The aim of the Complex Projects “Border” Graduation Studio is to research and design architecture projects in the context of the border region of the United States-Mexico borderline between the twin cities of El Paso-Ciudad Juarez. ‘Border’ here is a physical fence between a developed country and a developing country which shapes spatial differences and the different uses of space under the social and cultural specificities on either side. However, ‘border’ is also an unphysical link which strongly band border twin cities together through the resource sharing and cultural communication. This triggers a series of research and design proposals which aim to seek the possibilities of building a mutually beneficial spatial strategy based on existing diversity and similarities.

My project aims to rethink the preliminary result of research and design through the whole graduation lab (product, process, planning). And it serves to review whether the chosen approach is workable or not, to answer the questions of “how and why”. This graduation reflection is organized in following 4 parts:

1. Relationship between Research and Design
2. Relationship between the theme of graduation studio and subject chosen
3. Relationship between the methodical line of approach for the graduation lab and the method chosen
4. The relationship between the project and the wider social context

1. The relationship between research and design

The research of my graduation thesis composes by two parts: a general background research on the border condition and a specific research which I focus on the Water aspect of the border condition of El Paso and Ciudad Juarez at U.S.-Mexico border. Water environment was selected as theme because the water issue is a main binational problem there, but it is also a breakthrough point to improve border connection between twin cities. The research intension is to analyses what opportunities could be found in order to tackle water resources issue with architecture approach in innovative way on the border.

I’ve come up the research question and design statement after the group and personal analysis. The phenomena related water issue at El Paso/ Ciudad Juarez border is drought (in peacetime) and seasonal flooding. Date analysis shows that the aquifer level is declined due to over-pumping and surface water is excessed without management. Further research and analysis release the essence behind the current water problems: which is lack of sustainable water management and knowledge about the water cycle system. By understanding this, it can be identified what would be the most suitable design solution for the border area. Then is it possible to understand
that solving water related spatial problem could be the backbone to offer further space and education on water in the border area, twin cities could benefit from. Thus, a highly specific design strategy involving innovation in water cycle management and education could be proposed. In my proposal, the preliminary design has three scales:

- City scale: A border river line based water infrastructure chain and network master plan for El Paso and Ciudad Juarez
- Urban scale: An intergraded border river wetland park
- Architectural scale: A Water Centre integrated with water-cycle infrastructure and water-cycle research & education institute.

Reflecting on the relationship between research and design, here are some aspects I’ve been thinking through the project:

A. The situation research and theory research
The border region situation research identified clearly the severity of the water issue/crisis (groundwater declared causes water shortage and surface water excessed causes occasional flooding) which happened at target border region. Further water theory research releases potential theoretic strategy that can be an option for the issue (e.g. Applying ‘Aquifer Storage and Recovery’ system to rebuild sustainable water cycle between surface water, groundwater and city water usage). And then all these research formed a strong base and directly influenced on my late architectural design intervention and architectural typology change. (E.g. conceptually how much water could be stored in aquifer from surface water and which water infrastructure I should choose and integrate in my design.)

B. The multiple scope of design intervention
The multiple scope of design intervention (City scale, urban scale, and architectural scale) are directly defined by thesis research. The urban and architectural propositions in those scales are inter-correlated. From the water theory research, it can be known that the water issue cannot be settled by a single dot, but an integrated system with different scales. Thus the multilayered scope intervention is raised that large scale will visualize a bigger role while small scale would help to support the large one. Mutually effect of urban and architectural design on water would perform at the specific context of US - Mexico border.

The limitations and incomplete parts of the relationship between research and design:
A. Lack of professional knowledge support from other expertise (water management, hydraulic engineering) limits the extent of subject research and design.
The research on the water issues is primarily technique and engineering driven. The lack of profession knowledge and expertise support hind the effectiveness of the research and also subsequently the translation into architectural design. Even after self-learning and consulting related majors, the water related technique part of my graduation project is still a theoretical model. If I want to further prove whether it is workable or not, I need to collaborate with other professionals in the future.
B. The water issue is too ambitious to be tackled
   Even though, research has been translated into three scales design intervention
   (city, urban, architectural), they only offer an integrated framework. Especially for
   City Scale and Urban scale, further multiple directions design involved many other
disciplines, like urban water engineering, urbanism, landscape design, are need
to be added. However, due to time and knowledge limitation, the results of parts
are not well augmented and thought through as the architectural scale.

