

Elia Zenghelis, *Masterplan for the Sacred Valley of St Gerasimos, Greece*, 1984.

Lecturer

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Info

Programme Architecture Master 1 and 3
Language English
Credits 4
Semester Fall
Hours 5h weekly × 12 weeks
Schedule Fridays 13-18h
Moodle <https://go.epfl.ch/AR-476>
Blog <https://ueucartography.com>

Summary

Teaching unit on mapping environmental relations in architecture.

Sessions

1. Cartography and Modern Abstraction
2. Drawing: Visual Layers
3. Planning: Spatial Figures
4. Mapping: Social Formations
5. The Dialectical Method
6. GIS Workshop
7. *Midterm Reviews*
8. Environmental Thresholds
9. Territorial Conduits
10. Domestic Enclosures
11. Wilderness Frontiers
12. *Final Reviews*

Content

Maps are visual tools for thinking about the world at many scales. They shape scientific hypotheses, organize political and military power, delineate private property, and reflect mental conceptions about landscapes and nonhuman nature. In the Western tradition, medieval maps were less territorial descriptions than conceptual cosmologies, occasionally depicting biblical stories, mythology, history, flora, fauna, and exotic peoples and species.¹ With the advent of modernity, an important shift took place. Cartesian perspectives began to trace the world in relation to a fixed human subject, while mathematical God's eye views surveyed the land from an abstract elevated "nowhere." Accurate maps—stripped of all elements of fantasy, religious belief, and authorship—became essential tools for modern scholars and states who sought rational progress through scientific prediction, social engineering, and planning.² Cartography became concerned with analyzing and measuring the *res extensa*, and the land survey emerged as a crucial instrument of capitalist development.

As Neil Smith explained, capitalism required the invention of "space as emptiness, as a universal receptacle in which objects exist and events occur, as a frame of reference, a coordinate system [...] within which all reality exists."³ But the flip side of treating the environment as an abstract container is treating architecture as an abstract object, disembedded, consumed, and aestheticized for its own sake. From this radical separation, maps become quantitative systems for managing phenomena, while buildings become circulating commodities for the valorization of land rent. In today's context of ecological crisis, this separation is visibly contradictory. The environment is not a backdrop or a container of natural resources, just as architecture is not a collection of objects floating in a vacuum.⁴ Buildings and landscapes constitute each other dialectically, regardless of whether their relationship is collaborative

or antagonistic, and cartography can render this dynamic concrete.

This teaching unit proposes a cartographic method for embedding architecture in its environment. By mapping buildings in their space and time, we reveal the invisible backgrounds that make up their material conditions of possibility. The aesthetic choices conveyed in the so-called “object” thus appear no longer disinterested, but complex, as a rich totality of environmental relations. Throughout the course students should keep in mind the following questions: how should architecture reflect society’s relation to the environment; how should it constitute a critique of said relation; and how should it predict a collective ideal?

1. The term “cartography” was coined at the beginning of the nineteenth century, based on the Latin *charta*, meaning “paper” or “map,” and *-graphia*, meaning “description,” which derives from *graphein*, meaning “to write” or “to draw.” It is an umbrella concept derived from older terms such as geography, chorography, and topography, respectively meaning the description of *geo* or “earth,” *khōra* or “region,” and *topos* or “place.”
2. See, for example, Marcelo Escolar, “Exploration, Cartography and Modernization of State Power,” in *State/Space: A Reader*, ed. Neil Brenner et al. (Malden, MA and Oxford, UK: Blackwell, 2003), 29–52.
3. Neil Smith, *Uneven Development: Nature, Capital and the Production of Space* (London and New York: Verso, 2010), 95.
4. “Perhaps nothing is more irrelevant to architecture than the notion that it is the realization of a design *qua* idea. Far more dominant factors are the dialogue with and persuasion of the client and the collaboration with other staff members. The design as initially conceived is destined to be transformed during the course of its execution. [...] No architect can predict the results of construction. No architecture exists out of context. Architecture is an event *par excellence*.” Kojin Karatani, *Architecture as Metaphor: Language, Number, Money* (Cambridge, MA: MIT Press, 1995), 126.

