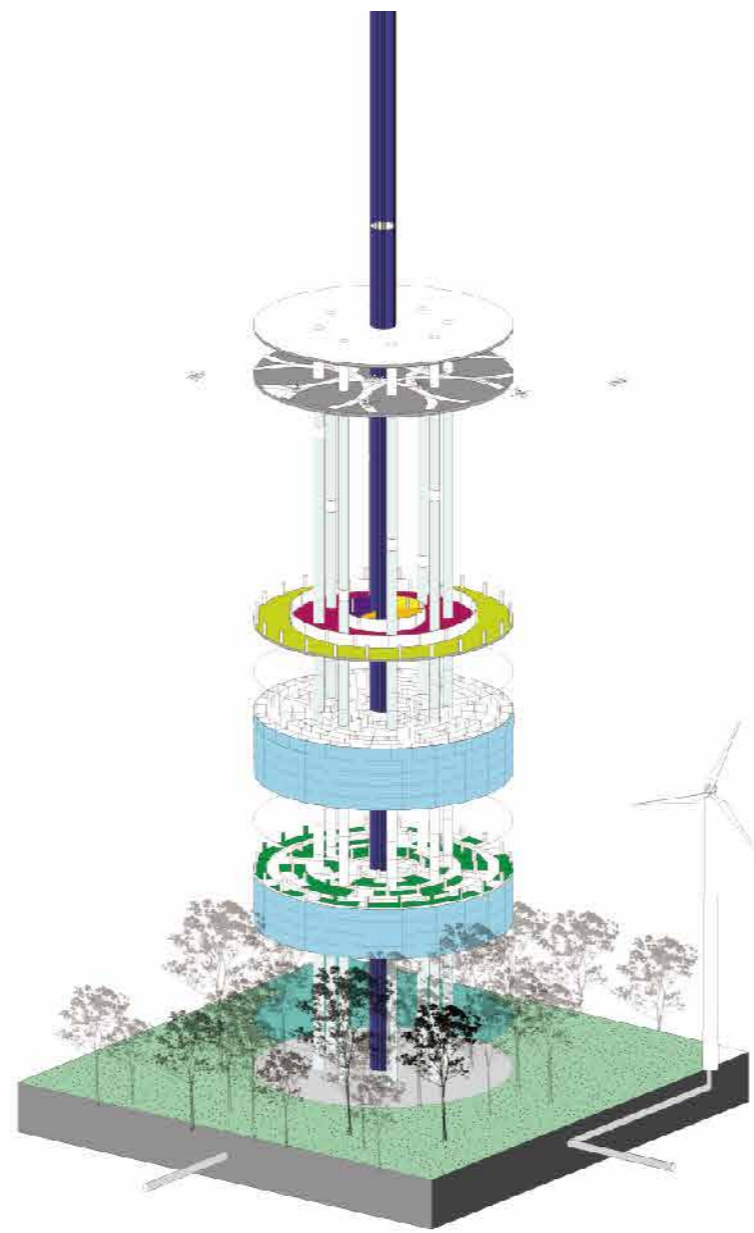
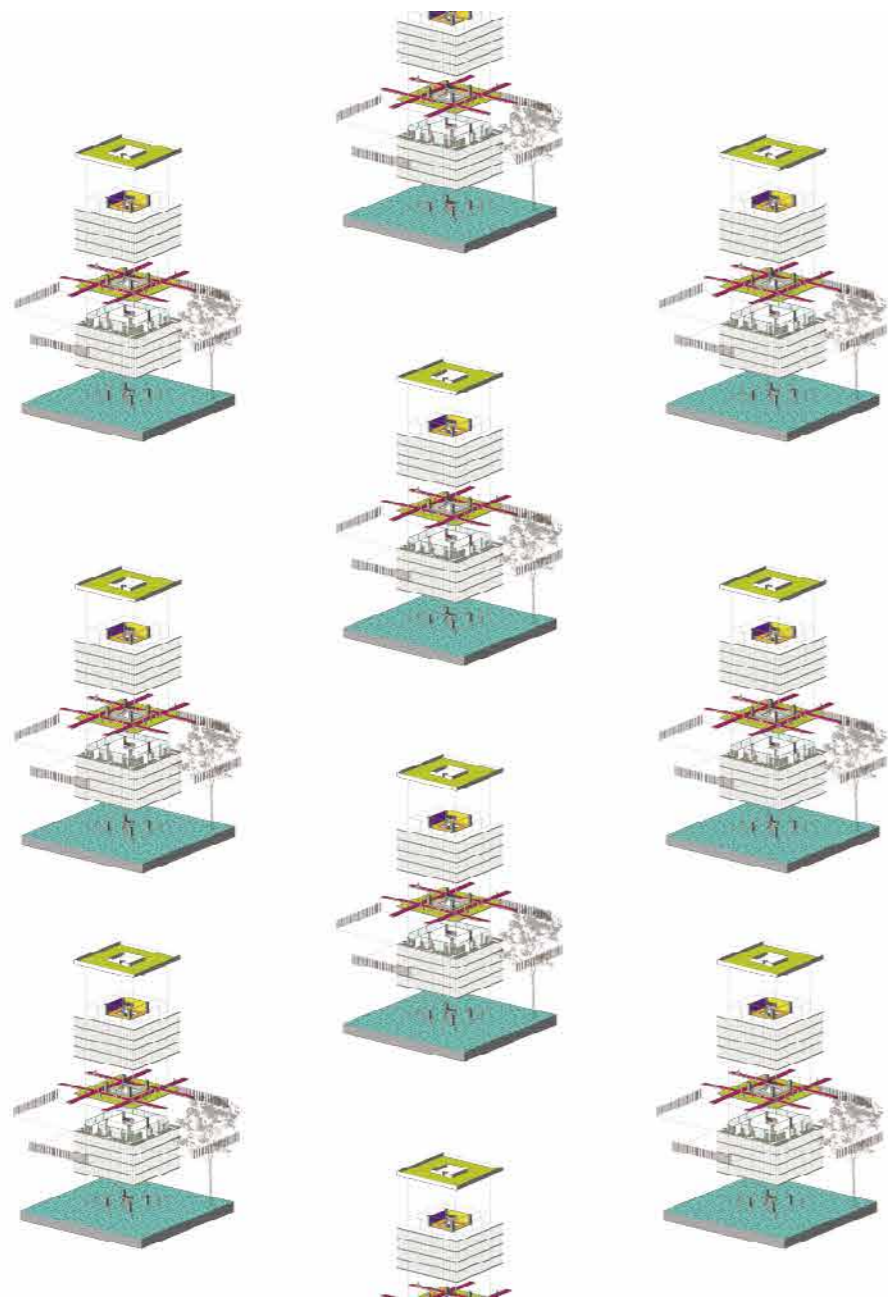


Comparison of the technology collections



Three living models





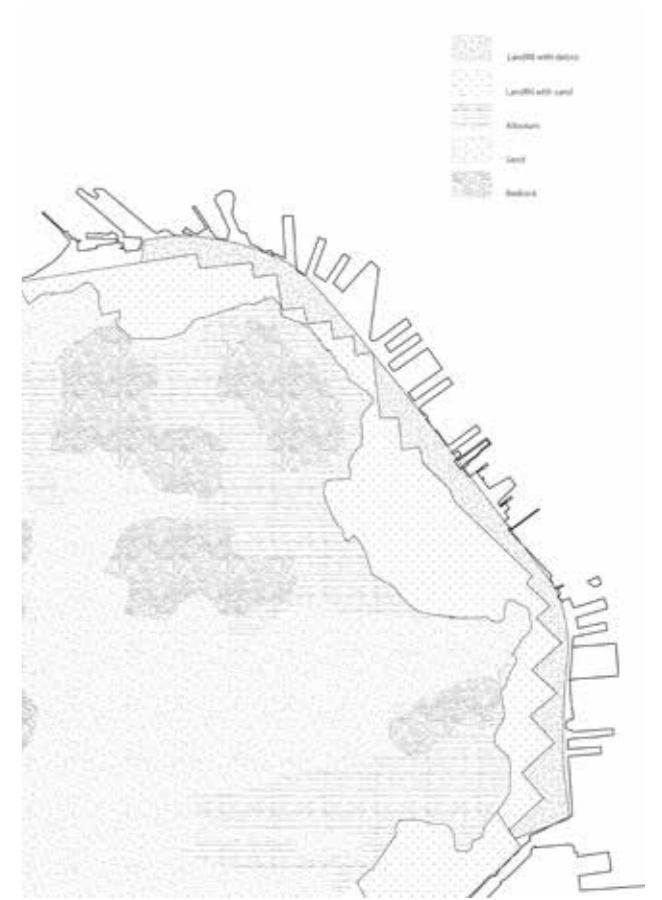
Scale and density of the living models



Inudation



Liquefaction susceptibility



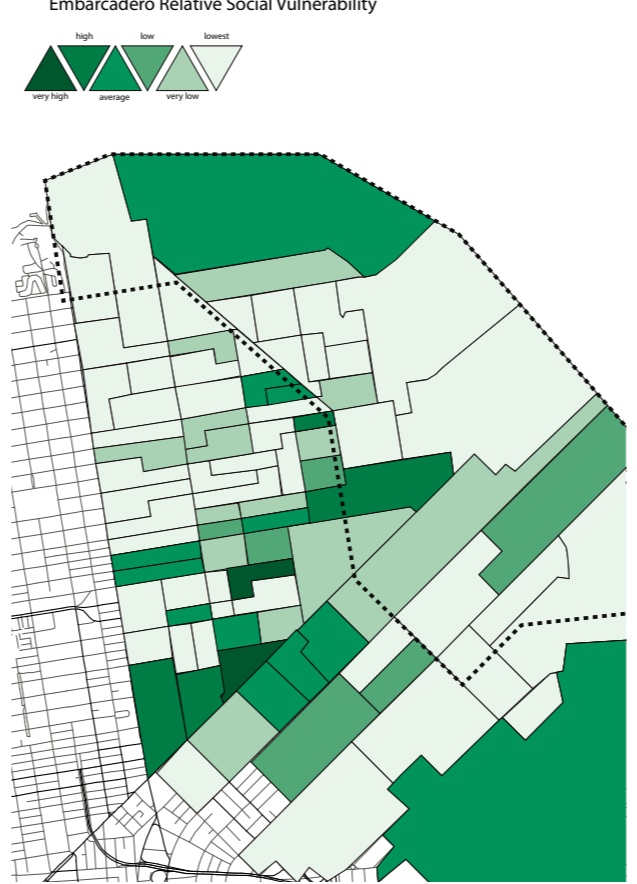
Soil map



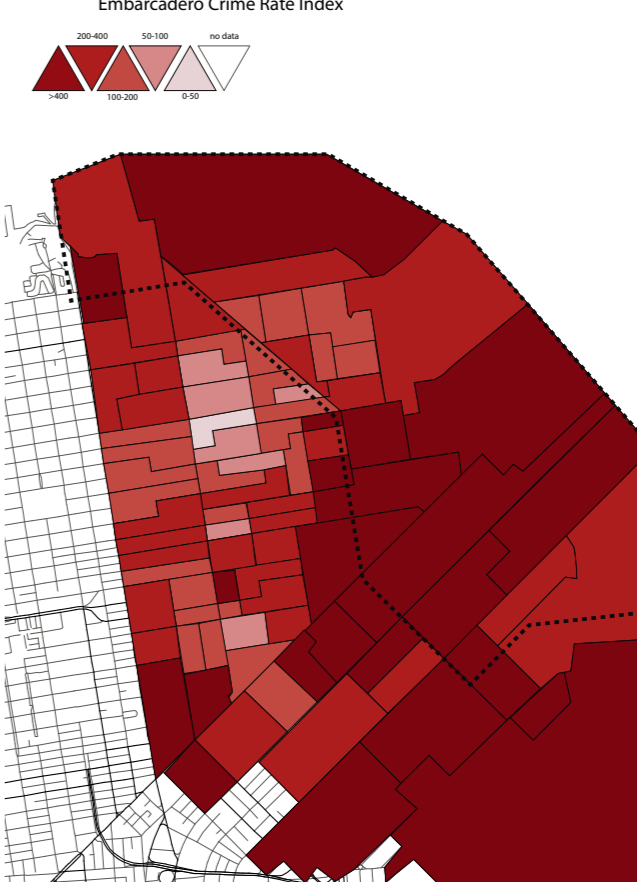
This set of maps is done by Jeroen van der Kwaak