2. Relationship between the theme of graduation studio and the subject chosen

The theme of ‘Border’ studio is intended to explore the possibilities of the border as a
condition for the design proposal which integrates architectural and urban
intervention. The borderline, which separated El Paso/Ciudad Juarez, is composed of
an international river which was as the main water resource feeding border twin cities
and their citizens. However, the current situation of borderline becomes a non-person
zone with a water empty concrete channel and artificial fences. Taking the border
background into account, I choose the border water environment as thesis subject
and use it as the conducting line for a design focus on water allocation resilience
through binational cooperation. The design thesis (architecture intervention)
envisions a surface-ground water collection and purification system. It also could be
coupled with providing space for further research, educational purpose, public
exhibition/events and water theme park. This design results of the subject chosen
(border water environment) will celebrate the border as a common asset rather than
exacerbating differences and a shared zone enjoyed by citizens of both nations, rather
than a physical barrier.

Reflecting on the relationship between the theme of graduation lab and subject
chosen. I consider the following points to be the successful:
A. The subject (water environment) is chosen directly relates to the theme of the
   graduation lab (border), since my topic is directly relates to the specific border
context. Besides, the intervention of dealing with water environment gives
multiple design opportunities to conceptualize a new form of border condition, it
would turn the border region into a more lively space.

B. The theme of graduation also affects the research of the subject. ‘Border’
generally means differences and imbalance on both sides. This led to a more
specific phase of investigation looking at the cultural differences in regard to how
water is extracted and used on both sides, Also what social values are attached to
water culture on either side. Analysis of these aspects has been a fundamental
pillar in understanding how water use in a contrasting cultural background realities
are facing the same critical issue of a sustained water scarcity over the last decade.
The approach within the graduation lab of political division crossing common
necessities has driven a deeper research on the possibility to operate on water
concerns across the border, also guiding a straightforward and innovative design
solution for water management and education across border regions.
3. Relationship between the methodical line of approach for the graduation lab and the method chosen

On the term of the methodology, the graduation lab has two phases, group research and individual research. Group research focuses on the general background information collection of U.S.-Mexico Border and twin cities El Paso/Ciudad Juarez. The result of group work gave an overview of the border condition. Then, at the individual phase, it expected that each student chooses the research topic based on their own interest. The main method at this phase is the multiplicity of scope research-driven design method, which encouraged me to work collectively to prepare an urban scale master plan, it also relates the architectural thesis to the larger context of the border in the city, connecting microscopic and macroscopic.

I choose to follow the methodical line of the graduation studio. Working with other ‘water issues research’ partners like Ronald L.K. Kam, Pieter van hall and James Moya Jessop to address the city scale strategies to deal with the water issues, as well as to identify the strategic areas in which urban and architectural intervention could occur.

Reflecting on the relationship between the theme of graduation lab and subject chosen, I’ve considered the following key aspects on the topic:

A. As water issues cannot be dealt with in one single scale, but rather in multiple scales as an integrated system, the choice carrying out the thesis design in three scales give a comprehensive view of the issue to be tackled, and giving the graduation thesis much more relevance to the bigger contexts

4. The relationship between the project and the wider social context

My graduation design project relates to a wider social context specifically at every scale. At the urban master plan scale, the border international water treatment chain will be built along the border channel and a twin-cities water sharing network will be established in future. The whole city water network master plan aims to reallocate water resource and collect excess surface water with a more efficient management, trying to avoid the contemporary recurrent hindering of nearby regions and ecosystems with inappropriate and obsolete infrastructural projects. On the urban scale, a natural wetland river shores park will be planned to re-evaluate the current dysfunctional border channel condition. On one hand, it will serve as a natural water reservoir and surface water purification system. It will collect storm water and retrained water from the urban area and to purify water by natural wetland condition (e.g. hydrophilous plants, animals and microbe). On another hand, wetland Shores Park would become a new kind of public space for citizens from both US and Mexico to enjoy. On the architectural scale, it serves to establish an International Water Centre that would become a binational landmark that draw attention to water issues through physical space experienced by curiosity-driven people from both countries.

Reflecting on the relationship between the project and the wider social context, here
are some key points I’ve concerned:

A. The Urban scale wetland shore park relates to the neighborhood directly and transforms the peripheral, inaccessible condition of the border zone into a central condition. It will be enjoyable for citizens from both America and Mexico, helping current detached societies re-contact with the water natural border.

B. The architectural scale intervention, a water cycle and research center, is designed to become a landmark and water-tech paradigm project in-between the border water of both US and Mexico. It serves to engage to public actively with the waterscapes and the water exhibition /education that would draw public attention on the water issue. The accessibility and architectural qualities of architecture intervention will express for renewed sociocultural interest in water sustainable development.

The limitations and incomplete parts of the relationship between the project and the wider social context

This graduation design project is a very hypothetical and complex thesis, since it tried to integrate multilayer of topics ranging from water infrastructures/management/environment to society, cultural and border policy. It is so ambitions that unclear joints between multilayers are inevitable. In addition, because the proposed project involves many political parties and it directly challenges the current system of border governance and jurisdiction, that makes it even more difficult to execute the project in reality so it is difficult to judge whether it will work well or not at the border region.