Wine Fissure is my proposal for the final Core Semester, a comprehensive architectural studio that poses a site-specific question, an industrial program, a housing component and seeks for a resolution that takes into account the building’s structural, energy, and envelope systems.

The building narrative begins with the side and program. It is a winery in the drought-stricken region of the Valle de Guadalupe, in Baja California. Intense diurnal swings make temperature management very important as well. The main idea for the project was to emulate the mechanisms of thermal mass that control ecosystems growing in the huge boulders of the valley. The cracks between the rocks offered spaces with controlled temperatures, focalized ventilation, and interesting lighting conditions, hence the idea of a “fissure”. This main space would become the barrel room, where the wine ages while hung from the walls. The building’s orientation helps in protecting the barrels in the fissure from sunlight, but also triggers the design of a high-performance brick facade that shields the housing component from the western light, hence helping reduce the energy consumption, while opening up to south views and light. The brick facade will also contrast the open, modular, industrial spaces in which wine, workers, and visitors collide.

In the development of the project, the fissure gains more significance as it becomes an important structural component. Parametric and optimization software guided the form-finding of this highly performative fissure in the landscape.

The images and materiality of the rocks on site led to the concept of the Fissure for safekeeping of the wine.

The orientation and position of the building on site respond to the topography, and the path of the sun throughout the year. The angles and overhangs of the Fissure protect the barrel room from direct light and create a wind tunnel effect to manage temperatures. The envelope protects the building from western light, and opens up the views to the south.
Underground access to barrel room.

Grape and visitor intake through facade pleats. Catwalks bridge the fissure.

The hotel component follows the industrial structure, and the skin takes on a domestic function.
Section through main components of production and lodging.

Barrel Room
**Energy Considerations**

1. Wall inclinations to protect wine from direct sunlight year-round.
2. Thermal mass.
3. Ventilating facade and wind tunnel on barrel room.
4. Radiating Slabs for better energy usage.
5. Porous facade shields building from western light year-long.

**Main Structure**

1. Independent structural gravity systems per building that hold the floor slabs and corrugated metal floors;
2. Corrugated reinforced concrete walls acting as the lateral load system and complimenting the gravity system;
3. Spread footings transfer load from columns to soil, and strip footing transfer the load from the walls and wine barrels.

**Corrugated Wall Optimization**

This process involved parametric scripts and STORM CLOUD, an optimization software developed in the department of Building Technologies, to carry out efficient form-finding that rendered self-supporting walls that doubled as the lateral load system.
Concrete Brick Wall Mock-Up

Hung Brick Facade Responding to Changing Sun Angles

Structural Details of Facade

Description of Facade Brick Angles that Intercept Western Light Through the Year
The initial analysis for this project is based on water: its flow, absence and extreme abundance. This interest was heightened after visiting the site in Tenjo, Cundinamarca and witnessing in a broader sense how unplanned, misguided development damages the flows of water in the Sabana de Bogotá, and how wetlands and rivers are vital in the cycle of water management.

This project takes development in the coming years as a given, at the heart of which needs to exist a desire to preserve the water bodies so they can coexist with new human settlements and agro-pasture activity. In order to channel this goal, Portal de Tenjo introduces connectivity infrastructure, a translating agent, that will carry diverse programs, promote clusters of guided urban development, and act as a boundary for this development as well.

This project emerges in a site of urbanistic interest, located at the boundary of Tenjo and Bogotá, where the first encounter with the valley occurs, hence the name Portal. Geologically speaking, it is where the Río Chicú meets the Río Bogotá.

The site has many intersecting elements: the natural reserve on the mountain, Río Chicú and Río Bogotá, industrial and residential developments, and major highways. So the first phase of the project consists in tracing the ideal path of the translator band from an existing TransMilenio bus station in Bogotá all the way to Tenjo, but using it to define an area to preserve along the river that eventually becomes a park.

The introduction of a park is supported from the ecological point of view, and from an urbanistic point of view. Bogotá’s current population, without taking into account its neighboring towns and booming predictions, is eight times that of Manhattan, while its mayor urban park equals a third of Central Park.

The second phase of the project focuses on making this park economically viable and usable, by introducing medium density urban development of which the translator and its multiplicity of programs become a key factor.

Finally, the project becomes investment on the issue of limits or boundaries between contrasting programs or morphologies, and proposes several typical conditions to effectively mediate and translate.
The top diagram uses GIS data on water bodies. Water embodies the conflictive identity of the Sabana. It is the reason to being of the City of Bogotá, and the fuel of the agro-pasture economy of the region. But a closer look reveals that the actual amount of water bodies and water flow has diminished, hence the valley faces contrasting moments of drought and devastating floods.

The diagram overlays urban growth from the city’s colonial origin to present (the most recently incorporated territories shown in red) and flood zones (light blue). Naturally, more recent developments have taken over wetlands and flood zones, for socio-economic reasons, and are the most affected areas during floods.

This master plan places the project in the hinge between Tenjo and Bogotá, emphasizing connectivity between urban development nodes, LRMT following existing infrastructure, and recognition/preservation of important natural systems.
Having five times the population of Manhattan, Bogota is in need for an urban park. This is even more justifiable with the predicted population boom. The proposed park will double to raise awareness of the importance of the water systems in the region, and provide an asset for social development and real estate.