Transportation



Social vulnerability

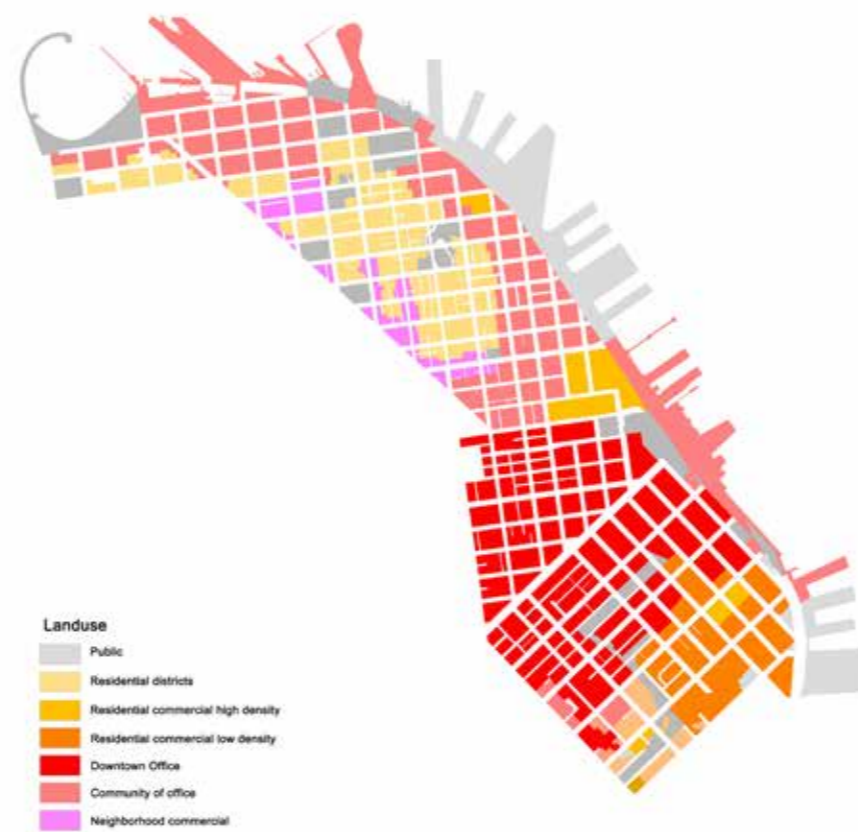


Crime rate

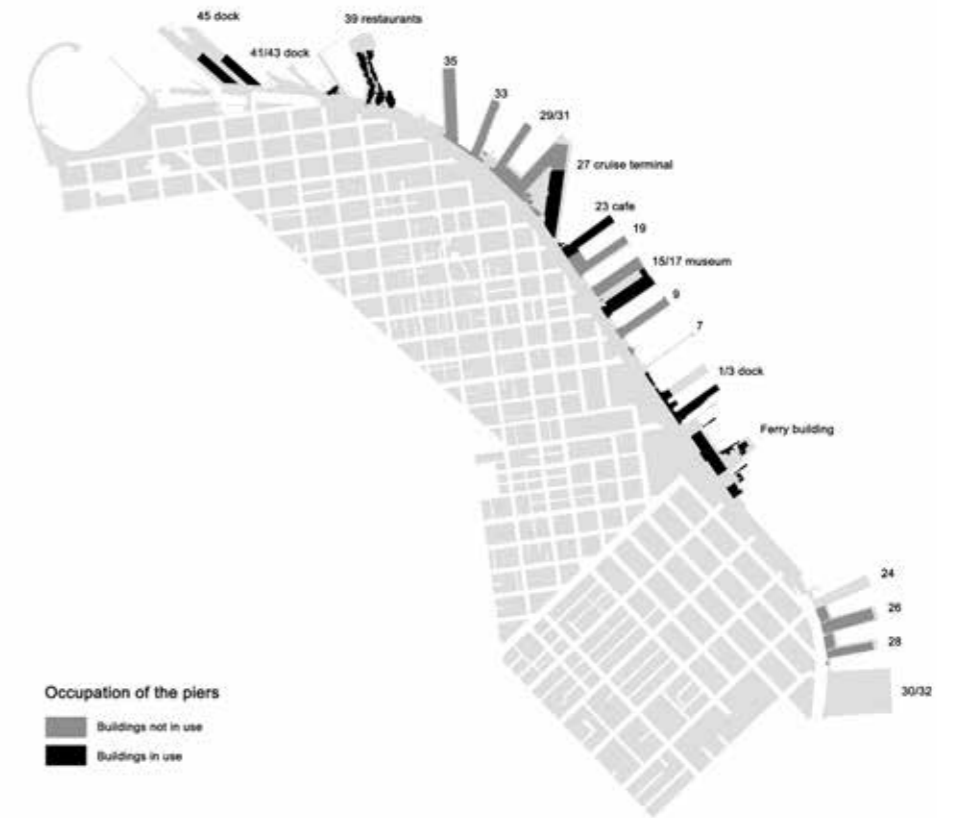
This set of maps is done by Zhuting Li



Open space



Land use

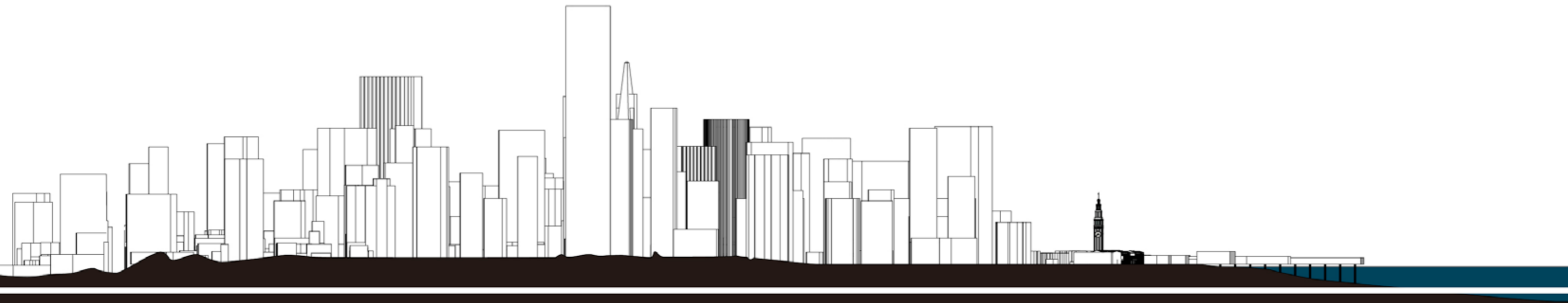


Occupation of piers



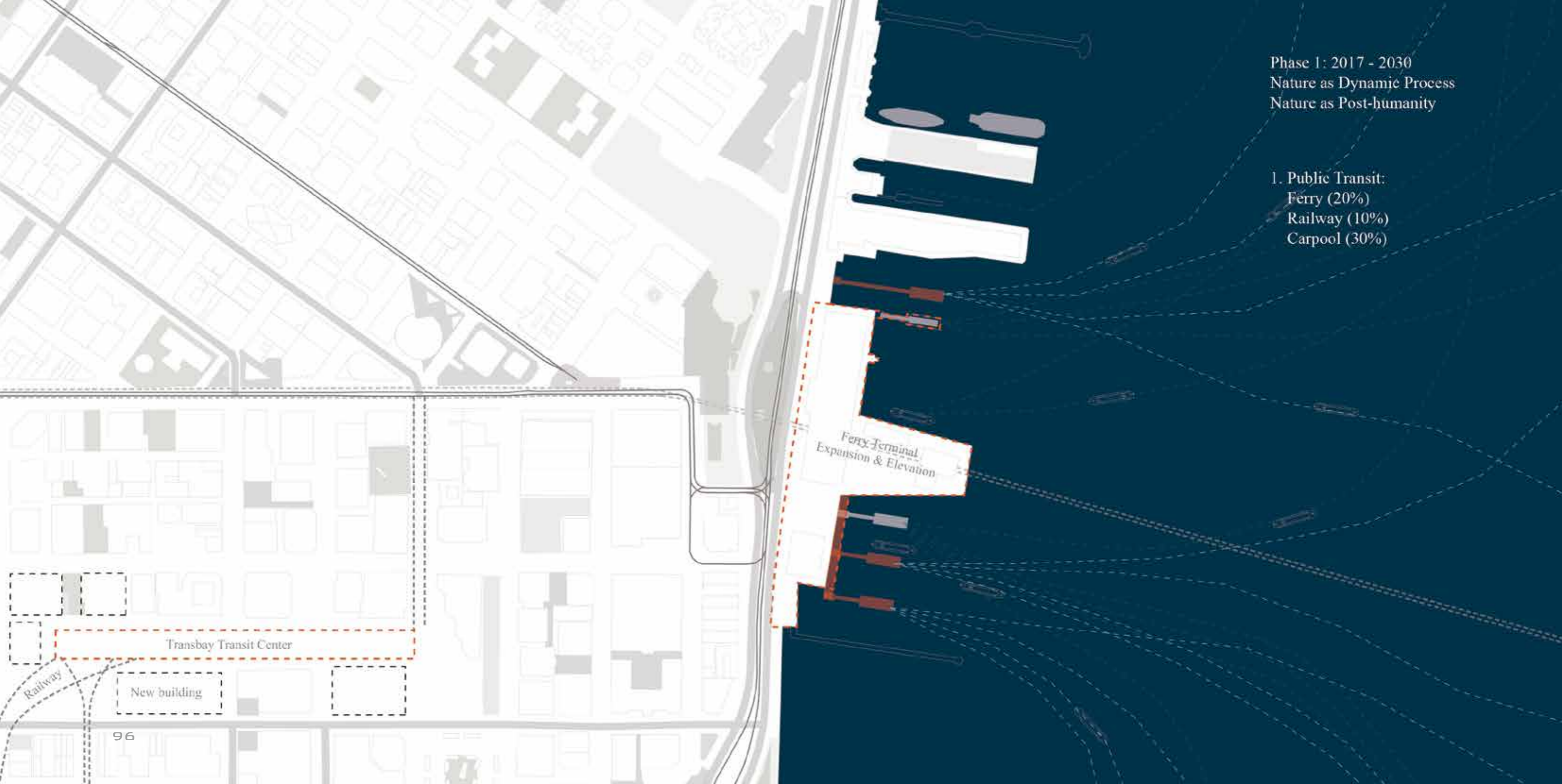
Phase 0: Current Situation  
Nature as Functional Component





2017





Phase 1: 2017 - 2030  
Nature as Dynamic Process  
Nature as Post-humanity

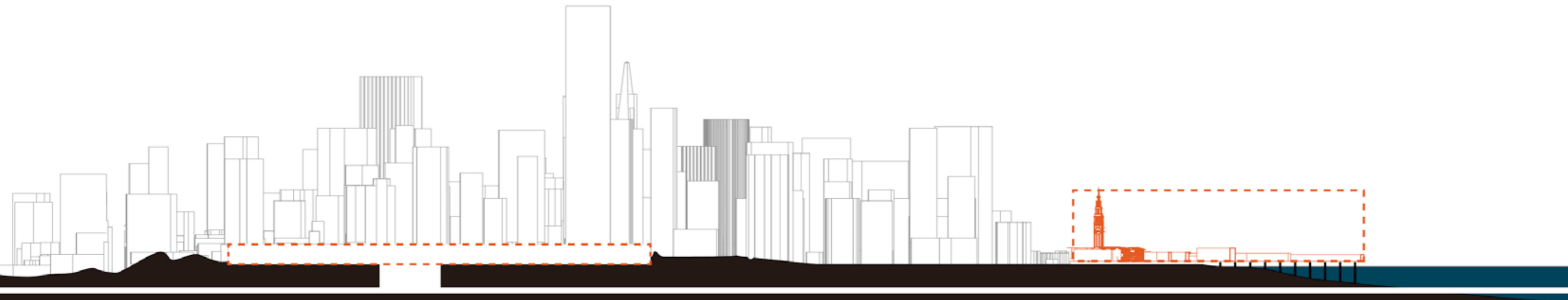
- 1. Public Transit:  
Ferry (20%)  
Railway (10%)  
Carpool (30%)

Transbay Transit Center

Ferry Terminal  
Expansion & Elevation

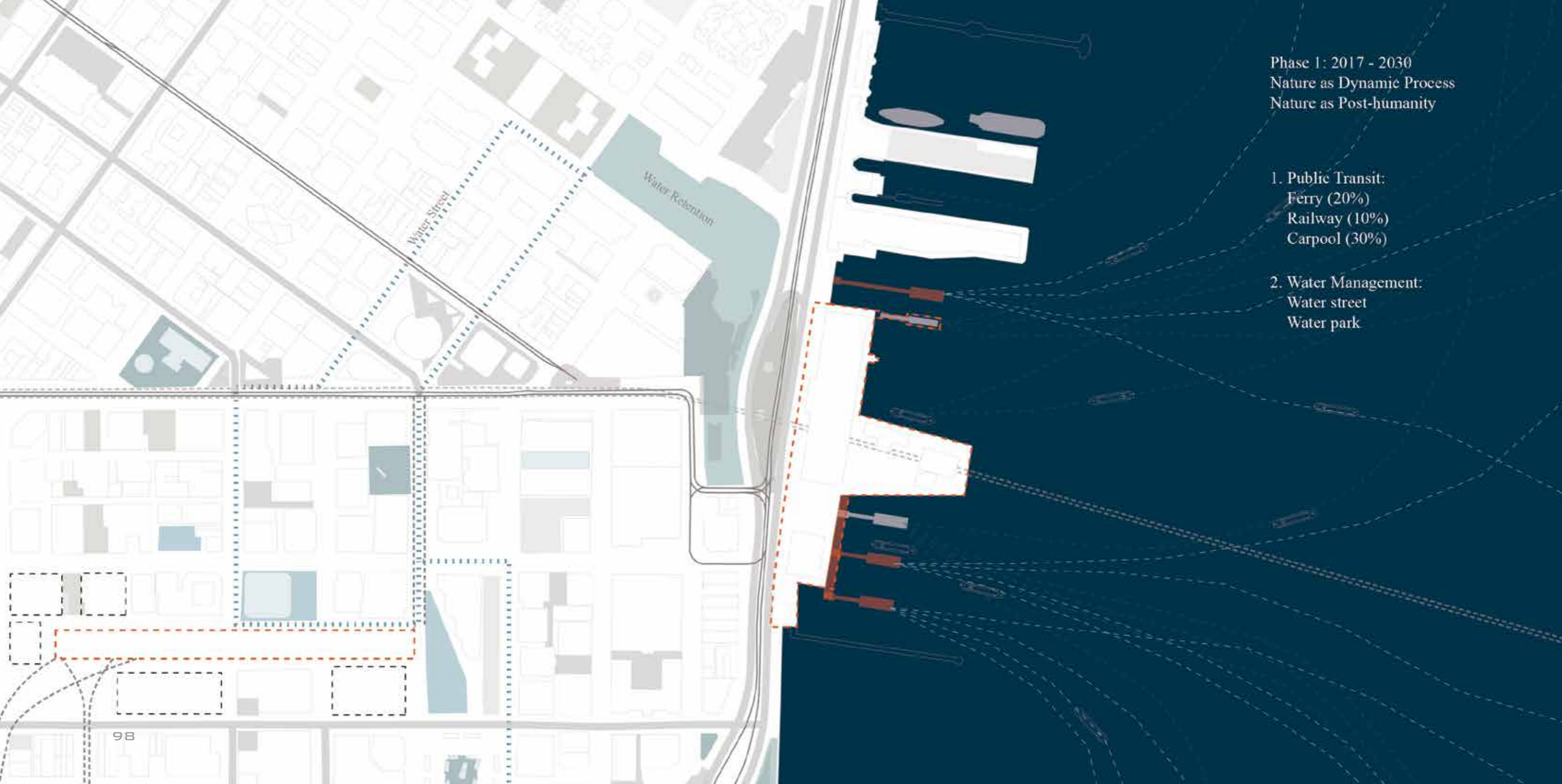
Railway

New building



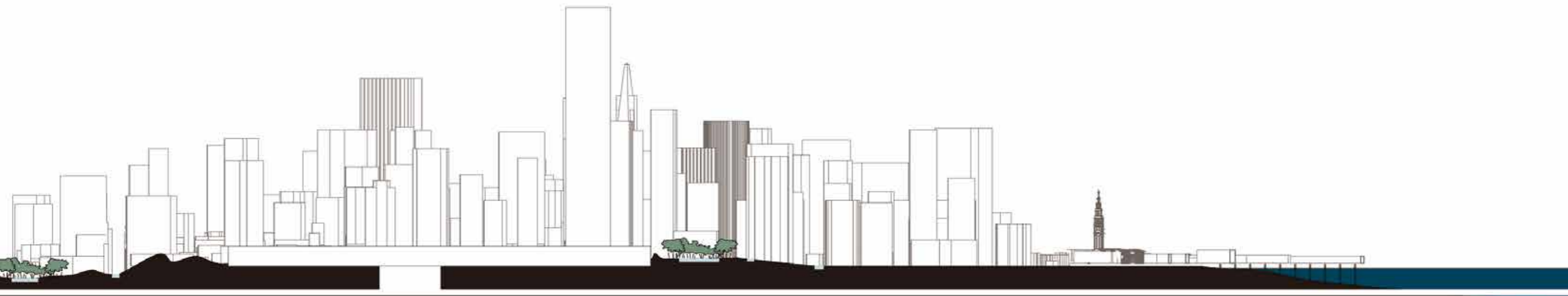
2020





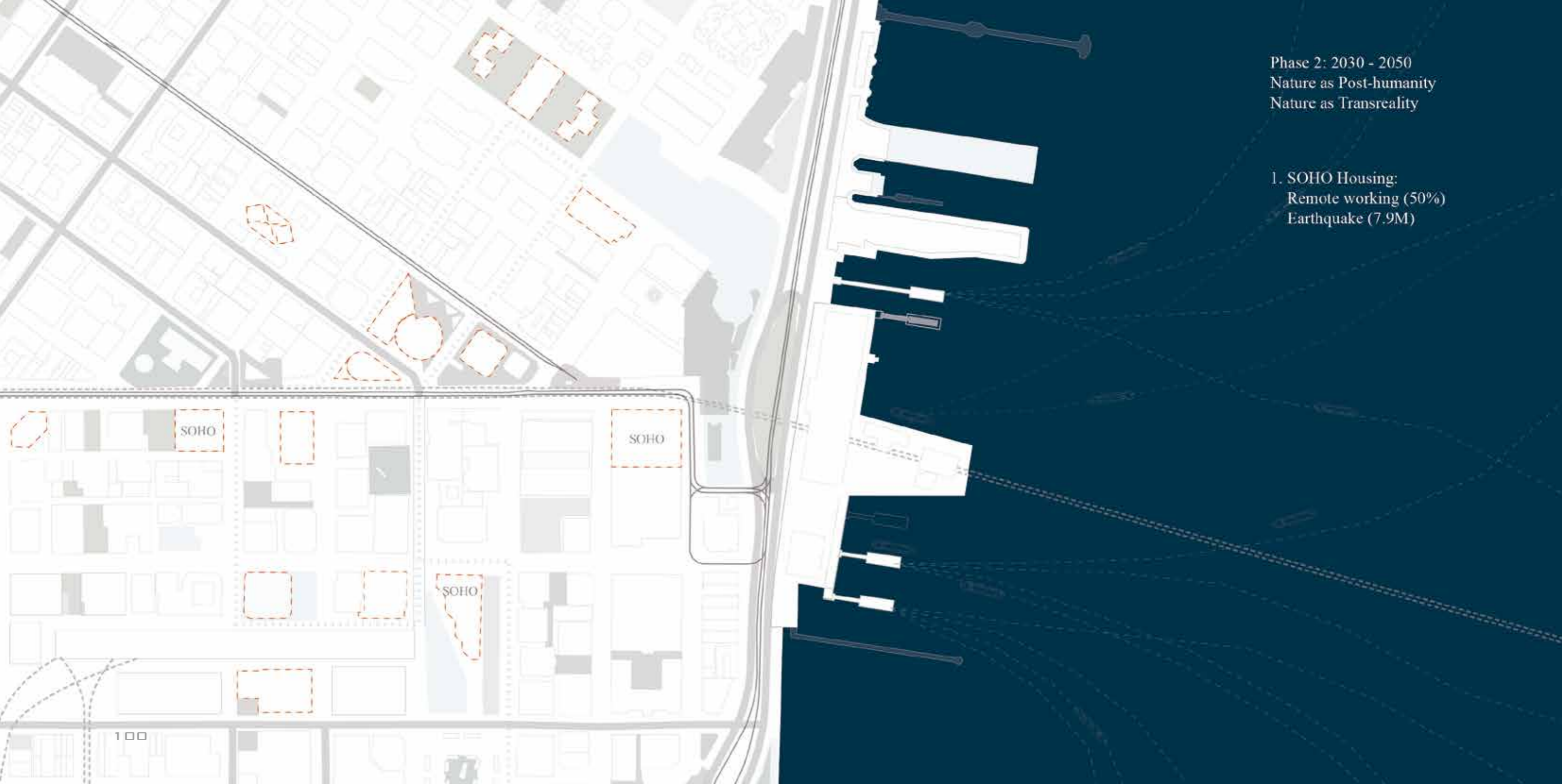
Phase 1: 2017 - 2030  
Nature as Dynamic Process  
Nature as Post-humanity

- 1. Public Transit:  
Ferry (20%)  
Railway (10%)  
Carpool (30%)
- 2. Water Management:  
Water street  
Water park



2025





Phase 2: 2030 - 2050  
Nature as Post-humanity  
Nature as Transreality

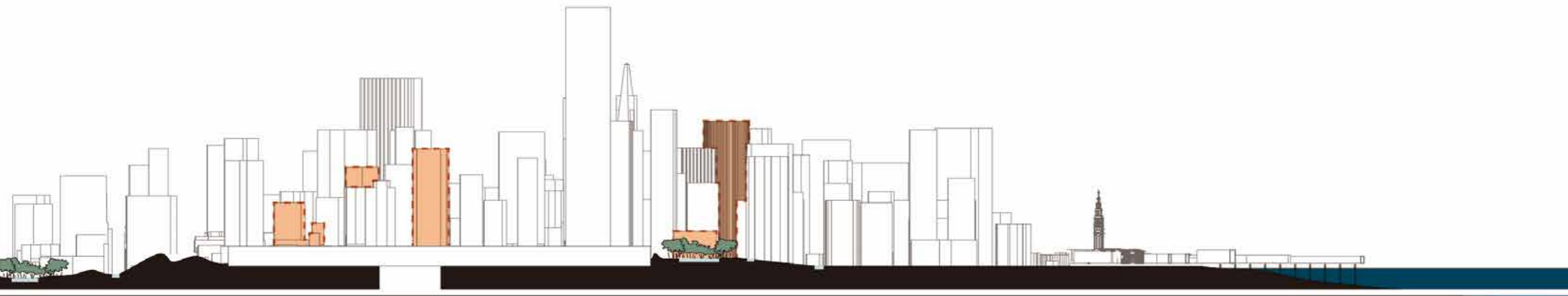
- 1. SOHO Housing:  
Remote working (50%)  
Earthquake (7.9M)