Method

The course takes a skeptical stance toward traditional claims of “cartographic truth” by addressing the map’s internal tension between sensuous perspective and rational plan. The method blends tools from art (hand drawing), planning (remote sensing), and history (dialectical criticism). Hand drawing guides the initial process of abstraction and layering; planning offers a set of spatial figures as metaphors for the urban palimpsest; and a dialectical approach to historical development reveals hidden relationships between form and context. In this way, cartography reconciles the immanent (object) and the contingent (environment), allowing us to measure how certain buildings function as devices of environmental mediation.

Theoretical content is provided through weekly lectures, and practical assignments are supported by weekly desk critiques and group reviews. Classes include close reading of historical maps, and the analysis of texts and films on cartography, landscape, and environmental politics. Special emphasis is placed on hand drawing, AI, CAD, and GIS, but no previous experience is required.

Assessment

Continuous assessment:

- Intermediate exercises and class participation: 25%.
- Midterm review: 25%
- Final review: 50%.

All classes will be held in English, reviews and table meetings may be held in French.

Learning Outcomes

Preparation for design and research studios that reflect on cross-scale relationships and the environmental backgrounds of architectural form. Provides a methodological basis for the *Enoncé théorique de master* and the *Project Urbain* orientation. Content is closely related to the theory course *Modernity, Architecture and the Environment*, which teaches a more historical and literature-based version of the same question and method.

General Bibliography

- AURELI, Pier Vittorio. “Life, Abstracted: Notes on the Floor Plan.” *e-flux Architecture*, October, 2017. Available at <https://www.e-flux.com/architecture/representation/159199/life-abstracted-notes-on-the-floor-plan>.
- COSTA, Bárbara Maçães. “Conduit, Patio, Waste Mapping Environmental Relations in Bairro da Malagueira.” PhD diss. École polytechnique fédérale de Lausanne, 2021.
- HARVEY, David. “The Experience of Space and Time.” In *The Condition of Postmodernity*. Cambridge, 201–326. MA: Blackwell, 1990.



