Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences
**Graduation Plan: All tracks**

Submit your Graduation Plan to the Board of Examiners ([Examencommissie-BK@tudelft.nl](mailto:Examencommissie-BK@tudelft.nl)), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

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<td>Student number</td>
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Goal

Location:

Rotterdam, Park Pompenburg
The posed problem, [Problem Statement]

As of January 2019 it is estimated that the world population has reached 7.7 billion people. This number is expected to reach 8.5 billion by 2030 and 9.7 billion by 2050. A significant shift has already resulted in 55% of the population living in an urban area. This is expected to rise to 68% by 2050, which means that at least two-third of the entire population will live in cities.

Urbanization has already brought about various challenges. Cities have to cope with population growth by maintaining accessibility and safety, preventing congestions and providing sufficient numbers of accommodation. Conventional solutions are not adequate and sustainable. Our current industry has led to climate change which has shown to have disastrous consequences. This puts a burden on us (as architects, urbanists, manufacturers and consumers), to urgently rethink the way we use/consume our resources.

The population growth and the mass influx into urban areas brings about two fundamental problems: densification and livability. However, considering the consequences caused by our current economic system, sustainability is considered critical for the quality of life. Therefore, three fundamental problems can be addressed that future cities need to be prepared for:

1. The exponential increase in population in urban areas requires the city to densify its existing fabric by mixing and stacking different functions while at the same time increase its livability.

2. Designing new (hybrid) buildings by combining different programs contributes to flexibility and adaptability, which stimulates multi-functionality and in turn leads to less vacancy.

3. Buildings in the future are required to be either energy neutral or positive. They have to be designed in such ways that they only consume renewable resources. However, circularity, closing material loops to prevent raw material depletion, is the actual challenge of our industry.

Research question and [Research Question]

Research question:
“How can a hybrid building facilitate circular behavior and activate interaction in order to exchange materials and knowledge?”

design assignment in which these result. [Design Assignment]

This study departs from a speculative starting point focused on future cities. There is more than one urgent issue, for which we have to prepare for. Climate change, globalization and resilience are the most pressing among these issues. However,
tackling them separately might result in ineffective solutions. Reducing the consequences of climate change requires a change in our behavior. Globalization demands smart solutions for densification without it being at the expense of livability, and resilience requires our industry to fundamentally change from linear to circular. Despite how separated these issues may seem, they are inherently connected. The convergence of these topics, but also the way our cities function in today’s society, calls for buildings that blur boundaries between living, working and leisure by creating the right mix of functions. Also, as one of the largest consumer industries, architects must integrate circularity both in the realization and operation of buildings.

This hypothesis evoked a concept in which buildings can stimulate circular behavior in their immediate environment. An interactive link between circularity and public space can contribute to improve the connectivity and reachability of its context with the neighborhood around to facilitate interaction with different (circular) initiatives. Public space can become an incentive in boosting circular behavior. The characteristics of public space can stimulate a proactive approach towards circularity.

This could facilitate the process of exchanging resources with other (circular) initiatives in the vicinity and around the city. Linking waste-streams provides possibilities to reduce waste production. This process has already been proved by the startups at BlueCity in Rotterdam. Waste will become a valuable resource wherein the output of one process can become the input for the other. This exchange and synergy prevents valuable materials from being lost and keeps them longer in the circle.

The mixed character of a hybrid building establishes the optimal ground for both circularity and densification. Moreover, combining both private and public functions, especially at ground (plinth) level, makes positive contributions to the public sphere. Mixing programs lead to more dynamic structures that stimulate activity, facilitate interaction, improve social safety and thereby enhance the livability.

The described hybrid building becomes an activator of circular synergy by facilitating interaction through enhanced connectivity with its surroundings. A repetition of the same strategy dispersed through the city can contribute to become a fully circular city, as the municipality of Rotterdam aspires to achieve by 2050.
**Process**

**Method description**

The primary aim of this thesis is not to dive into what circularity is and how exactly it can be integrated into the built environment. The aim is to take circularity, along with service & sharing concepts, as a condition to explore how they can influence architecture (and the way we combine programs to create mixed-use buildings).

This project focuses on approaching circularity in a proactive way, by connecting it with the characteristics of the public space as an urban connector within the context, in order to stimulate circular behavior. It is an architectural/spatial challenge that endeavors to explore the possibilities of improving the connectivity and reachability within the public domain in order to facilitate interaction for the activation of circular synergy in the area. It is therefore not the intention to investigate how circularity can be integrated into architecture, but how architecture can facilitate circular action.

The ultimate goal is to propose a hybrid building that can reduce waste as much as possible by facilitating interaction to link waste-streams and exchange resources with different initiatives and processes. The building can be considered as a prototype that can be repeated around the city in order to expand the scope of circular initiatives to conduce to the municipal ambition of becoming a fully circular city.

**Research phase:**
The first phase of the study is mainly based on qualitative research, case studies and plan analysis (architectural research).

*Qualitative research* – This will consist of concise literature study on the history and development of the project location. An extensive study on hybrid/mixed-use buildings. And a preliminary investigation on circular, service and sharing concepts. In addition, a number of interviews might be conducted to complement the acquired knowledge in order to construct a solid theory.

*Architectural research* – This will be based on various case studies, precedents and plan analysis of a series of projects and initiatives divided into three categories; theoretical, circular, and spatial references. Ultimately, a comprehensive study and analysis of the project location will be carried out to understand the current urban conditions and to propose a program of requirements. These studies will serve as the starting point to move on to the design phase.

**Design phase:**
Qualitative research will continue in the second phase of the study, but it will primarily be based on research by design.