SOHO

SOHO

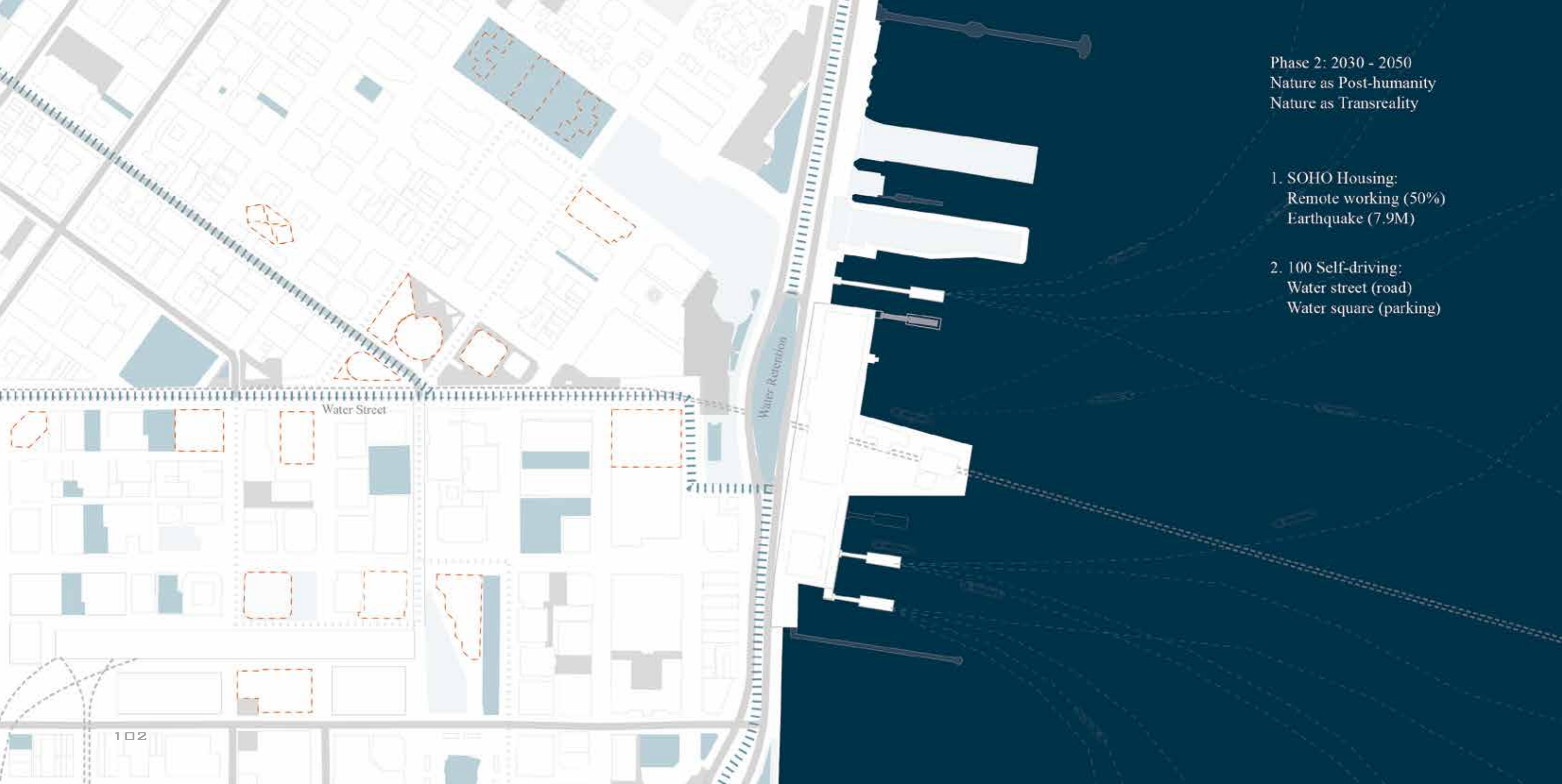
SOHO

100



2035



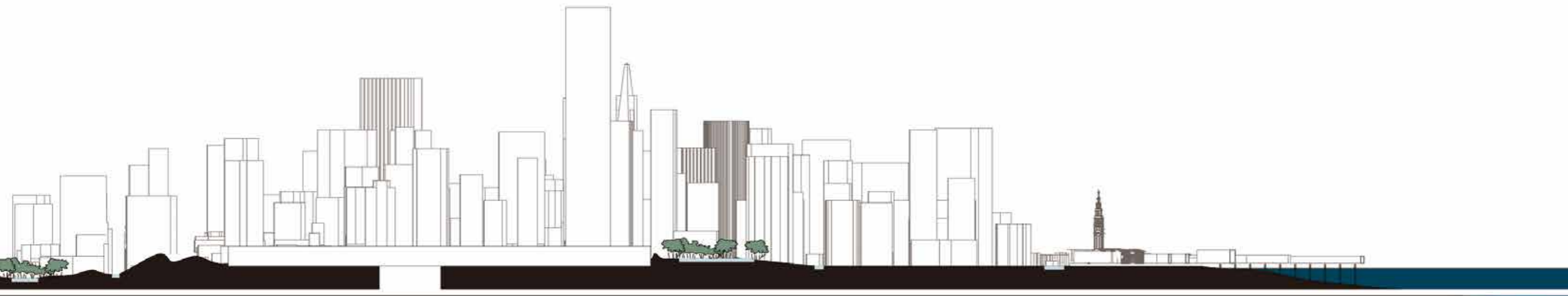


Phase 2: 2030 - 2050  
Nature as Post-humanity  
Nature as Transreality

1. SOHO Housing:  
Remote working (50%)  
Earthquake (7.9M)
2. 100 Self-driving:  
Water street (road)  
Water square (parking)

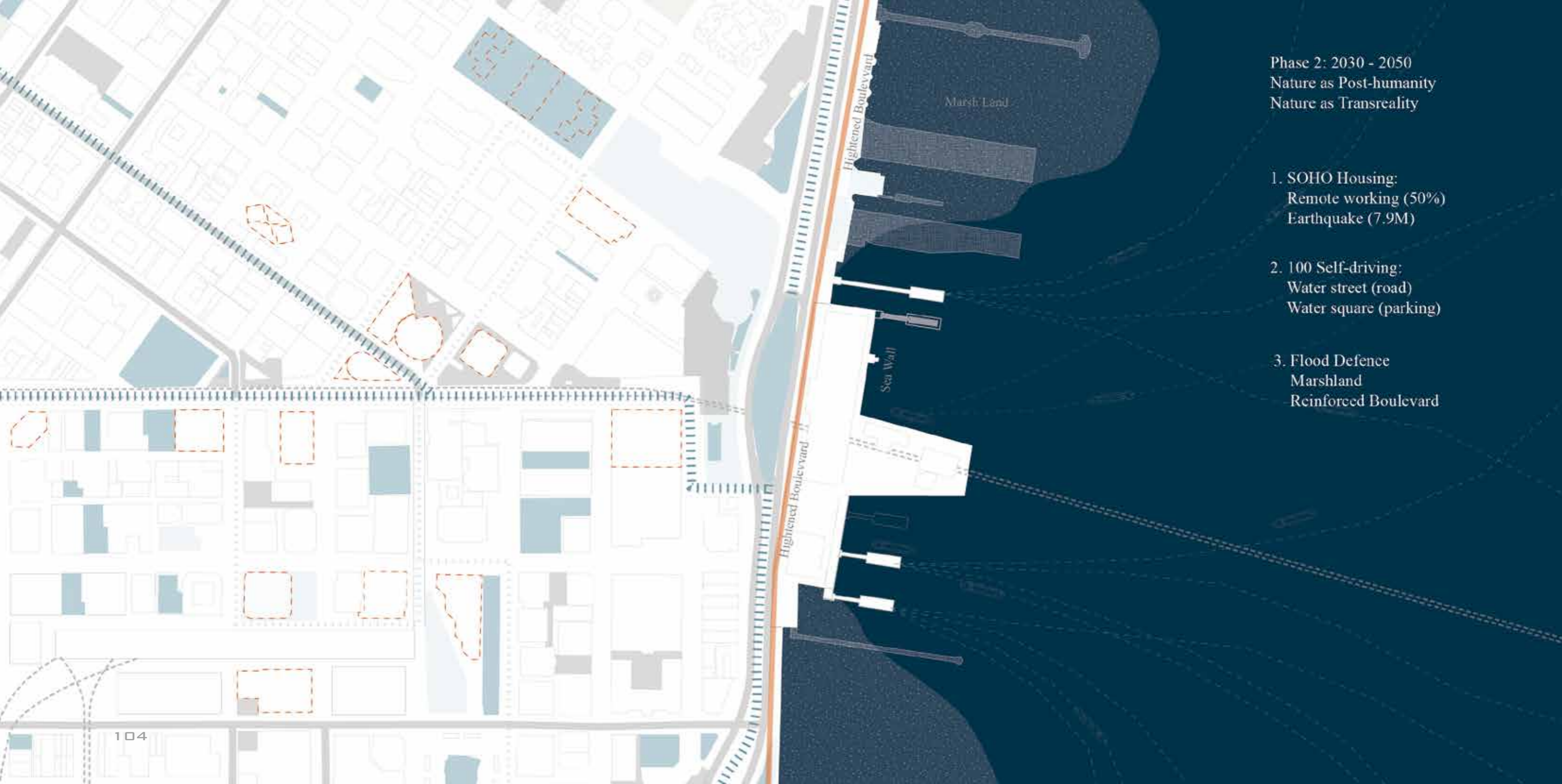
Water Street

Water Retention



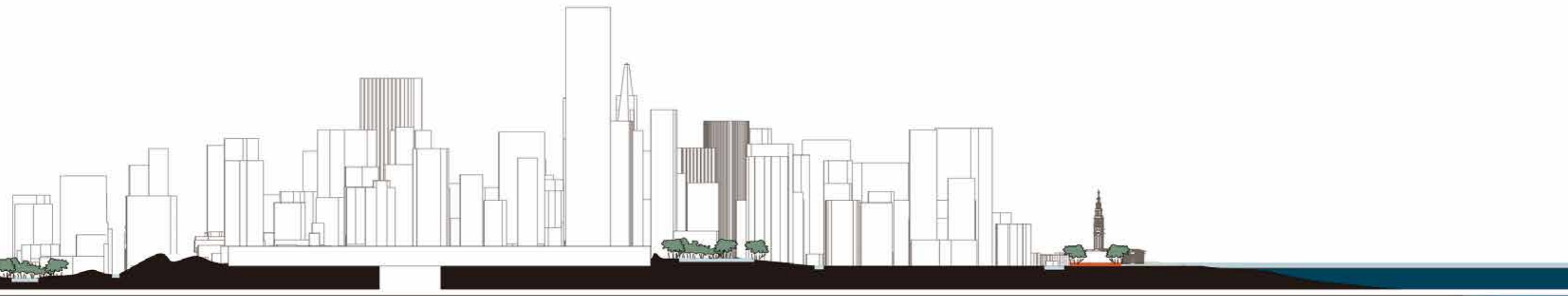
2040





Phase 2: 2030 - 2050  
Nature as Post-humanity  
Nature as Transreality

1. SOHO Housing:  
Remote working (50%)  
Earthquake (7.9M)
2. 100 Self-driving:  
Water street (road)  
Water square (parking)
3. Flood Defence  
Marshland  
Reinforced Boulevard



2050





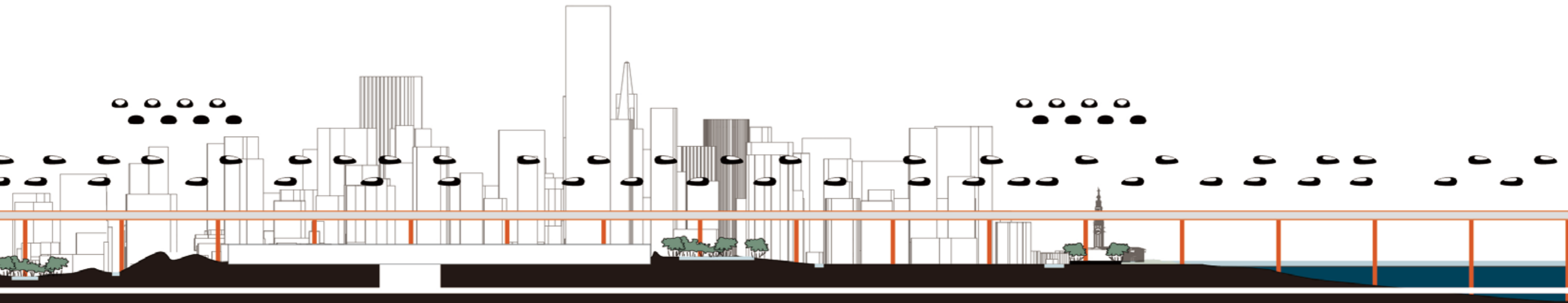
Phase 3: 2050 - 2070  
Nature as Trans-reality  
Nature as Eco-programme

1. New Transportation:  
Digitalisation  
Flying cars  
Hyperloop

Depavement

Hyperloop

Hyperloop



2060





Phase 3: 2050 - 2070  
Nature as Trans-reality  
Nature as Eco-programme

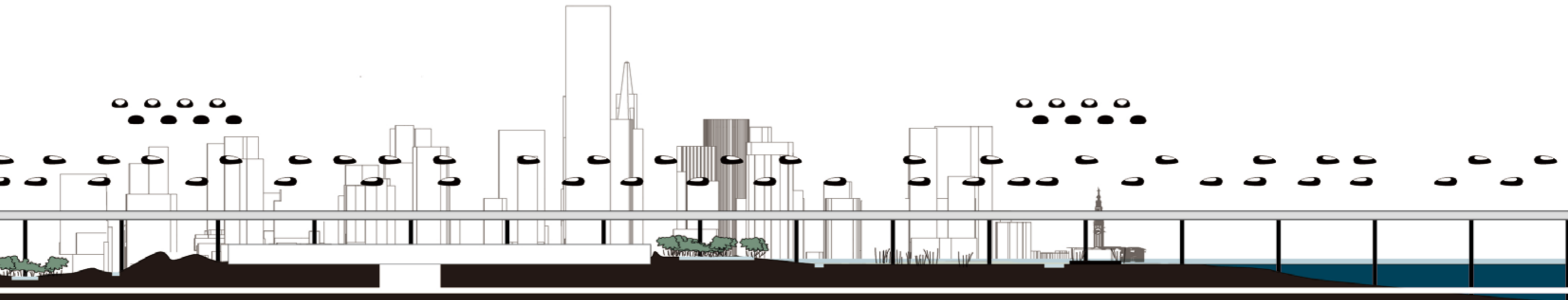
1. New Transportation:  
Digitalisation  
Flying cars  
Hyperloop

2. Water Defence:  
Unexplorment (40%)  
Building demolish (20%)  
Tidal Marshland

Building  
Demolish

Tidal Marshland

Hyperloop



2065





Phase 3: 2050 - 2070  
Nature as Trans-reality  
Nature as Eco-programme

1. New Transportation:  
Digitalisation  
Flying cars  
Hyperloop

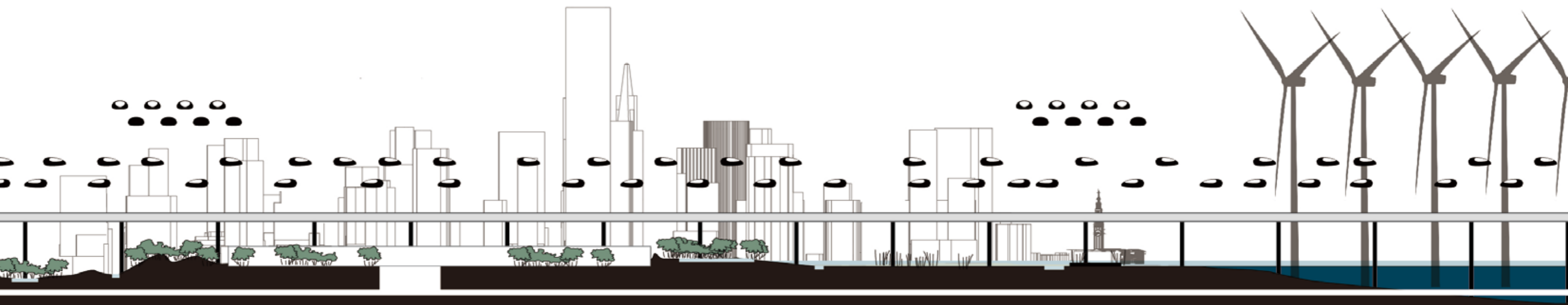
2. Water Defence:  
Unexplorment (40%)  
Building demolish (20%)  
Tidal Marshland

3. Self-sufficiency:  
Trees  
Windturbines

Windturbine

Trees  
Growing

Hyperloop



2070





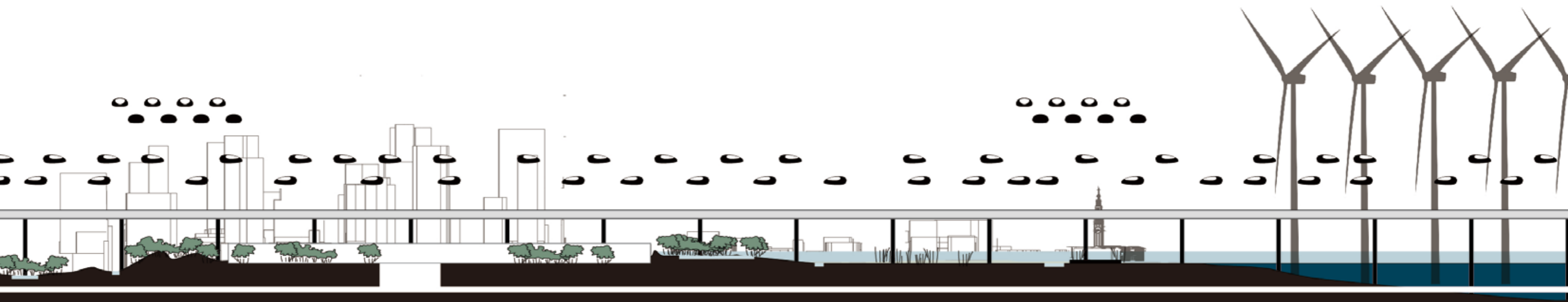
Phase 4: 2070-2100  
Nature as Trans-reality  
Nature as Eco-programme  
Nature as Post-humanity

- 1. Environmental risks:
  - Earthquake (8.1M)
  - Sea level rise (1.8m)