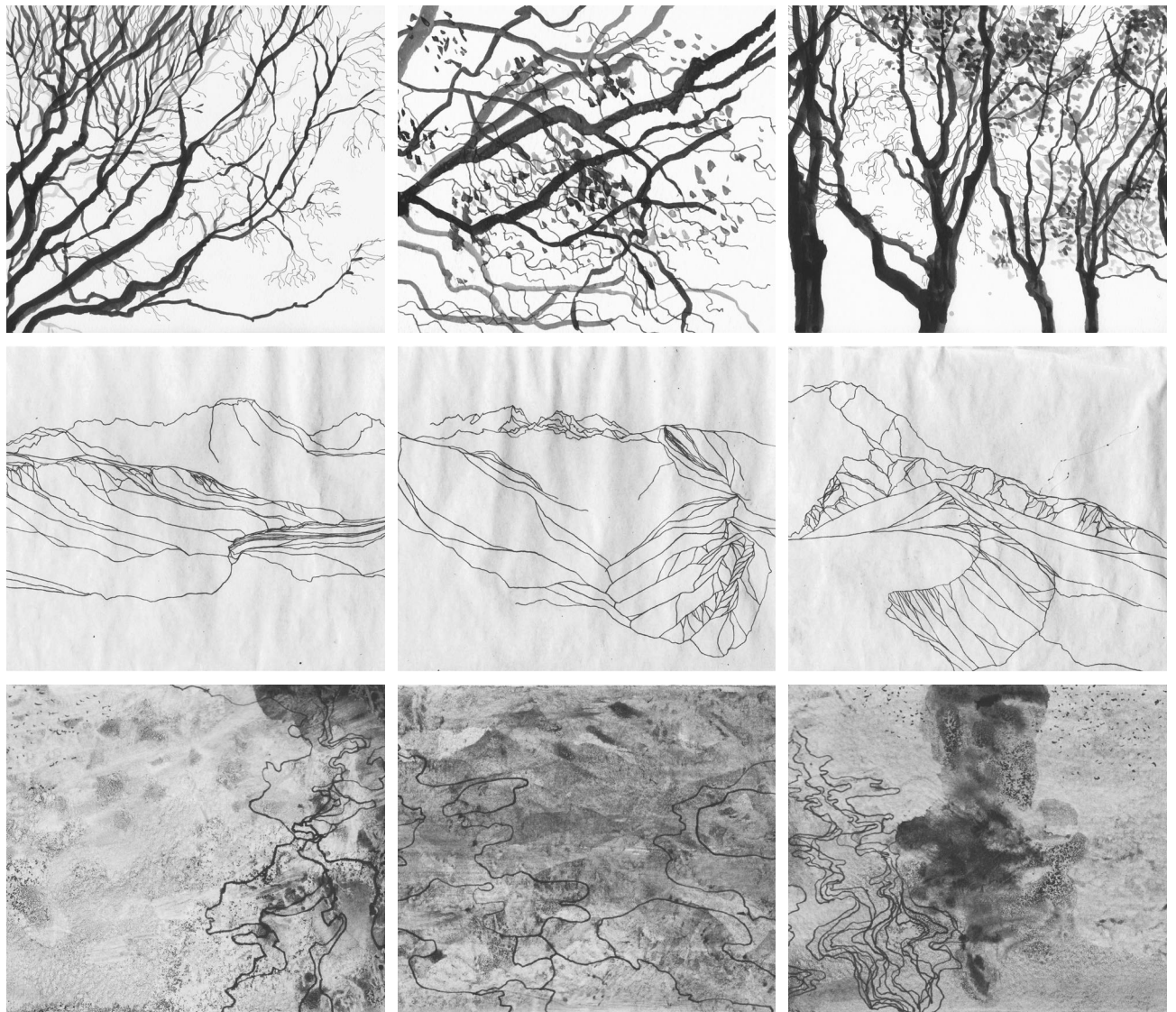
Top: Bedolina Map; Tabula Peutingeriana; Pietro del Massaio, Map of Rome after Ptolemy.
 Middle: Rosselli's View of Florence; Portuguese Portolan map; Mercator map
 Bottom: Survey of Philadelphia; Dymaxion map; Satellite photograph of Berlin.

1. Cartography and Modern Abstraction

Lecture: The rise of modern territorial abstraction and the transition from cartographic “description” (*-graphie*) to the more quantitative nature of the land survey. Premodern maps and the sensuous experience of local space-time vs. modern synoptic vision: the survey’s goal to annihilate space and time. Land enclosure, “improvement,” and ecological imperialism. Capital trying to free itself of its material barriers. Naturalization vs. historicization.

Activities: Introduction to class goals, presentation of list of projects to map, screening of *David Hockney: A Bigger Picture* (2009).

- AURELI, Pier Vittorio. “Appropriation, Subdivision, Abstraction: A Political History of the Urban Grid.” *Log* 44 (Fall 2018): 139–167.
- BLOMLEY, Nicholas. “Law, Property, and the Geography of Violence: The Frontier, the Survey, and the Grid.” *Annals of the Association of American Geographers* 93, no. 1 (March 2003): 121–141.
- ESCOLAR, Marcelo. “Exploration, Cartography and Modernization of State Power.” In *State/Space: A Reader*, edited by Neil Brenner et al., 29–52. Malden, MA and Oxford, UK: Blackwell, 2003.



Drawings from Bárbara Mações Costa, Master thesis FBAUL, 2016.