*Research by design* – This essentially means "learning by doing." The acquired knowledge in the first phase will be used to conduct various experiments. Sketches, drawings, 3d models and sketch models will serve as a medium to arrive at design decisions.
**Literature and general practical preference**

### History of Rotterdam:


### Hybrid and mixed-use buildings:


Circularity, Service, Sharing and Climate change:


Reflection

**Studio topic:**
The studio deals with the topic “City of the Future”. This can be understood as a rather vague and broad concept. Thinking about future cities reveals various relevant aspects that are essential to investigate. There are, however, a number of urgent matters that require solutions right away, such as globalization, climate change, circularity and the livability of our future cities.

This studio is a future oriented development study that aims to investigate a variety of critical subjects within a multi-disciplinary setting, by transcending classic area development solutions in order to explore new ways of thinking about the city.

**Graduation topic and relevance:**
Today, cities have become increasingly complex structures. Urbanization, densification, mobility, sustainability and circularity are all becoming an integral part of our thinking process and a significant confrontation in our daily life. Coping with the ever-increasing population and preventing further consequences of climate change not only requires buildings that are designed differently, but that also function differently.

Currently, it is common for circularity to be approached and measured through the design of buildings. Assessing the amount of reusable/recycled materials that have been used, or the degree of disassembly and remountability of the materials. In other words, does the building use materials with a second life, or does it respect its materials in order to provide a second life. The flaw of circularity is that it is usually measured as an individual performance or achievement. However, the ambition to become a fully circular city is unrealistic if circularity is limited by individual accomplishments. There is a need for interventions that activate and stimulate circular behavior in different areas, by facilitating interaction with other initiatives and processes in the vicinity.

Public space could be an incentive in boosting circular behavior through enhanced reachability and connectivity. Linking the context with the neighborhood could instigate circular behavior in a proactive way. Rather than integrating a circular building into a specific area, the building can be designed to activate and to stimulate
circularity in that area. Therefore, this graduation project attempts to explore a way to create an interactive link between circularity and public space in order to stimulate the process of exchanging resources to reduce waste.

Creating a circular hub that facilitates interaction with other circular initiatives in the city also widens the scope of their operation. This (envisioned) intervention could become a milestone towards a more resource responsible and circular city. Ultimately, a multitude of this ‘prototype’ could become an exemplary typology in future cities that establish themselves as circular catalysts in different neighborhoods to activate and facilitate circular interactions.

**Time planning**

All credits (60 ECTS+) of MSc. 1 and MSc. 2 have been fully obtained.

Refer to appendix A for the time planning.
Appendix A - Time planning

research phase.

- study BNA location
- preparation venice workshop
- study trip venice 19/09-22/09
- development area of interest
- define thesis topic and research question

prepare: p0.5 presentation

research phase 1.

- develop thesis topic and research question:
  - problem
  - vision
  - ambition
  - method
  - relevance
- define project location
- draft graduation plan
- draft position paper ±1500 words

prepare: p1 presentation

research phase 2.

- finalize position paper max. 4000 words
  hand in: 07/01/19
- finalize graduation plan
  hand in: 1 week before 22/01/19 (p2)
- project research:
  - project location
  - hybrids and mixed-use case studies
  - circular, service, sharing - interviews
  - draft program of requirements
  - draft masterplan
  - draft plans, sections, elevations 1:500 / 1:200

prepare: p2 presentation

concept & design.

- draft reflection
- proceed research
- concept:
  - site analysis
  - program configuration
  - form studies/massing
  - strategy/organization for exchanging resources
- design:
  - material development
  - climate design
  - structure design
  - sketch model(s)
  - plans, façades, cross-cuts 1:200 / 1:100
  - façade fragment 1:20
  - set up details 1:10

prepare: p3 presentation

materialization.

- final reflection
- design (refinement):
  - material development
  - climate design
  - structure design
  - site drawing 1:5000 / 1:1000
  - plans, façades, cross-cuts 1:200 / 1:100
  - façade fragment 1:20
  - details 1:10 / 1:5
- visualizations

prepare: p4 presentation

final design.

- final reflection
- design (finalization):
  - material development
  - climate design
  - structure design
  - site drawing 1:5000 / 1:1000
  - plans, façades, cross-cuts 1:200 / 1:100
  - façade fragment 1:20
  - details 1:10 / 1:5
  - final visualizations
  - research booklet(s)
  - final architectural model

prepare: p5 presentation

research development.

Design studio:
- thematic research
- site analysis
- situational research
Research studio:
- thematic research
- draft analysis
- situational research

p1 - progress review
Design / Research studio:
- graduation plan
- urban draft / master plan 1:1000 / 1:500
- programme of requirements
- draft design (plans, sections, elevations) 1:500 / 1:200

p2 - formal assessment

Design studio:
- thematic research
- site analysis
- situational research

Research studio:
- thematic research
- draft analysis
- situational research

p3 - progress review
Design / Research studio:
- draft reflection
- plans, façades, cross-cuts 1:200 / 1:100
- part of the building, plan and cross-cut 1:50
- façade fragment with hor. and vert. section 1:20
- set up details 1:10 / 1:5

p4 - formal assessment go / no-go
Design / Research studio:
- theoretic and thematic support of research and design
- final reflection on architectonic and social relevance
- site 1:5000 / 1:1000
- plan ground level 1:1500
- plans, elevations, sections 1:200 / 1:100
- part of the building, plan and drawings 1:50
- façade fragment with hor. and vert. section 1:20
- details 1:5

p5 - public final presentation

Design / Research studio:
- theoretic and thematic support of research and design
- final reflection on architectonic and social relevance
- site 1:5000 / 1:1000
- plan ground level 1:1500
- plans, elevations, sections 1:200 / 1:100
- part of the building, plan and drawings 1:50
- façade fragment with hor. and vert. section 1:20
- details 1:5

GRADUATION MANUAL