1.5m SLR

Reins

1:12



2080



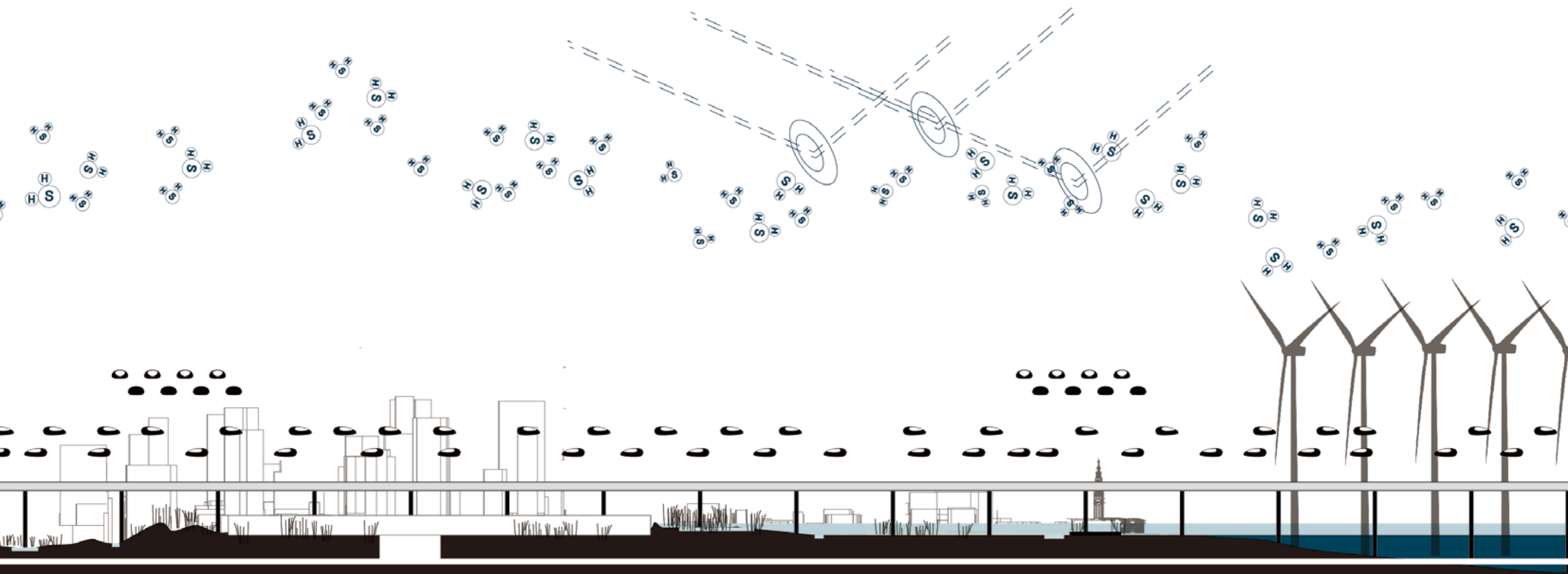


Species extinction

Phase 4: 2070-2100  
Nature as Trans-reality  
Nature as Eco-programme  
Nature as Post-humanity

1. Environmental risks:  
Earthquake (8.1M)  
Sea level rise (1.8m)
2. Climate engineering:  
Species extinction





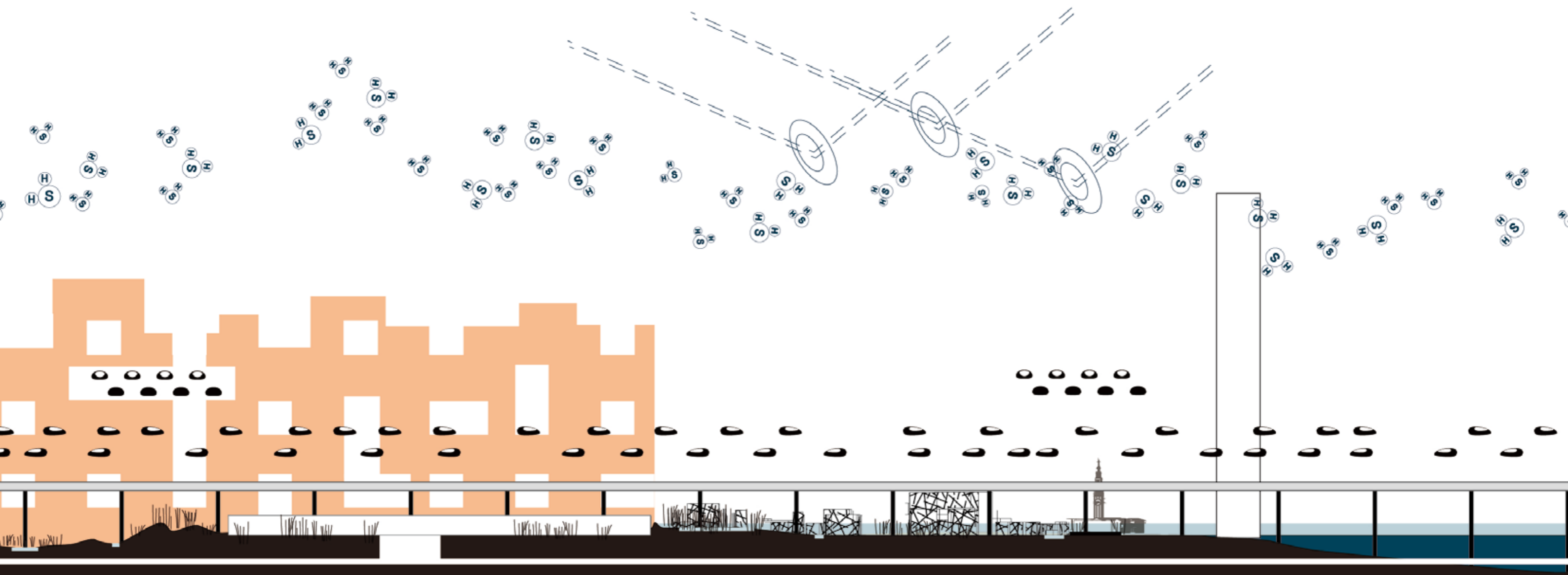
2090





Phase 4: 2070-2100  
Nature as Trans-reality  
Nature as Eco-programme  
Nature as Post-humanity

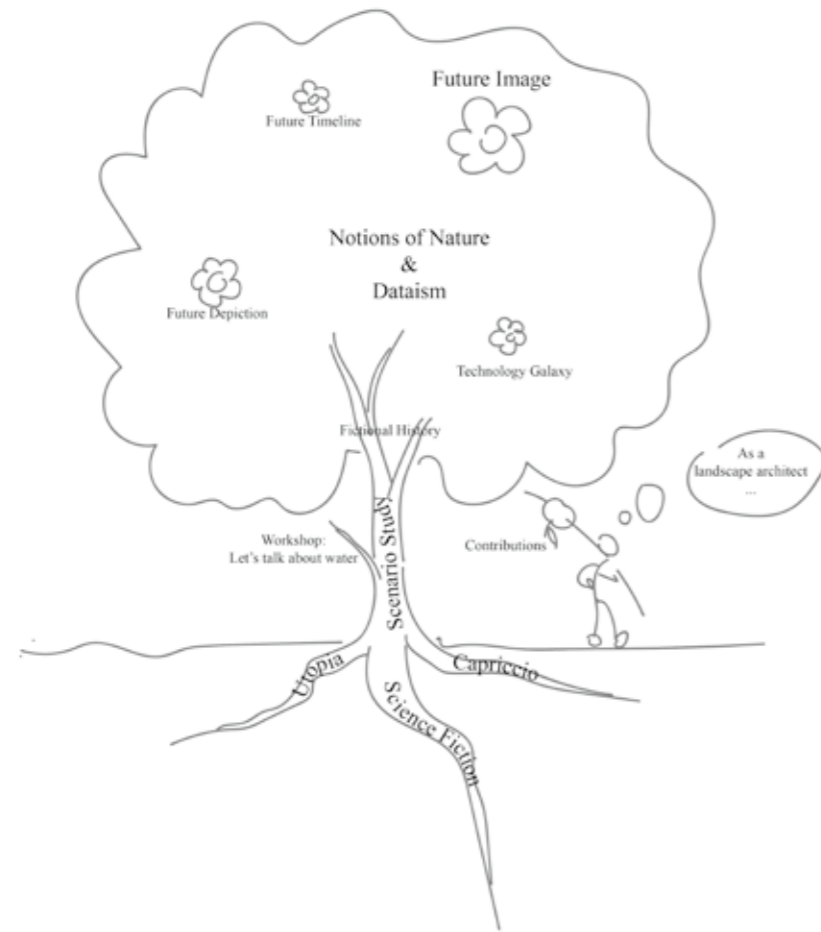
1. Environmental risks:  
Earthquake (8.1M)  
Sea level rise (1.8m)
2. Climate engineering:  
Species extinction
3. Mixed living:  
Continuous city  
Rebuild isolated tower  
Living in the ruin



2100 +



## 8 REFLECTION



In the recent years, I was often in a deep insecurity. I'm afraid, one day, I'll wake up losing all my super abilities, curiosity and possibility. Now, I'm glad that they are still with me, in my master graduation project.

Till now, it sounds still risky that I have chosen such a fantasy as my graduation project, Space Fiction. As my first mentor Inge said for several times, "it is an experiment for all of us; and we should all be aware that it is also a risk". We witnessed the project lost and reborn. Now, looking back to the trials and failures in the last year, I finally get a holistic view and find that the crucial phases of the process can be drawn out as the growth of a tree.

### *The Roots: Space Fiction*

The concept Space Fiction came after P1. I presented my P1 pitch in front of the whole Flowscape studio and proposed a research topic about long-term adoptive urban development strategy reacting to sea level rise, which harvested almost no reaction or discussion. In another word, it was boring. The only thing I can't bear in my life is to be boring for a second, let alone to do a boring project for a whole year. From that moment on, I made up my mind to create something emotional and controversial. If it's about future, let it be a radical one.

I started to go bold and search for a fascination from my

personal interests. Science fiction is one of them, which inspired me to question, is climate or sea level the only significant change when we talk about the time scale of 100 years. As the Canadian writer, Margaret Atwood, wrote, "it's not climate change; it's everything change." (2015) Later, the term "Space fiction" is fabricated to address my role as a landscape architect. Accordingly, the research question was formulated as, what new urban spatial configuration can adapt to the long-term environmental changes.

In this stage, architectural utopia and Capriccio are taken as references for the case study.

### *The Trunk: Scenario Study*

While I was mapping and analyzing the site, San Francisco, a methodology was needed to theorize the research and limit the boundless imagination. I chose the most popular tool for future study, scenario making. By drawing lessons from the cyclic approach, scenario making technics and scenario typologies, I built up my own methodology. The complex system contained 3 cyclic phases, the predictive scenario, the explorative scenario and the normative scenario. Each phase can be operated in 4 steps, scenario base, scenario context and visualization and reflection.

This methodical tool offered a way to integrate the

scientific scenario making and intuitive speculating through constant reflection. However, it has its limitations. Scenarios are mostly used for a relatively short future within 30 years, thus variations are differed by one or several actions. My project has a time span of 100 years and is aiming to consider several aspects of changes, which makes the design process too intricate. My solution at that time was to take reactions to nature in the condition of climate change as the domain variable and redeem the other variables as outcomes. Despite this doubtable simplification, I proposed resiling as the base for the predictive scenario and three alternative reactions as bases for explorative scenarios. They were, reclaiming, retreating and residing. This was presented in my P2 presentation.

### ***A Lateral Limb: Let's Talk About Water***

After P2, although satisfied with my methodology, I found myself lost in the rational research model. Keeping the original intention of something emotional in mind, I wanted to experiment with some alternative approach to activate my project. That was the moment I encountered the workshop, Let's talk about water, organized by a film festival.

I took it as an opportunity to try out some thoughts for my explorative scenarios. And through the process, I gained the skill of movie making as a narrative and

presentation tool.

Although I won the best picture award in the workshop with my movie, The daydream of a cable car, I was not satisfied with the outcomes. The collages I made for future San Francisco were merely fragmented thoughts without strong arguments. I needed a tool to integrate the thoughts through space and time.

### ***The Branches: Fictional History:***

Ever since I chose the topic, Space Fiction, I had been expecting a sci-fi movie and a sci-fi novel as final products. After the movie making, I immediately thought about novel writing as the way to integrate my thoughts. I started to conceive 4 fictional histories of San Francisco in the next 100 years, from a personal perspective as the representation of the scenarios

The first story about the resilience was a success, in the sense that it managed to order all the variables into a timeline and position them into space, which made it convincing. However, when I was writing the second story, which was about reclaiming nature, the problems were revealed. First of all, a single action to nature was not sufficient to summarize or differ the building practices for 100 years. Some technologies, such as solar panels and flying cars, could occur in any of the scenarios. Thus a more fundamental variable was

required to differ the scenarios in a philosophical level. Secondly, through writing, I realized that climate change is not the domain driver which connects everything. There are tons of revolutionary technologies to deal with climate change and to change our lives. How they will re-shape our living environment depends on humans' collective environmental philosophy. It, of course, has a lot to do with climate change. But the real question for a landscape architect is, what is nature.

Although I failed in completing the stories, the writing technic remained the important method to make the research and design coherent.

### ***The Foliage: Notions of Nature & Dataism***

What is nature? It was not a coincidence that I finally came to the question. Through the study of landscape architecture history in TU Delft, I'm convinced that landscape architecture is the representation of nature and any kind of landscape architectural praxes are the fruits of the nature notions at a certain time. However, I was confused by the fact that we landscape architects do not have a consensus of what is nature today, let alone what will be nature tomorrow.

I'm glad that I encountered these big questions directly in my graduation research and managed to propose an answer for discussion.



In order to speculate on the future notions of nature, the first step I took is to point out the nature notions behind the historical landscape architecture praxes by literature reviewing. Then based on Yuval Noah Harari's new book, *Homo Deus: a brief history of tomorrow*, I positioned those notions of nature in the three dominating social ideologies through history. They are animism, theism, and humanism. Finally, inspired by Harari's speculation on Dataism, a new era mankind is entering, I proposed three possible notions of nature, nature as post-humanity, nature as trans-reality and nature as eco-programme.

This research positioned the project into a philosophic discussion. At the same time, with involving too many new concepts, which are not widely accepted, the project became more controversial and less academically rigorous.

### ***The Flowers: Future Images***

I came up with my proposal of the three new notions of nature just right before my P3 presentation. And the discussion on their definitions could be endless. But it was the time I had to stop the theoretical research and shift my focus to the landscape representation of the three notions. Several innovative technics were implemented on the representation, such as technology galaxy, future depiction, future timeline and future images.

Among them, I regard future images as the most fruitful outcome, which is not only an implementation of my skills as a landscape architect but also a powerful tool for communication with non-specialists. Methodology paper is developed to elaborate the three ways to make future images.

### ***The Fruits: Contribution to the discipline***

As what I was aiming to from the beginning, the main contribution of my project is to raise a discussion by proposing a question with my personal answers.

Human-beings are facing a collective threat, climate change, which is caused by the conflicts between the short-term urban development and the long-term environmental changes. To deal with the problem, we need a long-term vision. The research calls for a utopia discussion on future cities and helps to evoke the awareness and ambitions for a long-term radical achievement. By setting the future context as a Dataism era and proposing the three related nature notions, an initial viewpoint is put on the table which works as a trigger for both additions or oppositions.

How and where the discussion will go will first be examined by a student workshop after P4, then possibly by a bigger debate in public.

Under the big research question, there are some sub-researches have been working out, which can be regarded as side-contributions of the project. Firstly, a methodical model is built up as an integrate of scientific scenario making and intuitive speculating. Secondly, notions of nature behind the historical landscape architecture praxes are pointed out and related to the dominating ideology at their time. Last but not least, four innovative technics are tested in the project. They are technology galaxy, fictional story, future timeline and future images, among which the making of future images is studied and formulated into a methodology paper.

### ***New Seeds: Recommendation for Further Research***

I regard this project as a brief and trigger for a much bigger research.

On one hand, the notions of nature could be researched deeper by landscape architects and philosophers. The three notions of nature in the data-ism era I proposed, nature as post-humanity, nature as trans-reality, nature as eco-programme, are arguable. Interested researchers are more than welcome to prove, redefine or even overturn them. More fundamentally, the concept of data-ism is also doubtful. Personally, I agree with Harari's speculation that Dataism will come and take over Humanism, although I depict the details differently.

However, it is not an affirmation or consensus of human-beings yet. From other viewpoints, there could be some alternatives for future ideology, with which the similar researches could be done. Moreover, the historic story of nature notions and ideologies is so confined within the mainstream western history. By involving landscape architecture praxes from other cultures, the argument will be more convincing and some unexpected thoughts might be added to the discussion of future.

On the other hand, the representation of nature notions could be experimented further by all spatial designers or visual artists. In my case, I used fictional history to compose the technical actions through time, then emotionalized them with stories and visualized with future images. This is a very prototype trial and could be filled in with more thoughts and efforts by the followers. The project shows the possibilities to represent those nature notions in literature, fine art, and film. I believe those artistic creations could be done better by professional artists. In return, their artworks could make the research and discussion richer.

### *The gardener: self-critics and thoughts*

Even as a brief for a further research, the project is not completed as much as I expected. As a landscape architect, I could have put more effort into the spatial design, which will make the project more convincing and

discussable. The project actually can be de-composited into three parts, a scenario making methodology, a historical and philosophical deduction and an artistic presentation. The job of a spatial designer is missing. Though I can argue it is not necessary for telling the story, it will definitely add a dimension to the project.

On the other hand, it might not be the proper time yet for this research question. In order to go that far to the cutting-edge in one year, I took big steps, where few the precedents and previous research can fill the gaps in between. Therefore, the credibility of the research is not high. However, through those big steps, I'm able to know what are the gaps at least.

After all, I would still regard the project a success to myself, in the sense that I managed to execute such a complex research, jumping from a wide range of disciplines, with the help of my mentor group. The knowledge I gained about science, technology, history, philosophy, as well as CG drawing and filmmaking, opened my mind to realize the complexity of the world. At the same time, it helps me to situate the discipline, landscape architecture, better.