Graphic Layers:

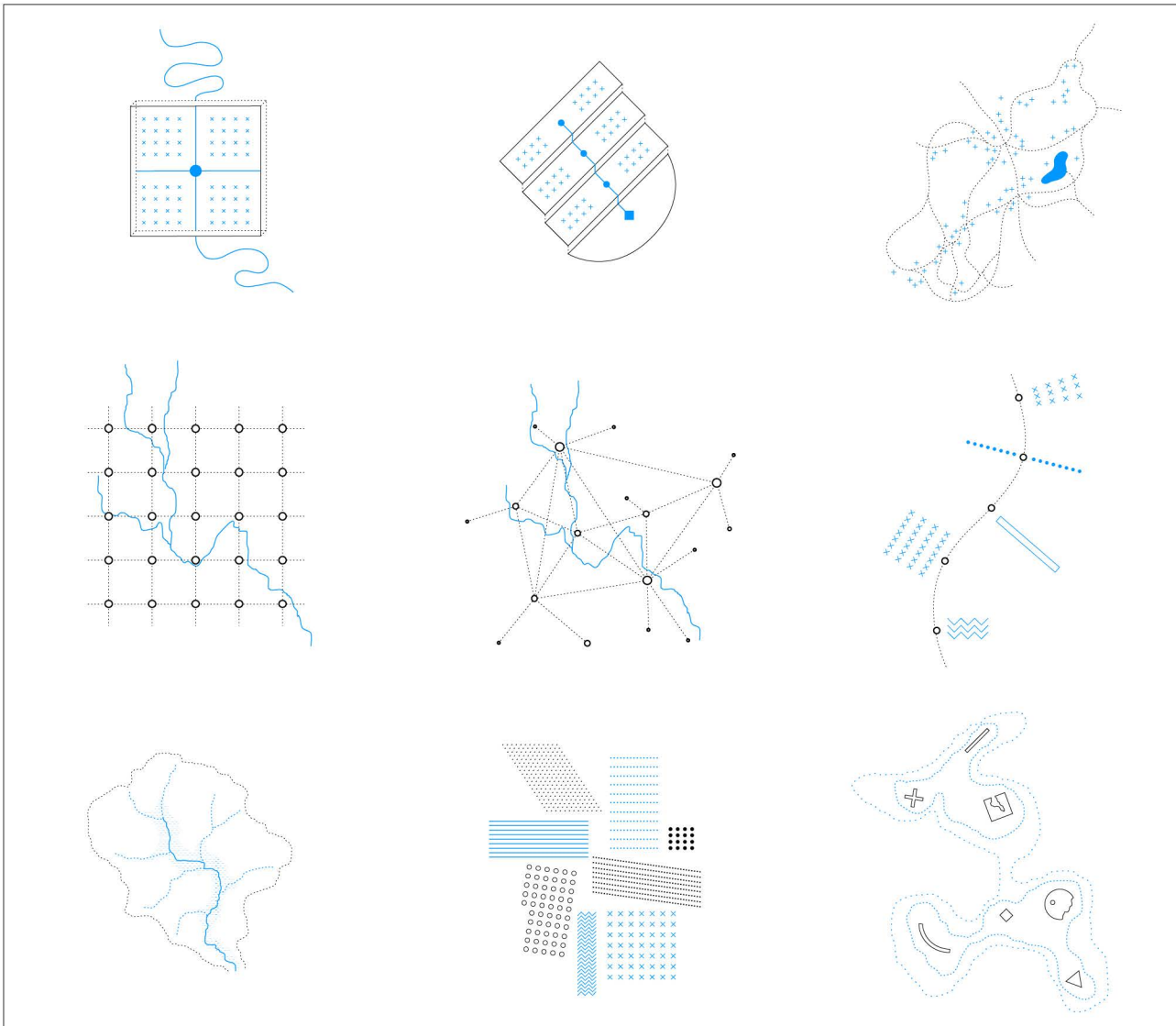
Lines, dots, textures, colours.

2. Drawing: Visual Layers

Lecture: Introduction to drawing's basic challenges: hierarchy of weights, relational composition between elements, the presence and shape of voids, the problem of stereotypes, the unconscious tendency for symmetry, fear of complexity, etc. Introduction to hand drawing materials, wet and dry. Patterns of graphic codes: lines, dots, textures, colours.

Activities: Exercise I – Drawing: quick hand drawing exercises from projected photographs of landscapes, with the goal of extracting and overlaying graphic layers. Possible live drawing at the Geneva Botanical Gardens.

- COSTA, Bárbara Mações. “Desenho de paisagem: investigações sobre representação espacial.” Master diss. Faculdade de Belas-Artes da Universidade de Lisboa, 2016.
- WOLLHEIM, Bruno, director. *David Hockney: A Bigger Picture*. Coluga Pictures, 2009. 1 hr., 1 min.



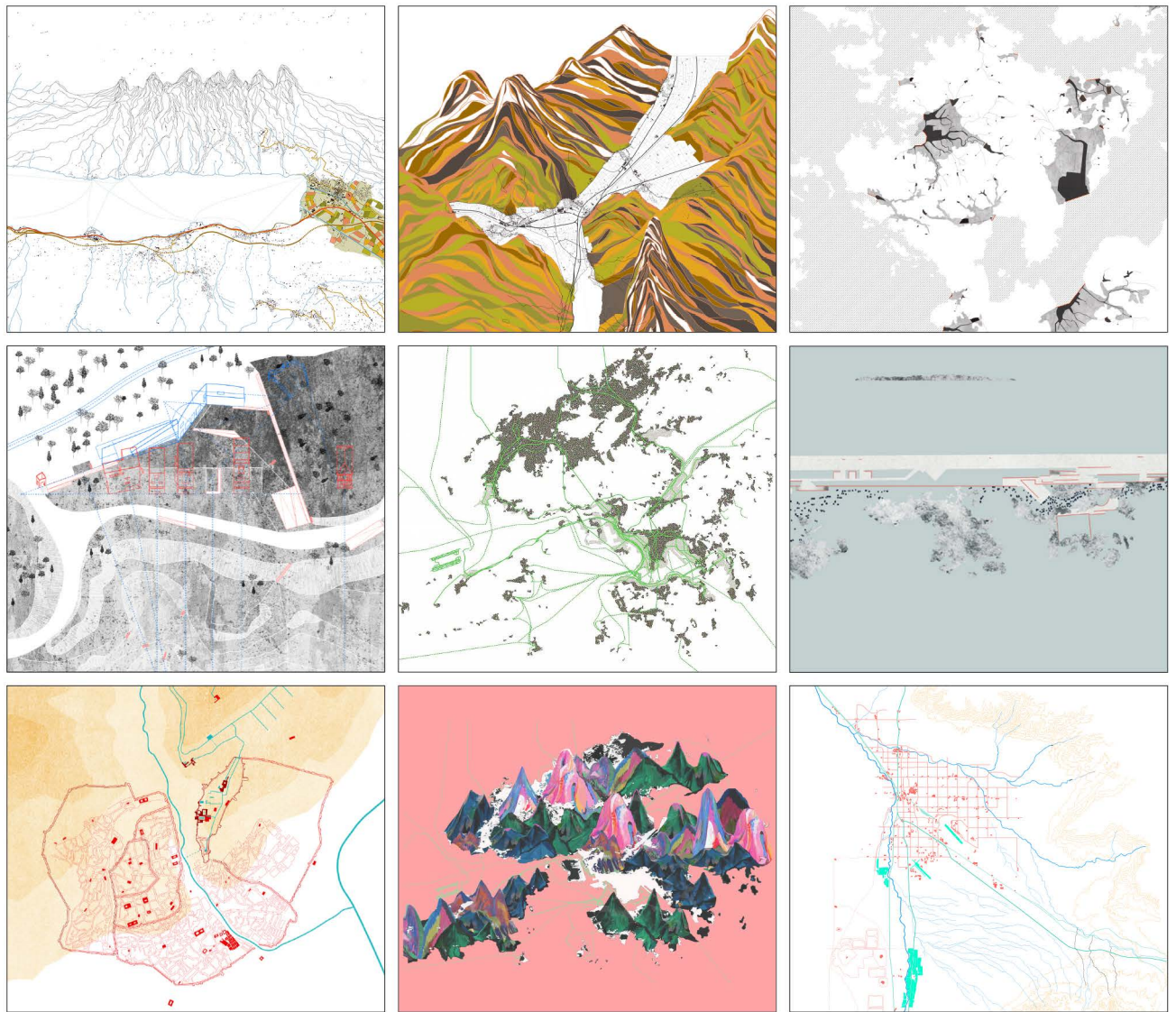
Spatial Systems:
Cloister, Garden, Park.
Grid, Network, Line.
Watershed, Patchwork, Archipelago.