Alpha-go, artificial intelligent designed by Google, has won the game of go, which was regarded as the last defense line of human-being against AI. For centuries, our education and decisions have been based

on experience and knowledge. The more experienced and knowledgeable people are in a profession, the more professional they are. This is especially true to architectural professions like architecture, urbanism and landscape architecture. However, due to the ability to access and process big data, nobody would be more experienced or knowledgeable than AI in the future. Will our jobs be taken by a design program or the programmer behind it? In a Dataism era, every single kid will learn to programme from the primary school like what we do with mathematics and physics today. To be an "adaptive" landscape architect, should I start programming my design? Or since AI will not be able to understand aesthetics or entertainment in the foreseeable future, shall we work as artistic or playful advisors in a project? Here comes the crossing, where landscape architects have to choose a way both personally and collectively.



## 9 ACKNOWLEDGEMENT

During this graduation year, many teachers, colleagues, friends and family members contributed to this project in various ways. In this last section of my report, I would like to mention some of them.

First of all, my deepest appreciation goes to both of my mentors, Inge Bobbink and Mike Emmerik, not only for the professional guidance and critics but also for giving me so much freedom, encouragement, and trust to complete such an experimental project. Inge could always see qualities from my weird ideas and help me to examine them academically, while Mike has always reminded me my role of a designer and offered practical solutions to realize my design. Without helps from either of them, this thesis would not have been possible.

I would like to thank my examiner, Marjolein Spaans. She has been very positive with my unconventional approach and tried hard to understand my project, even when it was still a chaos.

I would also like to express my sincere gratitude and

affection to my parents, who offered me the opportunity to be born, to grow up and, eventually, study aboard with endless love and freedom. It was you that brought the spirit of adventure in me. This research might be my project, but I'm definitely yours.

Further, a special thank to my friend Sicco Jansen, who appreciated and criticized my creativity, shared knowledge with me and even helped me build the hologram device.

In addition, thanks to Yuechen Liang for supporting me and helping me finalize some drawings; thanks to Jean Pierre Droge for creative inputs and suggestions for handy Apps; thanks to ManHin Lam for searching outfit for me; thanks to Jeroen van der Kwaak, Menghan Zheng and Zhuting Li, Licheng Wang, Seul Lee, Sumanth S Rao for a short period of group work.

Last but by no means least, my research is supported by China Scholarship Council. Thanks to this financial support, I was able to work in a much more comfortable condition.

Thanks to everyone and everything I met in my life. You all contributed to this project in a way.

## 10 APPENDIX: EXPERIMENTS

### 1. *Sci-fi movie review*

Science Fiction is an integration of science, technology, design, art, and ideology. And most of the sci-fi works are aiming to propose some big questions by depicting a utopia or dystopia. As a sci-fi fan, I'm always fascinated by the future cities equipped with the upcoming high-tech. Skycars are flying through the interspaces of the skyscrapers; holographic advertisements are floating above the building tops; people in tights suit are traveling in and out the massive spaceship harbor; Babel-like towers are standing in the center holding the centralized energy and political power.

But beyond these, philosophical or ethical contradictions revealed in the scenes could often leave their audience in questions. For instance, *The Matrix* questioned what is real and is it necessary (Brothers, 2008); *Logan's Run* depicted the dystopia of defeating ageing and proved the importance of death (Metro-Goldwyn-Mayer et al., 1976); *Ghost in The Shell* discussed what is the nature of human when our bodies can be replaced and our memories can be modified (Oshii and Shirow, 2003).



Neo Tokyo, 2019 (*Akira*)



New York, 2263 (*The Fifth Element*)



New York, 2012 (*I'm Legend*)



Washington DC, 2054 (*Minority Report*)



Neo Seoul, 2144 (*Cloud Atlas*)



Los Angeles, 2019 (*Blade Runner*)



Dome City, 2274 (*Logan's Run*)



San Francisco, 23 C (*Star Trek*)



2. Movie: *Daydream of a cable car*

Sea level is rising due to climate change. But climate won't be the only change in the next 100 years.

Our habitat, Cities, has changed a lot in the last 100 years by the emerging technology, and will undoubtedly keep changing in the following 100 years.

How will our cities change themselves to adapt to climate change? By imaging the future cities, the probable, possible and desirable futures will be explored and discussed.

Driving long Embarcadero around and around every day, the cable car was told that this place will be inundated in 100 years. He can not help to dream about the future, what will Embarcadero look like when that day finally comes. He was inundated by his daydream.



### 3. Novel: *Embarcadero 2117*

Ever since I chose the topic, Space Fiction, I had been expecting a sci-fi movie and a sci-fi novel as final products. After the movie making, I immediately thought about novel writing as the way to integrate my thoughts. I started to conceive 4 fictional histories of San Francisco in the next 100 years, from a personal perspective as the representation of the scenarios

The first story about the resilience was a success, in the sense that it managed to order all the variables into the timeline and position them into space, which made it convincing. However, when I was writing the second story, which was about reclaiming nature, the problems were revealed. First of all, a single action to nature was not sufficient to summarize or differ the building practices for 100 years. Some technologies, such as solar panels and flying cars, could occur in any of the scenarios. Thus a more fundamental variable was required to differ the scenarios in a philosophical level. Secondly, through writing, I realized that climate change is not the domain driver which connects everything. There are tons of revolutionary technologies to deal with climate change and to change our lives. How they will re-shape our living environment depends on humans'

collective environmental philosophy. It, of course, has a lot to do with climate change. But the real question for a landscape architect is, what is nature.

Although I failed in completing the stories, the writing technic remained the important method to make the research and design coherent.

This novel contains the fictional histories of San Francisco in the next 100 years in 4 parallel worlds. As a design tool to explore and elaborate the future urban configuration in radical scenarios, the stories will emphasis on the spatial effects of flood, earthquake, mobility, housing, food, and energy. And the stories will be differed by humans' attitudes towards those issues, especially the long-term sea level rise. Each attitude represents one kind of relationship between human and environment. Each of the stories is told by the 124 years old Louis in the parallel world, from the perspective of a homeless, the most vulnerable group of the society. And there are several common settings in all the stories, including:

Storm "Loki" in 2031  
Magnitude 7.2 earthquake in 2042  
Storm "Ultron" in 2076  
Storm "Thanos" in 2110  
California food productivity decreasing by 40% by 2080  
Solar energy technological breakthrough in the 2040s

Nuclear fusion in the 2090s  
Trend of working at home

For the readers to quickly grasp the main idea of the stories, the brief of each story is attached here.

**A Resiling Story: Blooming behind wall**  
This is a story based on the current trends of development, Resilience. The essence of resilience is to keep things as it was in a flexible way. In this timeline, humans choose to adjust our urban configuration to increase it's tolerance to changes. The new seawall is built as a container for programmes. Roads are transformed to water street, offering opportunities for ecosystem and urban agriculture. However, as long as basic urban configuration remains the same, its resilience will be limited. How tall can the seawall be? How much rainfall can the city contain? How do those flood defense systems work along with the other changes? Those questions will be revealed in the story.

**A Reclaiming Story: Step to Bay**  
In this story, the confidence of "conquering nature" finds its way back to human history. Human-beings choose to solve environmental problems by engineering the landscape. New constructions are extended to the bay as both flood defense and urban expansion. Energy is harvested from earthquake to reduce the damage... This crazy idea sounds totally opposite to the "environmental



belief” today. But it is a reflection and doubt. How can we decide what is good for nature? Is human part of nature? Is engineering not nature? Does nature need our protection?

A Retreating Story: Let in.

This story originates from the surviving wisdom of all creatures, live where suitable. In this story, the capital is relocated to the safe land gradually. New skyscrapers with more advanced technology are built in the bedrocks. The Financial district is partly torn down by the earthquake. In this case, the opportunities of sea level rise are revealed. A natural area is embraced by the highly compact city. A utopia community is established upon the ruin of the financial district with creativity industry and food production.

A Residing Story: Upper flow

This is a story which has been taking place for thousands of years. Human-beings build our settlement according to the environment. Only this time, our ultimate settlement, the city, is so capitalized that it will take great determination and efforts to transform it fundamentally. The ground floors are flooded and used as recreation and alga farming. Instead, bridges are built between the buildings, making up a 3-dimensional flow system.

## EMBARCADERO 2117

### Prologue

*My name is Louis. This is 2 July 2117. Outside of my place, people are celebrating the achievement of project San Francisco Space Fiction (SFSF). Well, inside my house, my 124th birthday party is about to end. Hahaha, it is said that the maximum age of a man is 125. Now, sitting on the healthcare machine, surrounded by my grandchildren, I think it's the time to tell them the story of Embarcadero in the last 100 years...*

*I came to San Francisco in 2017 as a climate refugee. In that year, the concern of climate change came to its eruption in California. People gathered in the street for months asking for actions. And it was on 2 July that the announcement of SFSF was made by San Franciscans. That day, the city was as aloud as it is right now. Well, for me, a 24 years old homeless young man, I took the gathering as an opportunity for some easy money. I didn't expect it would change my life, fundamentally.*

### A0: A Resiling Story: Blooming behind wall

#### Traffic

*San Franciscans started to live a resilient life. They invested a bit more money on clean energy and bio-food. Several old blocks in Chinatown and Tenderloin were replaced by sustainable*

*skyscrapers to offer more accommodation. I worked for the renovation of Chinatown.*

*The biggest obstacle in the way of resilience was the private car. Although several public transport lines with the Transbay Transit Center were executed in the following 3 years, people just couldn't give up their cars. With the growth of population, the traffic even got heavier. There was no space to contain our resilient wishes since 40% of the city was occupied by the traffic, until 2021, the "break out" of the Oil War.*

*After Mr. President announced war with Iraq on Twitter on 21 March, within one day, almost the whole world got involved. I thought I was about to be sent to the frontier. I was not worrying. There was no real frontier. Die there or here, it made no difference to me. Everybody knew that whoever took the first action would be the sinner for the Third World War. As the largest oil consumer, it was time for the United States to make the decision, give up oil or give up humanity. The choice was clear to all, but the maddest president in American history, who almost managed his second tenure.*

*4 years later, 2025, 60% of San Franciscans started to commute by public transit. The number was growing. The rest 40% who owned cars all became Uber drivers, which was defined public transit a few years later. Along with the decreasing of the traffic, the once paved roads gradually became green networks creeping across the whole city in the following few years. I worked for the depaving and greening project. Because of my unexpected gifts of gardening and the sense of responsibility, I was selected as a "city gardener" from the homeless, maintaining the green San Francisco with my previous homeless fellows. I also got a small piece of land to grow my own food. Life got better.*

### The Trick of Loki

*However, it was not heaven yet. In 2031, 11 August, the historic storm "Loki" attacked California. The whole Financial District was flooded with 20cm water for 3 days. The economic system was paralyzed, as well as my garden. For the city, it was 30 billion loss. And for me, it was all I had. The flood came first from the hinterland. The sewer outlets below the seawall were inundated soon. Pumps were not enough to get rid of the wastewater with the runoff. My garden was in a low-lain area and contained the overflowed water. All my plants died. And the garden was flooded by my tears for another 3 days.*

*The storm made people really realize that the once far-away sea level rise was no longer a future, although experts said floods in this level would happen only once two hundred years. Reacting to that, the second wave of urban transformation began. In 2035, a half meter continuous bench was built along Embarcadero, from Fisherman's Wharf to Mission Bay. The bench was multifunctional with a funny shape. It soon became a must-go of the city, especially for the kids. On the other hand, a large amount of the green networks were redesigned into rain gardens for run-off retention.*

*Another thing the storm changed was the offices in the Financial District. Since the instant communication was quite advanced, many companies gave their employees the freedom to work at home. It started with one home-working day a week, then two days in the office a week. Till 2040, 30% of the companies completely moved out from Financial District. The left offices were transformed into social houses (I got one room myself). The leaving companies saved the office rent, the commuting fee and time, and they were not in the risk of flooding or earthquake*



anymore. Yes, there were earthquakes.

### **Earthquake**

*It was 10 o'clock in the morning, 11 May, the 2042 Earthquake shook San Francisco Bay, magnitude 7.2. Once again, the Financial District, which was built on the landfill, was damaged badly. 5 skyscrapers fell down into the ground, including the notorious Millennium tower, upon which it is the Millennium Park today. At the same time, on the bedrock, where the seismic impact was less, a lot of old family houses were also in a poor condition. Fortunately, the death was quite limited due to the retrofitting programme and evacuation plan, and my apartment was safe.*

*The rebuild of the city took place immediately, starting with the family houses. The original owners of those properties had passed away for decades, and their offsprings spread everywhere. People at that time didn't have big families anymore with the awareness of the growing population and the accelerated climate change. Thus, many of those old family houses were sold to developers for more compact residential units with plenty of public spaces. However, things didn't go that well in the landfill area. People were still scared by the striking earthquake, but nobody was willing to give up the land and the capital on that. The damaged buildings were torn down, leaving vacant land for homeless; the survived buildings were reinforced; some companies from the fallen buildings moved away; some found their new offices nearby. Life came back to its orbit, pretending nothing happened.*

### **The Solar Age**

*2048 was a memorable year, from when on no fossil fuel would be burnt anymore. But don't get me wrong. The nuclear fusion would*

*come later in the 90s. In the 30s, a significant breakthrough was made in the solar panels, whose conversion efficiency grew from 30% to 80%. This resulted in the third industrial revolution. With sufficient clean energy, the technologies once in sci-fi were no longer fantasy, from AI-Robot to moon travel.*

*Life changed rapidly. By 2060, the whole city was energy self-sufficient and under control by the "Twin Peaks" the name of the supercomputer. 40% of works were taken by AI-robots. Self-driving cars were delivering goods around the city; all the skyscrapers were built as or transformed into the super living units like today, each of which was like a micro-city with all the functions—sleeping, working, eating and recreation. The only reason people got out their units was traveling. However, that would soon not be the case due to the universal application of VR. Along with the technology development, the anxiety of the society and the healthcare were put into concern.*

### **Foodism**

*Another revealed problem was about food. As a result of the global warming, the traditional food production of California had decreased by 20% by 2065, while the population doubled. Artificial food started to be popularised, due to what there was no famine anymore. However, people felt uneasy about the disconnection to natural food. The worries budded from the new rose social class, the useless, of which I happened to be one. We were people whose jobs were taken by machines, lived on the social security system and accordingly with neither economical importance nor political power. Thus, we were also the ones with no access to fresh food.*

*The sought of natural food drove us to the open space, occupying the vacant land and growing our own food, which led to the*

*famous Food Defence Movement. The forgotten concept, urban agriculture, was once again put on the table. Only this time, it was not about recreation but therapy.*

*Inspired by this, the upper class started to grow food in their collective balcony as an easy access to nature. Thus, even the food production started to be integrated into the multi-functional building. On one hand, sociologists were discussing the social problems caused by this independence. On the other hand, it did help to avoid some troubles, for instance, the flood.*

### **Age of Ultron**

*In 2076, San Francisco was attacked by the storm "Ultron". At that time, the effect of sea level rise had been readable by the naked eyes—the sea water got over the old seawall every year. The continuous red bench was consolidated to the new waterfront. The storm was predicted one week ago. The logistic system ran double hard for 3 days to prepare for the coming flood. Every living unit stored sufficient food and energy for 5 days in advance. At the time Ultron knocked the door, nobody answered. There was not a single man nor his property outside in the flood. People were locked in their living units. But what did it matter, if they didn't want or need to go out?*

*It was a monumental flooding. It was the first time that we do not defend flood as a city but a building. It inspired a new solution for sea level rise.*

## **A1: A Reclaiming Story: Step to Bay**

### ***Energy***

*The first issue put on agenda by the politicians was the goal to achieve the 100% renewable electricity in communities. To take the responsibility and impress the consumers, the big companies in Financial districts competed to claim themselves sustainable and renewable, from products to their offices. Solar panels were installed; facades were made smart enough to control the temperature and light. Energy consuming became crucial criteria in the further development in South Financial District. By 2020, an extra 1 billion was invested in the Financial district for energy.*

*Following the call of the state government, I stepped into this promising industry and became a solar panel installer. However, we almost only got jobs for the office building. There were very few citizens invested on the private solar panel. According to the market report, 40% citizens thought the solar energy technic was far from mature, 20% believed the residential energy was only an insignificant section of the total energy consumption, another 20% were concerning the pollution in the manufacturing process. Whatever, I got unemployed soon after the energy fever in office buildings.*

*With the failure of solar energy, experts proposed wind turbines as an alternative. There was no way they could erect 100 meters wind turbines anywhere in the city. Inspired by the project in Northern Sea, they moved their eyes to the Bay. In 2025, a dozen of 2-megawatt wind turbines was built on Treasure Island which was abandoned due to the concern of sea level rise. Following that, the neighbor counties, such as Oakland and Santa, started to build wind turbines on marsh land. By 2030, 120 wind turbines*

*were erected in the Bay, with a total capacity of 250 megawatts.*

### ***Mobility***

*To achieve the energy goal, as well as to release the traffic congestion, several improvements for mobility were considered. However, self-driving cars were not approved by the transportation bill yet; electric cars were too expensive and lack of charging facilities; long-distance railway required too many efforts and time to construct.*

*In the winter of 2017, in the maintaining period of, the ferry capacity was pushed to its limit which was 70% more than normal. People started to notice the potential of the traditional ferry traffic. In 2018, San Francisco Downtown ferry terminal expanded three more gates. In the following 5 years, ferry service became operational in Richmond, Mission Bay, Redwood City, Treasure Island and Berkeley. By 2035, the ferry commuters reached 30%. This inspired another round of ferry expansion. In 2037, Pier 41, Downtown San Francisco, and Mission Bay terminal were extended 100 meters to the sea. From 2025 to 2040, I worked for the installation and maintenance of wind turbines. I took the ferry every day between the work fields. A boat would run every 15 minutes to any destinies. It was much more convenient than buses but kept the bay quite busy.*

### ***The Trick of Loki***

*Oh, there was an unforgettable interlude In 2031. On 11 August, the historic storm “Loki” attacked California. The whole Financial District was flooded with 20 cm water for 3 days. The situation was even worse in Mission Bay and Treasure Island. The flood came first from the hinterland. The sewer outlets below the*

*seawall were inundated soon. Pumps were not enough to get rid of the wastewater with the runoff...*

***To be continued...***



#### *4 Paper: Imagining by imaging*

##### *Three ways to image future urban landscape*

(This paper is under the supervision of Steffen Nijhuis)

#### **Abstract**

Architectural design is always future-oriented. This is especially evident nowadays when our urban landscape needs to respond to both long-term climate change and short-term changes in our society. But the uncertainties and possibilities of the long-term future make it difficult to be imagined and communicated. Among a wide range of methods to explore and represent the emerging future, the image has been regarded as a powerful tool for inspiring and communicating, rooted in three traditional architectural approaches—capriccio, utopia, and scenario. Thus, the methodological research question of this paper is how to create images of the future urban landscape. To answer this question, images from the three approaches mentioned before are analyzed and categorized. As a result, three methods are found and introduced in this paper. They are, superimposing future objects into an urban context, integrating future conditions into an urban context and visualizing data in an urban context. These methods will be examined with a design project, San Francisco Space Fiction.