3. Planning: Spatial Figures

Lecture: Decoding the land as palimpsest. Rendering graphic layers more concrete by organizing them into typologies of landscape systems. These systems are nevertheless abstract rationalizations, diagrams to be used as figures of speech in our developing understanding of the environment.

Activities: Exercise II – Tracing: mixed hand and computer drawing exercise from satellite photograph, with the goal of extracting and overlaying graphic layers that now have a more concrete spatial meaning.

- BACON, Edmund N., *Design of Cities*. London: Thames and Hudson, 1982 [1967].
- CORBOZ, André. "The Land as Palimpsest." *Diogenes* 31:121 (1983): 12–34.



Studentwork: Mapping exercise, EPFL UE U, 2015-21.

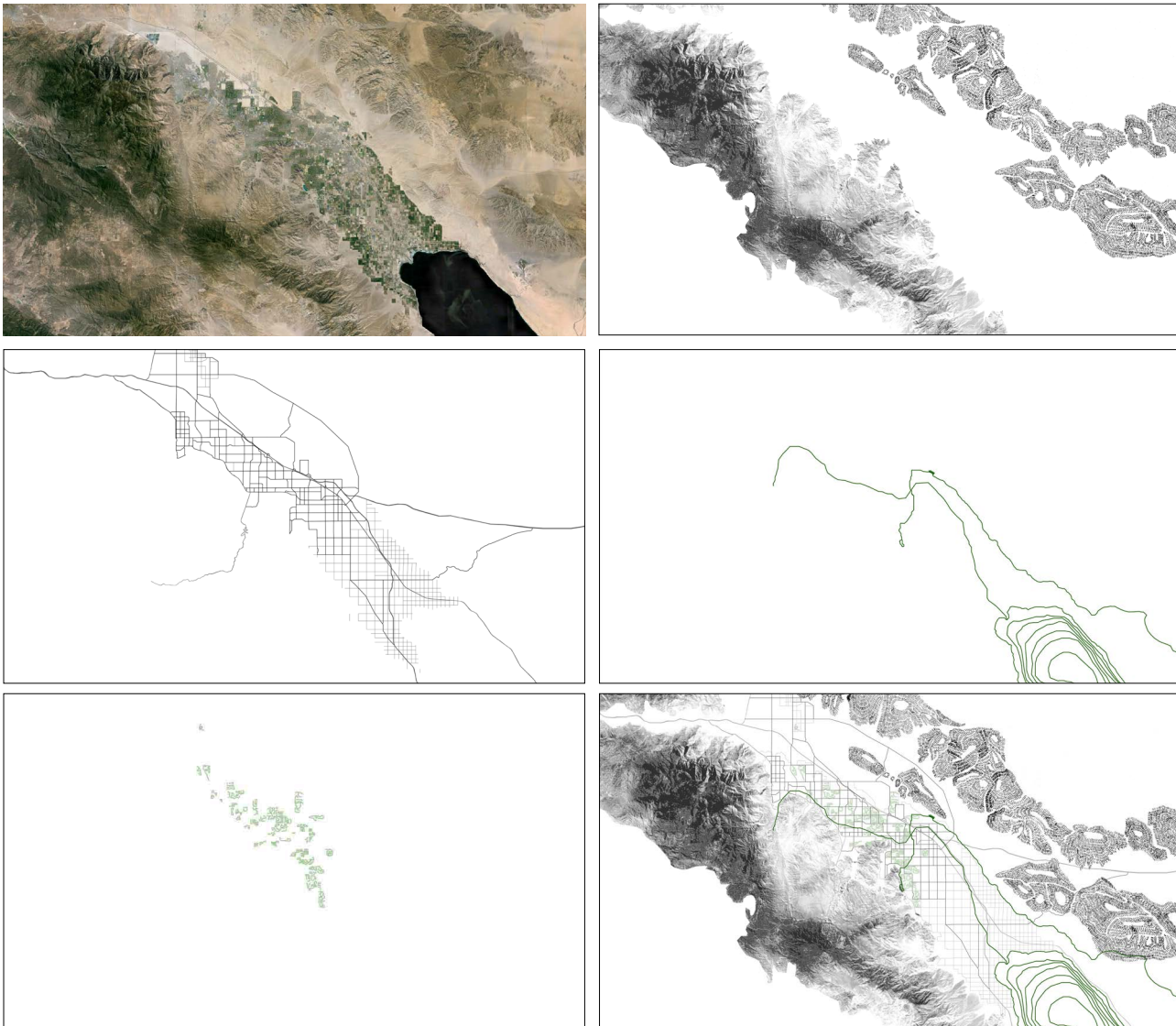
5. Mapping: Social Formations

Lecture: A totality of environmental relations:

- 1) Nature: geography, ecosystems, climate, raw materials.
- 2) Technology: infrastructure, land management and construction techniques.