**Keywords – image, future, urban landscape, architecture**

#### **1. Introduction**

Architectural design is always future-oriented. ‘In fact, the entire discipline [architecture] is consequently focused on the future world—from basic building process all the way to the inevitable configurations of social and political space’ (Feireiss, 2011). This has become more and more evident since the changes of our society were getting faster and faster in the last centuries. Additionally, a significant climate change in the relatively long-term future is expected to threaten our habitat, the cities. Thus there is a call for us, architects, landscape architects and urban designers, to envision a future urban transformation, integrating both the long-term changes of the environment and the short-term changes of our society. As Wood and Andraos observed,

*With the failure of the suburban experiment and the looming end-of-the-world predictions — from global warming to post-peak-oil energy crises and uncontrolled worldwide urbanization — architects and urban planners find themselves once more at a crossroads; a place fertile for visionary thinking.* (Wood & Andraos, 2009)

However, the further future we are talking about, the more uncertainties and possibilities there will be, which

makes the long-term future difficult to imagine and even more difficult to communicate. How can we explore the alternative futures away from the empirical vortex? How can we make the outcomes less abstract that they can be accessible to the non-specialists since the future study is value-laden in the sense that the goal is assumed to be desirable or valuable for groups from every standpoint (Niiniluoto, 2001)?

‘A wide range of futures tools and methods have evolved to represent and explore different aspects of the emerging future. They include trend extrapolation, forecasting, backcasting, scenario building, Delphic surveys and so on’ (Slaughter, 1997). Along with them, images, which are more understandable and concrete, have been regarded as a powerful tool for inspiring and communicating.

*An early integration of 3D visualization in the planning process offers a wide range of opportunities for exploring alternative futures. . . . The visualizations could be the basis to communicate the vision—the views of the future—and to share the vision with others in order to influence future change.* (Lange & Hehl-Lange, 2010)

However, the question still remains to designers — how can we create images of the future urban landscape? Here, an image is a concrete 2D picture depicting the physical space and urban landscape refers to the

perceived urbanized environment with no distinctions between metropolis, city, town or suburb.

To answer this question, images from a wide range of urban visions, consisted of Capriccio, utopia, and scenario, need to be studied and categorized.

Since we are talking about urban transformation, images discussed here are created in localized geographical urban context, where is more problematic and the link between now and then is evident. In this case, with exceptions, the fictitious cities, the urban expansion in the unspoiled nature and prototype future cities with unclear context are excluded in this paper.

On the other hand, architectural capriccio and utopia cities are not always future-oriented. Here we only select those with clear future context. Thus, with exceptions, those timeless images, images of the fictitious past and images has already been implemented are excluded in this paper.

## 2. Capriccio, Utopia, and Scenario

The making of future images in architectural discipline is rooted in the 3 traditional approaches: Capriccio, Utopia, and Scenario. They make up the material analyzed in this paper.

### 2.1 Architectural Capriccio:

Since the eighteenth century, the Capriccio in the arts has meant either a brief, sprightly musical composition or an image composed of disparate architectural elements, often archeological (Mayernik, 2016). Specifically, in architecture, Steil (2016) interpreted capriccio as ‘creative re-ordering, re-composing and transforming of buildings, ruins, landscapes, urban spaces processed from memory, imagination and architectural invention into an emulating and intriguing synthesis’ (see, Fig. 1). While Steil argued architectural capriccio could be regarded as ‘conceptual paradigm, design catalyst, and didactic tool as well as a work of art itself’, Mayernik proposed 4 methods to make it:

- *juxtaposing familiar things in unfamiliar ways (local landmarks set in different landscapes);*
  - *imagining future perspectives on our world (showing great buildings in a future ruined state; generally showing the process of decay of entropy; cites and nature exchanging roles);*
  - *changing scale (making something humble into something grand, or vice versa);*
  - *fantastic reality (grand stairs, fountains, cities).*
- (Mayernik, 2016)

Capriccio has many similarities with future images discussed in this paper in their form and roles. Therefore

the methodology of Capriccio could be a reference for making future images. However, emphasizing on imagination and fantasy, capriccio indicates the way of playing (French Larousse Dictionary, trans. 2016). It could be the inspiration for future intervention, but it is not target-oriented and value-laden, which differs it from future study.



Fig. 1. National Trust Grottesca (C. Laubin, 1947).



### 2.3 Visualisation of scenario

Scenario-building is one of the most popular methods of long-term planning. ‘Scenarios are narrative descriptions of possible futures that focus attention on causal processes and decision points’ (Kahn, 2009). While policymakers play with the schematic descriptions of certain key variables, architects, landscape architects, and urban designer would emphasis more on space, and the non-specialists would concern more about their daily life. Therefore, spatialization and visualization of scenarios become crucial tools to illustrate the spatial influence of scenarios and to communicate with the public (see, Fig. 3).

As distinguished by Borjeson, Hojer, Dreborg, Ekvall and Finnveden (2006) there are three main categories of scenario studies: the predictive scenario, explorative scenario and normative scenario. Accordingly, the visualization of different types of scenario has informative or explorative meanings. However, even in the explorative scenarios, the visualizations are still created strictly based on the policies and are only used as a reference for informing and deciding. Hence, the creative power of making future images is limited in those visualizations.

### 2.2 Utopia and Architecture

While there are hundreds of definitions of utopia, I deem utopia as a place which is too good to be true. ‘Too good to be true’ indicates both the disagreement with the surrounding reality (Mannheim, 2013) and the inevitable failure caused by the complexities and paradoxes inherent in the search for perfection (Feireiss, 2011). Since all architecture ‘claims to make the world a better place’ (Koolhaas & McGetrick, 2004), many radical, visionary architecture or urban plans are regarded utopian, from Le Corbusier’s Radiant City in the 1920s to Buckminster Fuller’s World Game in the 1960s till works today. The images created in these utopian projects can offer us a great number of references of how architectural designers can claim future by images and how the images can alter the future by projecting a profile of a perfect world in the descendants’ mind (see, Fig. 2).

‘Utopia is powerful because of its ability to abstract and crystallize a problem into a concise and internally consistent solution’ (Darryl Chen, 2011). The images of utopia cities contain both the problem and solution. Since both of them are so concise, but not precise, there are a lot of contradictions to be revealed and debated. And this leaves space for exploration and inspiration.



Fig. 2. The Radiant City (L. Corbusier, 1930).

### 3. Three ways to image the future urban landscape

By analyzing and grouping the cases from Capriccio, utopia, and scenario, three methods are found to image the future urban landscape. They are:

- superimpose future objects into an urban context;
- integrate future conditions in an urban context;
- visualize future data in an urban context.

#### 3.1 Superimpose objects into an urban context

Images created by this way are used to discuss the relationship between a future object and its context. They are used mostly in small-scale intervention, like a building or park. By creating this type of images, multiple tasks can be performed.

In most situation, objects are superimposed to explore the possibility of an innovative form or programme in a context. In Buckminster Fuller's Tetrahedral City, a floating residential pyramid is superimposed into San Francisco Bay (see, Fig. 4). The strong image forces viewer to think about the possibility of super residential unit and occupation in the open bay. While the image itself offers a possible form, a pyramid, it inspires many other projects to explore more options. The Cloud, a landmark structure superimposed to commemorate London's role as host of the 2012 Olympics, displays

the real-time information from over the world in the sky of London (see, Fig. 5). As one of the project leaders, Carlo Ratti (n.d.), says, it experiments 'a new form of collective expression and experience'. The image shows a possible new landscape element, the universally accessible information, and raises questions at the same time. What spatial opportunities can information offer? Do we like to watch and be watched? What's the regulation for the information? Superimpose future objects into urban context as both solution and question, this principle can be found in many other projects, such as Atlas of Imagination by Luca Galofaro, Urban Sky Link by David A. Garcia, and The Mobile Mountain City Zoo by Tomorrow's Thoughts Today, etc.



Fig. 3. Scenario visualisation for Rotterdam (PBL, 2013).

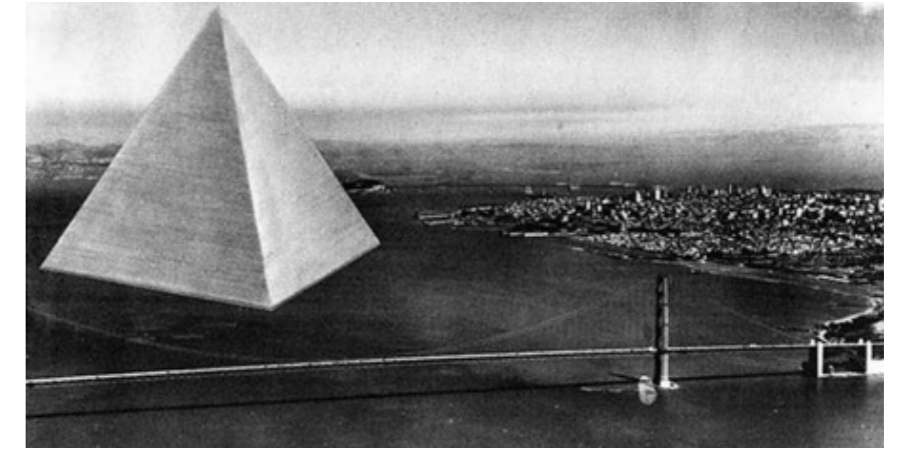


Fig. 4. Tetrahedral City (B. Fuller, 1969).

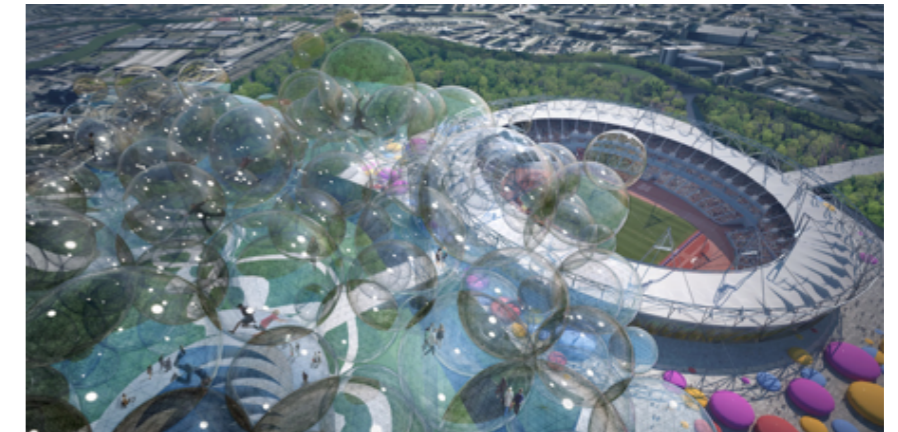


Fig. 4. Tetrahedral City (B. Fuller, 1969).





Fig. 6. The Continuous Monument (Superstudio, 1969)



Fig. 7. Phyte (N. Mouret, 2009).

In some projects, superimposed objects are not used as possible solutions, but rather than a reflection on the current way of development. One famous example is Superstudio's Continuous Monument (see, Fig. 6). The expanding monument creeping across the global landscape is made of prefabricated steel-glass units arranged in grids, as a result of the internationalism and modernism. By superimposing this massive monument in multiple cities, the collage renderings illustrate 'imaginary urban dystopias in which a given aspect of international style modernism or modern consumer culture is taken to its absurd, albeit logical, conclusion' (Elfline, 2011). From another perspective, Nicolas Mouret's Phyte expresses his concerns of the reality by superimposing the opposite. Phyte is the result of Mouret's reflection on the lack of natural environments in Paris. By superimposing a fiber-concrete tower which can wave in the wind beside the monumental steel Eiffel Tower, the image questions how static our cities are (see, Fig. 7).

There are even other situations where objects are superimposed only as a trigger for public attention and boundless imagination on a certain spot or a topic. In the project, The Berg, Mila Studio superimposes a 1000-meter-high mountain on an abandoned airport in the heart of Berlin (see, Fig. 8). The image itself may

look meaningless, but 'the core body of the project is formed by the reaction it provoked', as Feireiss (2011) described,

*Spurred by overwhelming coverage in local, national, and international TV, print and online media, a local grassroots movement developed that stretched from elementary schools through to nightclubs. Most relevant of all, these architects triggered to create art, write stories, celebrate parties, draw portraits—to ultimately see in their mind's eye, the berg, an imaginary attraction that created a new symbol of the many virtues of contemporary Berlin. (Feireiss, 2011)*



Fig. 8. The Berg (Mila Studio, 2008).

### 3.2 Integrate future conditions in an urban context

To make this type of image, a certain future condition should be pre-set, then all the relevant forms, programmes and compositions can experimentally emerge on the existing urban landscape. By doing this, the comprehensive relationships among all the elements can be understood and the unexpected paradoxes or side-effects of the future condition can be revealed. While theoretically all kinds of conditions can be implemented, the following three groups are mostly observed in the precedents.

The first group of all are images in a condition of technology innovation. The universal application of a technology innovation, like the new generation of the traffic system, is usually coming with large-scale construction as pre-settings or consequences. Hence, it becomes a condition. Imaging the urban landscape with a technology innovation, makes it operable to evaluate and adjust the innovation itself and makes the world better prepared for the coming technological revolution. Skycar City is a research project by MVRDV. By depicting the future Rotterdam with a traffic system based on self-driving skycars, the images explore the possible spatial consequences—the massive densification, three dimensional traffic regulation, accesses to buildings, skycar parking lots, etc. (see, Fig. 9) While the Netherlands is envisioning

a highly densified future, its neighbour, Germany, is expecting a rapidly declining population and large-scale abandonment of urban infrastructure in 2050. Recovering Berlin, a project by Protocol Architecture, utilizes ‘innovations in biotechnology to implement the first highly networked earth-based bio-supercomputer’ (Feireiss, 2011). One type of modified bacteria is used to distinguish and demolish the inhabitable buildings, while another is unleashed to create microfilament connections transforming the soil into a rich network. The images described the new subterranean urban fabric coming as a result of this technology (see, Fig. 10).

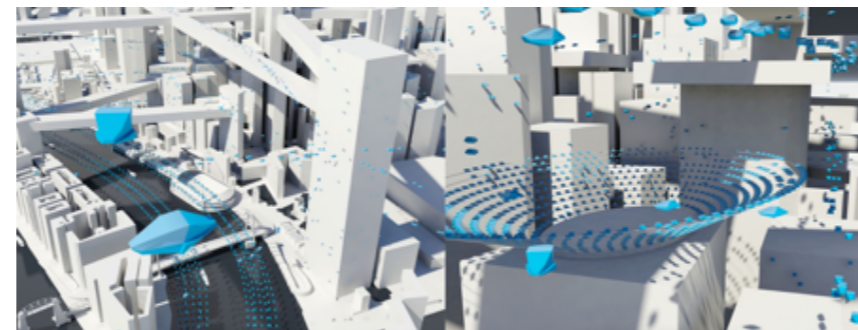


Fig. 9. Skycar City (MVRDV, 2006).



Fig. 10. Recovering Berlin (Protocol Architecture, 2010).





Fig. 11. Aqualta (Studio Lindfors, 2009).

In the second group, the condition is settled by social, political or cultural position. The changes of our positions will lead to changes in collective actions, thus influence the physical world and its atmosphere. Le Corbusier's Radiant City, Frank Lloyd Wright's Broadacre City, or Ebenezer Howard's Garden City can all be counted the precedents of this situation, since the belief behind them is social engineering. The Aqualta series of images by Studio Lindfors imagine how New York and Tokyo might look like in a few centuries if we change our attitude from resisting the rising sea level to embracing it (see, Fig. 11). In the images, the transportation system

underwater is replaced by piers, boardwalks, cable cars and the network of navigable canals; rooftops are occupied for green space; wetland and oyster-beds thrive in the cities. While depicting the opportunities offered in the condition, many problems are also revealed in the images, including less mobility, less entertainment, sanitation, and health, etc.

There is one more big group whose condition is given by alternative urban structure. The origin of this group can date back to architects' favor of 'mega-structure' in the 1960s. Archigram's Walking City, Constant Nieuwenhuy's New Babylon, Yona Friedman's Spatial City, or the Metabolists' capsule buildings, all these projects envisioned new urban configuration in the condition of a certain structure for urban development. Since we are introspecting our excessive urban expansion in the last decades, the alternative structure has once again been searched for a new dimension of urban development. In the images of Multiplicity, a project envisioning Melbourne in 2110 by John Wardel Architects and Stefano Boscutti, a new parallel city is first superimposed above the old one. Then, immediately, it poses the question of how the two cities might co-exist. 'Will they be populated similarly? How will the two meet? Will the upper city be residential and separated from the corporate city below? Will the new city supersede the old?' (Feireiss, 2011) By painting these questions out, a condition of the parallel cities is

integrated into the existing urban context (see, Fig. 12).



Fig. 12. Multiplicity (John Wardel Architects, 2011).



### 3.3 Visualise future data in an urban context

This method is handy when future data are predicted or set as targets. Since those data are often offered by scenarios, this method is widely used in the visualisation of scenario. The numeral and quantifier of data can suggest the various information of objects, such as form, function, amount, size and density. Therefore, the data can be visualized into several types of image.

By locating the data of the amount and area in an urban scale, a future image of the urban structure can be visualized, then the spatial influence suggested by numbers can be perceived. In MVRDV's project, the Grand Paris, the target data are spatialized in area and volume, then located carefully in the city with the design principles. For example, to achieve the 0.139 km<sup>3</sup> more public transportation, a grand central station is created at the location of Les Halles, the Boulevard Périphérique is densified by adding a metro line and two motorways ring-roads underground, a new Grand Axe's and a subterranean infrastructure band are invested along the Seine (MVRDV, n.d.). By doing this, the images clearly show what the urban fabric will be when the target data are achieved and make the further discussion of relocation easier (see, Fig. 13).

On the other hand, by depicting the data of form, size, and density in an individual scale, the spatial quality

and livability of a place after an intervention can be visualized. The vision, *Where the Grass is Greener* by Tomorrow's Thoughts Today, is set in a community in the outer suburb of London, which targets to offset 19,000 ton of CO<sub>2</sub>, whilst simultaneously producing 68,800 MWh/year surplus heat and electricity. To fulfill the assignment, a giant ring of infrastructure which contains a series of productive and social programs, including hybridized architecture, renewable energy generation, terra-forming and natural obstructions, are created. Images are made based on the programs and their size and density—the number of wind turbines and solar panels in a neighborhood, the proportion of greens in the streets, etc. This offers the non-specialists a window to examine the lifestyle suggested by the data, at the same time offers the professionals a reference to adjust the data further. For instance, the street may look too narrow to accommodate the activities in the drawing, and the wind turbines may be too dense, but not big enough to achieve the full-efficiency (see, Fig. 14).

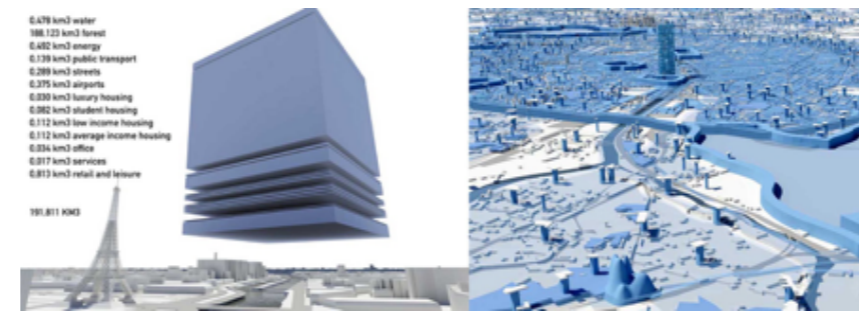


Fig. 13. Grand Paris (MVRDV, 2008).



Fig. 14. *Where the Grass is Greener* (Tomorrow's Thoughts Today, 2009).

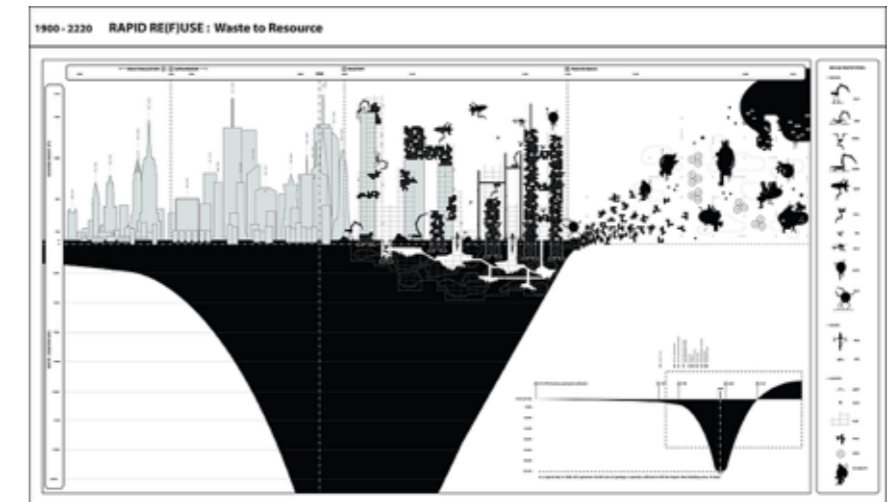


Fig. 15. *Re(f)use: Waste To Resource City 2120* (Terreform One, 2008).



*Future images can also be created based on the data of speed. The speed of generation, consumption or construction with a method or a material, will determine form and process in operational level. Rapid Re(f)use: Waste To Resource City 2120, a project by Terreform One, visualizes the speed of waste generation in Manhattan and experiments one possible way to reuse the waste with the probable form of the construction. Utilising waste kept in Fresh Kills Landfill in the last decades and the waste will be produced in the next, seven entirely new Manhattan Islands could be recreated at full scale with automated, robotic three-dimensional printers. In the early period, constructions will be assembled by crushed waste cubes with simple shapes. With the technological improvement, a more delicate form can be expected (see, Fig. 15).*



Fig. 16. Visualisation of Scenario 0 (by author, 2017).

## 4. Reflection

### 4.1 Contributions and limitations of the methodology

*The methodology introduced in this paper can be a guidebook and inspiration for architectural designers to image the future urban landscape. It consists of three methods to make the images, the situations where each method can be applied and the precedents utilizing each method. For architects, landscape architects, and urban designers, this methodology can help them quickly start the imaging process. And for professional form future study fields, it can help to involve more opinions and can make the public communication easier. Thus this methodology can be an academic bridge between architectural design field and future study field, and contribute to both disciplines.*

*However, the introduced methodology has its own limitation. On one hand, it only offers principles, without elaborated steps to follow. Even for well-read researchers or designers, they may still find difficulties and failures when applying this methodology. Nevertheless, since the making of future images should always a creative process, I believe an over-detailed operation instruction may limit the creativity emerging from try-and-fail. On the other hand, the methodology is only a categorization of the existing practical methods. It does not create any new ways to image the future urban landscape but helps*

*designers to be aware of the methods they are taking. Further, the categorization itself is problematic, in a sense that one can easily rename the category or even re-categorize them from a different perspective. For instance, the category of ‘integrate future conditions in an urban context’ call almost be named ‘superimpose a future system into an urban context’ from the perspective of the results instead of the driving forces, and the future data could also be a condition or results of specific conditions. However, the categories are sufficient to cover most situations and the categorization and naming are based on the start point of the image making process. Therefore, this methodology has sufficient applicability.*

*Starting from the limitations of this methodology, several complementing pieces of research can be proposed. More detailed and concrete procedures without eliminating the creativity could be developed for each method. New ways to image the future urban landscape could be discovered or invented. And alternative ways of categorization and naming could be proposed and discussed.*

### 4.2 Application—San Francisco Space Fiction

*This methodology for imaging the future urban landscape will be applied in project San Francisco Space Fiction, the graduation project for my Master diploma in the Technology University of Delft. The project will explore the alternative urban configuration of San Francisco Financial District in 100 years in the context of climate*

*change and technology development. The design process is based on scenario making, thus the described methodology will be intensively applied for scenarios visualization (see, Fig. 16). Additionally, since the 100-year future scenario is so blurring with uncertainties and possibilities, Capriccio will also be used a lot for inspiration (see, Fig. 17). By examining and altering those images, better scenarios can be developed. The project is currently in progress. Another paper, the report of the methodological application in this project will come out with my Master thesis.*



### 5. Competition: hOUR City

With the results of my project as input, I participated in a competition, hOUR City.

Presented by AECOM and Van Alen Institute, with 100 Resilient Cities — pioneered by The Rockefeller Foundation, hOUR City is the 2017 Urban SOS® student ideas competition. Students are asked to propose new solutions to tackle housing, transportation, or economic development challenges and to re-imagine what a future "hour city" boundary can be.

The term "hour" was used to define the boundary of a city in past days, from an hour of walking to an hour of car riding, which, however, was fundamentally changed by the digitalization revolution. The new era introduced the Internet into people's life, expanding one-hour accessible distance into an immeasurable scope. With massive amounts of time, spaces and resources being released from traditional city life-patterns, that how to achieve the optimal resource allocation in the city to solve the current and upcoming challenges became our biggest concern.

In the case of San Francisco, the frequent arrived earthquake, flood, chronically high demand of affordable housing and the growing need for city's development calls

for infrastructure improvement. The resource liberated from two current transitions of remote working and self-driving offer the government opportunities to do so by encouraging the idle resource to flow into e-commerce industries, smart transportation, and office transformation. While the governmental policy support, design intervention and grassroots contribution, the government allow the practice to be professionally guided and to be supported in both economic and politic way. To be specific, the San Francisco government will provide subsidies and tax reduction to the companies and the building stakeholders to withdraw the offices and transform the architect under experts guidance into affordable housing. Similar policies will apply to transportation and e-commerce industries as well.

(This project is a group work with Qiao Yang and Jiayu Lyu.)

THE BOUNDARY OF CITY

How far can you travel within one hour in this **VIRTUAL** world?



THE DIGITAL ERA

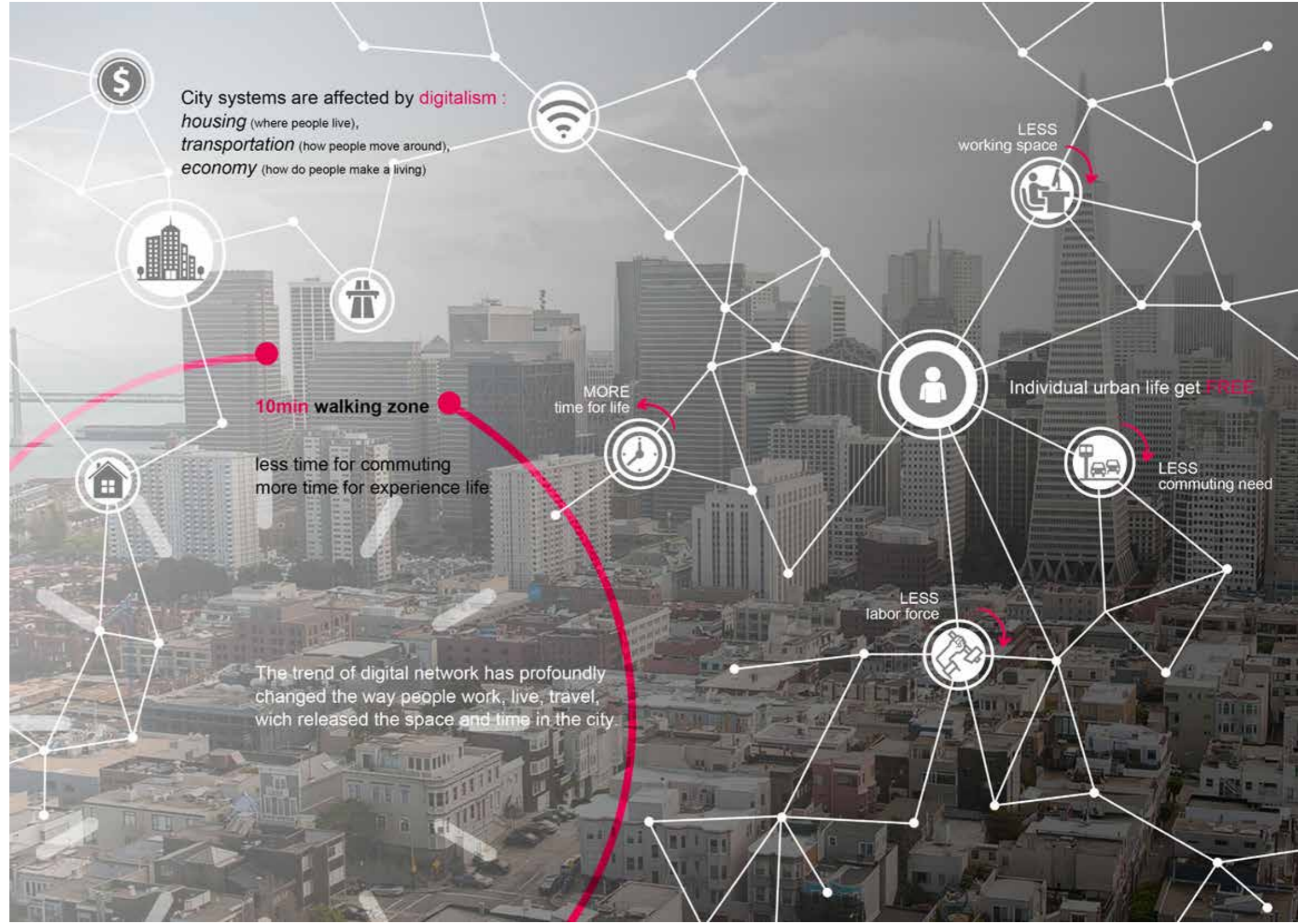
- = Infinite Distance?
- = Intensive Area?
- = High-tech Addiction?

Re-define the boundary of city & individual urban life



OUR CITY hour LIFE  
 point CITY ONE FILE







TARGET CITY SELECTED

## San Francisco In Challenge

San Francisco is facing challenges from social inequality and environmental uncertainty and growing demand for further development.



The United States



San Francisco Bay



San Francisco



Infrastructures are insufficient to meet the needs of being a high-growth and prosperous city.



1.5m SLR+3m Storm Surge in 2100



X 7499



45% of tenants in San Francisco pay more than 30% of their income in housing.



76% of possibility to have an over 7.0M earthquake in following 30 years.



CURRENT TRENDS FACING

## San Francisco In Transitions

Out of the top 100 companies offering **remote jobs**, 8 companies are located in Bay area.

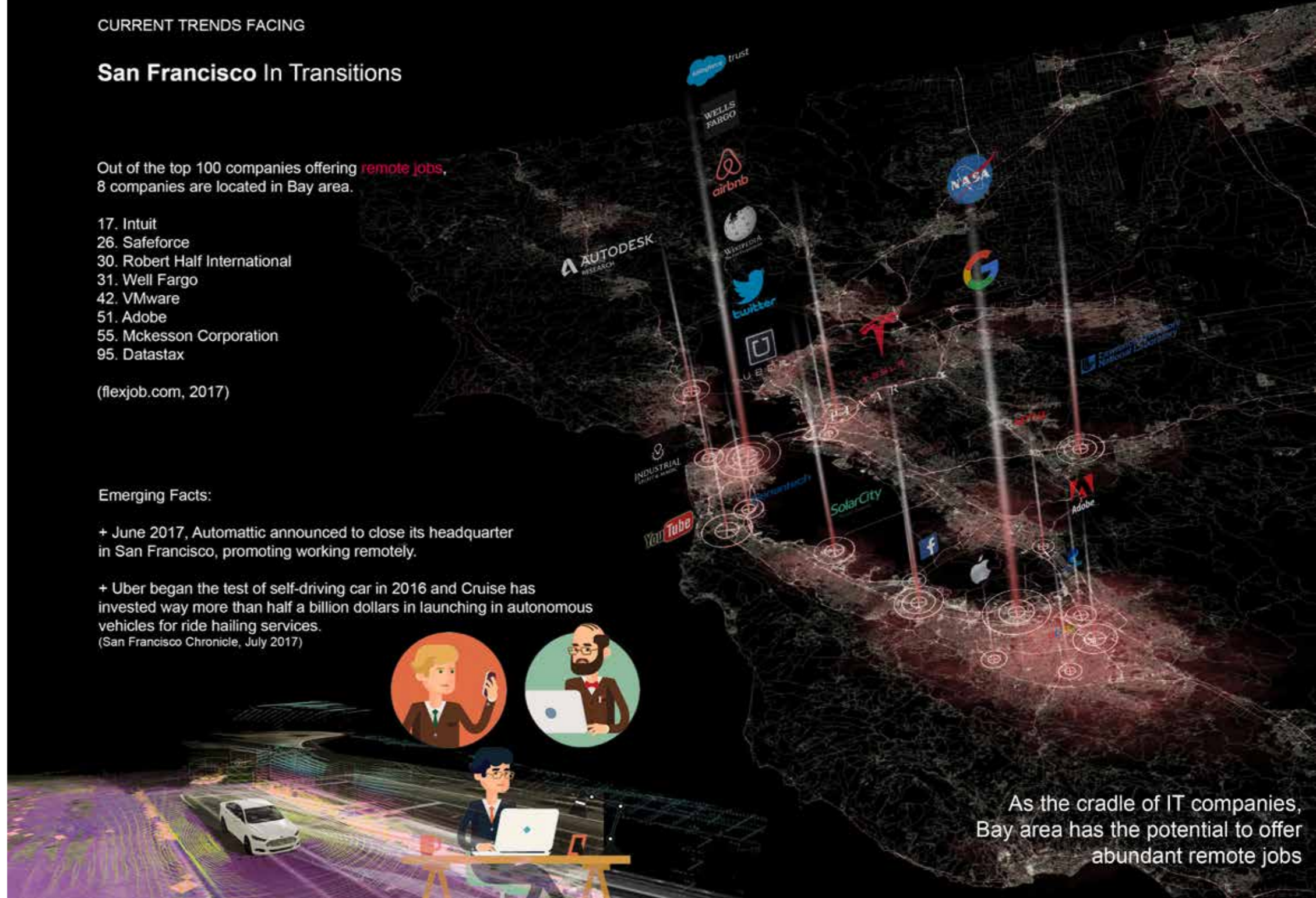
- 17. Intuit
- 26. Salesforce
- 30. Robert Half International
- 31. Well Fargo
- 42. VMware
- 51. Adobe
- 55. Mckesson Corporation
- 95. Datastax

(flexjob.com, 2017)

### Emerging Facts:

+ June 2017, Automattic announced to close its headquarter in San Francisco, promoting working remotely.

+ Uber began the test of self-driving car in 2016 and Cruise has invested way more than half a billion dollars in launching in autonomous vehicles for ride hailing services.  
(San Francisco Chronicle, July 2017)



As the cradle of IT companies, Bay area has the potential to offer abundant remote jobs





# STRATEGY

Towards A **FREE** San Francisco



## #1 Office Transformation

[ACTIONS]

- + Provide subsidy to office building taking part in the transformation
- + Encourage replacing of affordable housing
- + Give priority to young professionals with low-income



[ACTORS]

Government, office companies, low-income groups



## #2 Smart Transportation

[ACTIONS]

- + Provide allowance to abandonment of car ownership
- + Encourage self-driving in public transportation
- + Reduce parking lot & road and adapt into resilient infrastructure



[ACTORS]

Government, car-owners, driving companies, communities, residents



## #3 Encourage Ecommerce

[ACTIONS]

- + Reduce e-business taxes and provide small loans to young starters



[ACTORS]

Government, young starters, private enterprises





# 1 Office Transformation

SPACE-MAKING PRINCIPLES

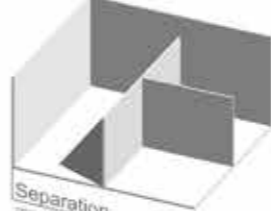


CURRENT OFFICE  
area: 676m<sup>2</sup>  
height: 3.9m

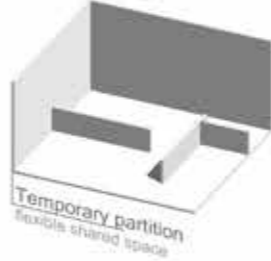
mobility function / flexible



Stratification  
create different layers



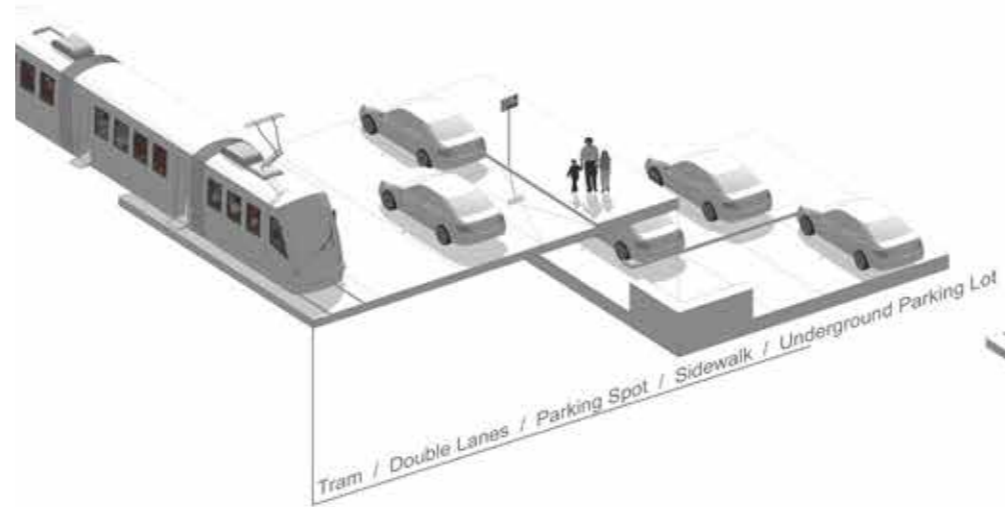
Separation  
meet diverse needs



Temporary partition  
forms shared space

FROM STRATEGY TO DESIGN PRICIPLES

# 2 Smart Transportation



Tram / Double Lanes / Parking Spot / Sidewalk / Underground Parking Lot

AFFORDABLE HOUSING SAMPLE



SINGLE STUDIO  
area: 376m<sup>2</sup>



SHARED APARTMENT  
(applicable to family)  
area: 1076m<sup>2</sup>

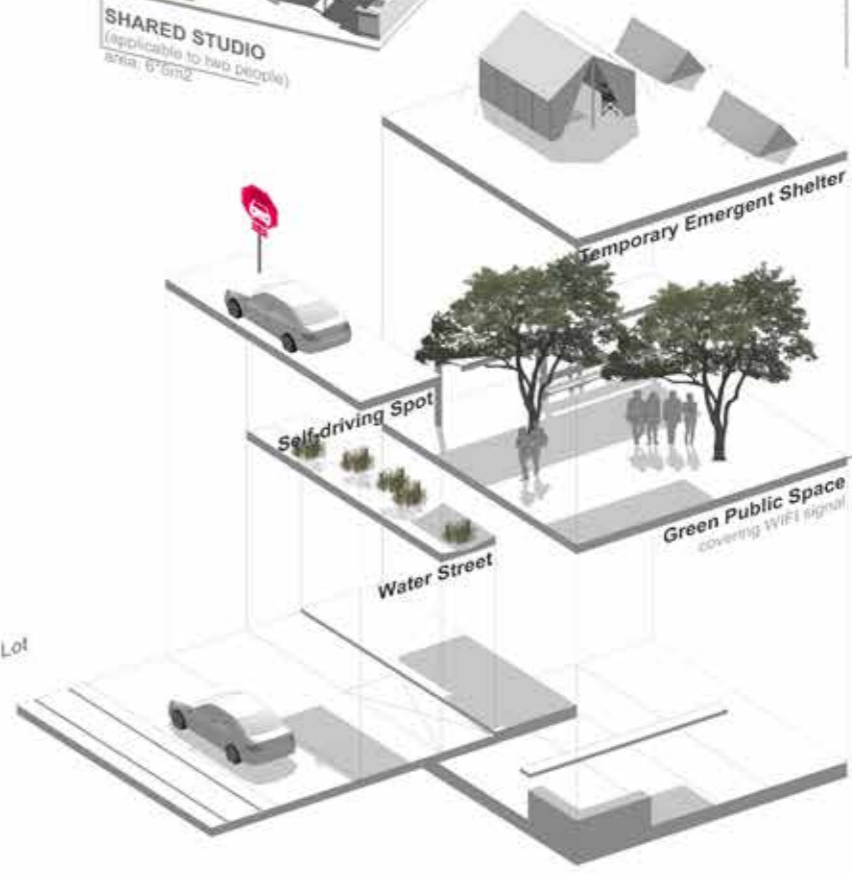


SHARED STUDIO  
(applicable to two people)  
area: 676m<sup>2</sup>



SHARED LIVINGROOM  
meet the needs of communication  
provide indoor e-commerce space

# 3 Encourage E-Commerce



Self-driving Spot

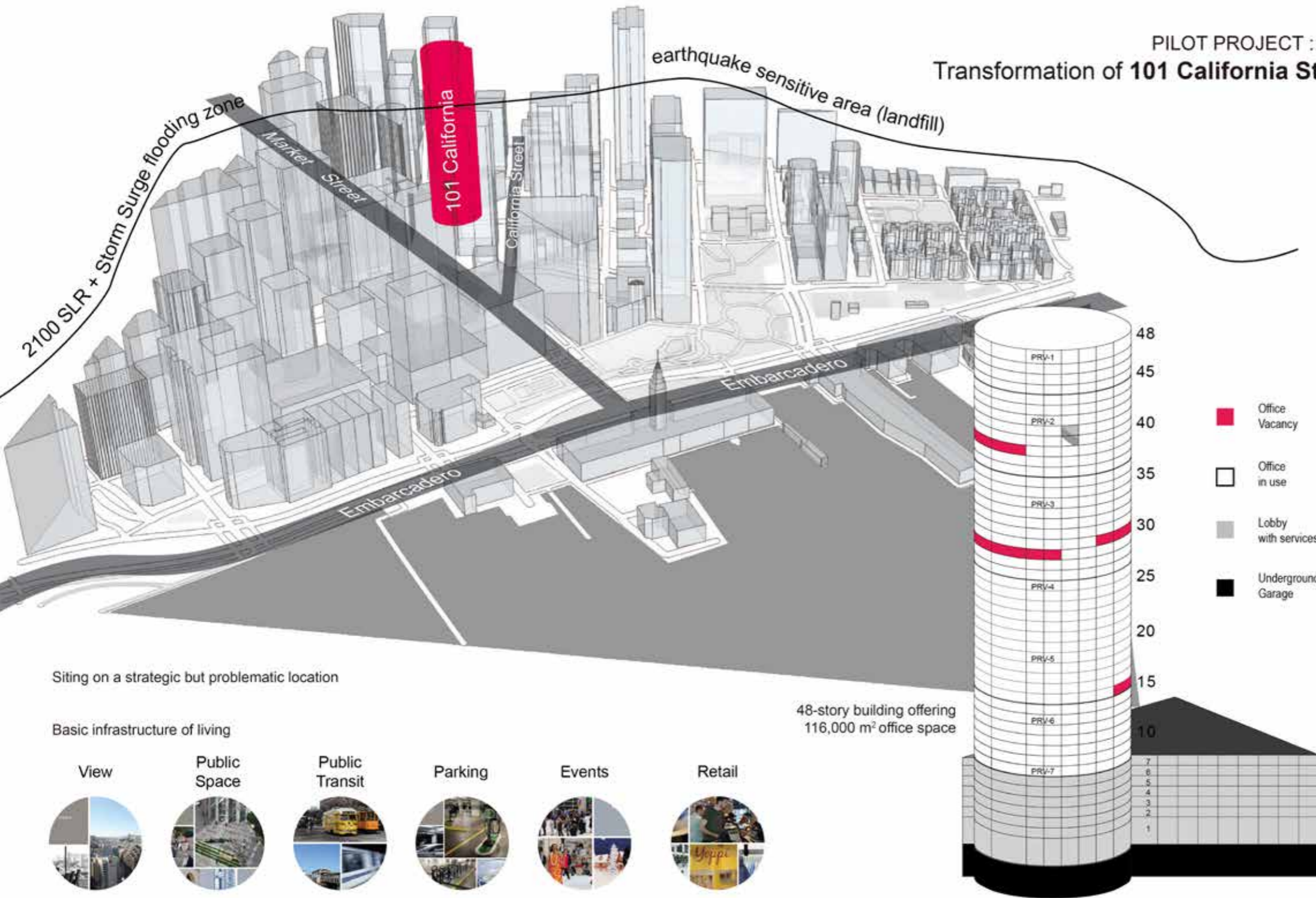
Water Street

Green Public Space  
covering WiFi signal

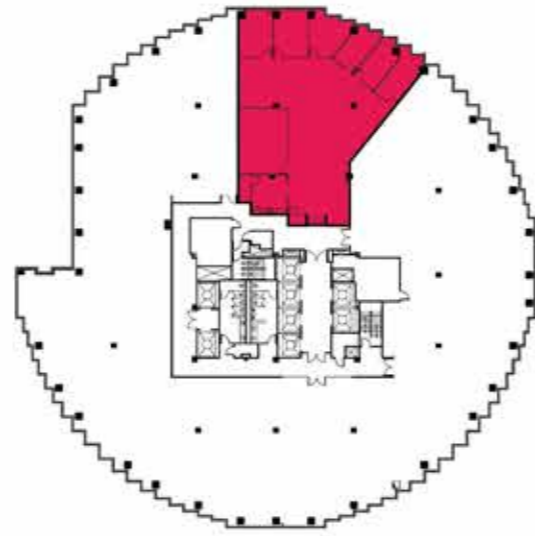
Temporary Emergent Shelter



PILOT PROJECT :  
Transformation of 101 California St



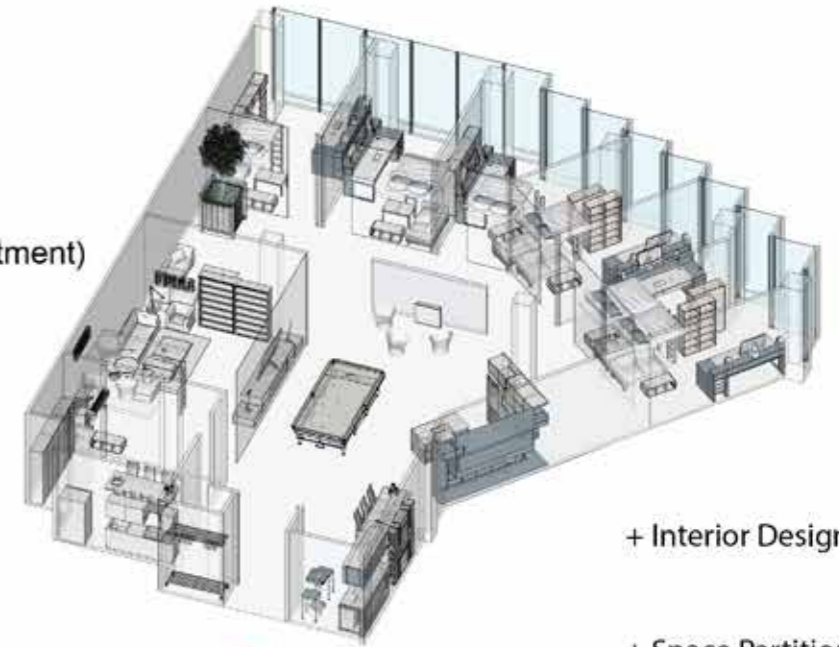




## OFFICE TRANSFORMATION DESIGN

- + transfer into affordable housing
- + provide different living units (studio/apartment)
- + e-livingroom as shared space

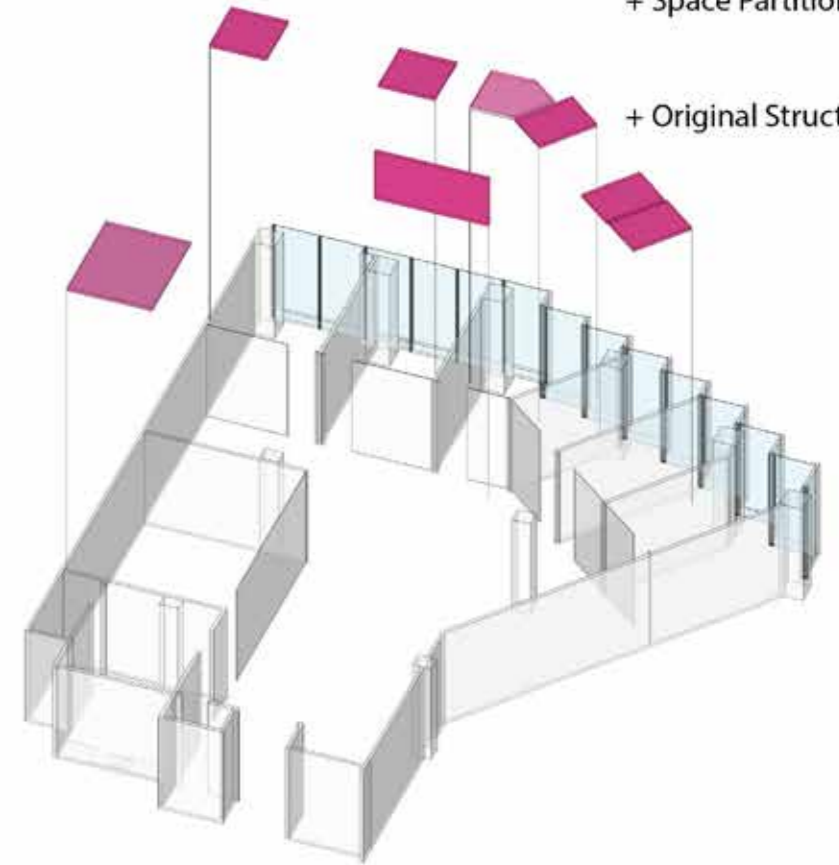
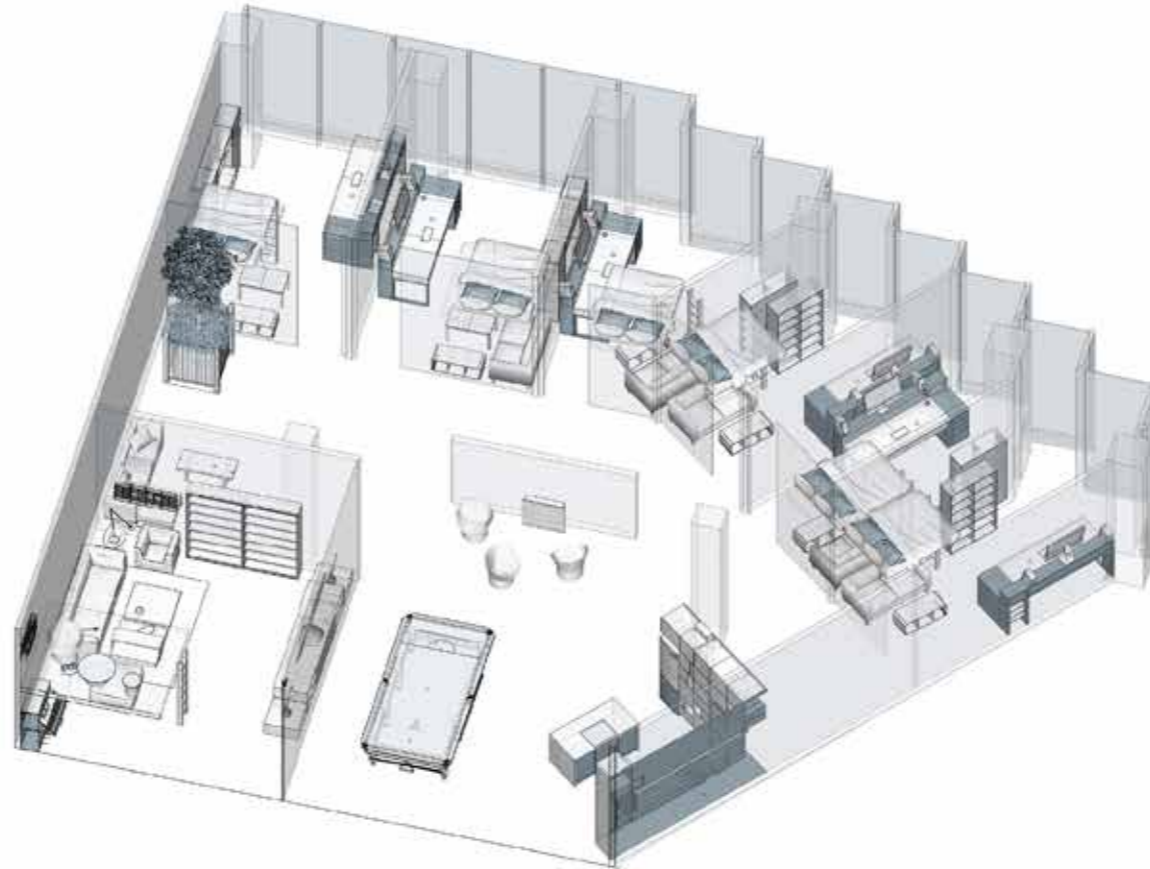
Floor Plan of 39F / office vacancy



+ Interior Design

+ Space Partition

+ Original Structure





GREEN WATER STREET

SELF-DRIVING SPOT

AVENUE WITH WIFI

CURRENT ROAD SITUATION

**SMART TRANSPORTATION DESIGN**

- + self-driving service with spot
- + green water street to store extra rainfall
- + more open space for Temporary shelter
- + green avenue with WIFI covering



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