- 3) Production: economic practices, labour and property relations.
- 4) Reproduction: divisions of labour, social hierarchies, institutions, rituals.
- 5) Aesthetics: ideology, beliefs, culture, politics.

Activities: Exercise III – Mapping: pick team and project, begin historical research (collecting historical maps and essays on the urban development of the chosen place).

- COSGROVE, Denis E., *Social Formation and Symbolic Landscape*. Madison, Wisconsin: University of Wisconsin Press, 1984.
- HARVEY, David. "An Important Footnote." In *A Companion to Marx's Capital: The Complete Edition*, 191–203. London and New York: Verso, 2018 [2010].



Map by Gilda Gysin, *Coachella Valley, California*, EPFL UE U 2015.
 Aerial view, or frame. Topography.
 Infrastructure. Hydrography.
 Vegetation. Total map.

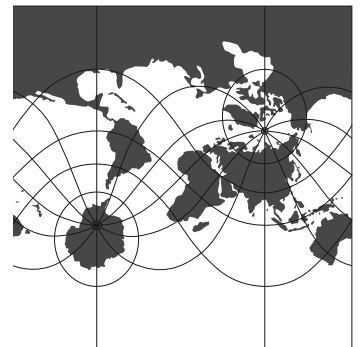
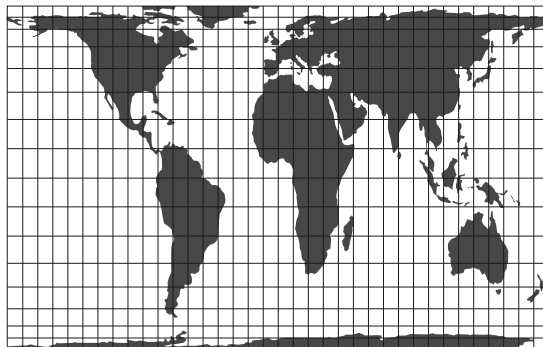
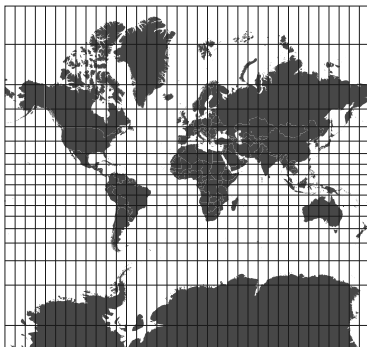
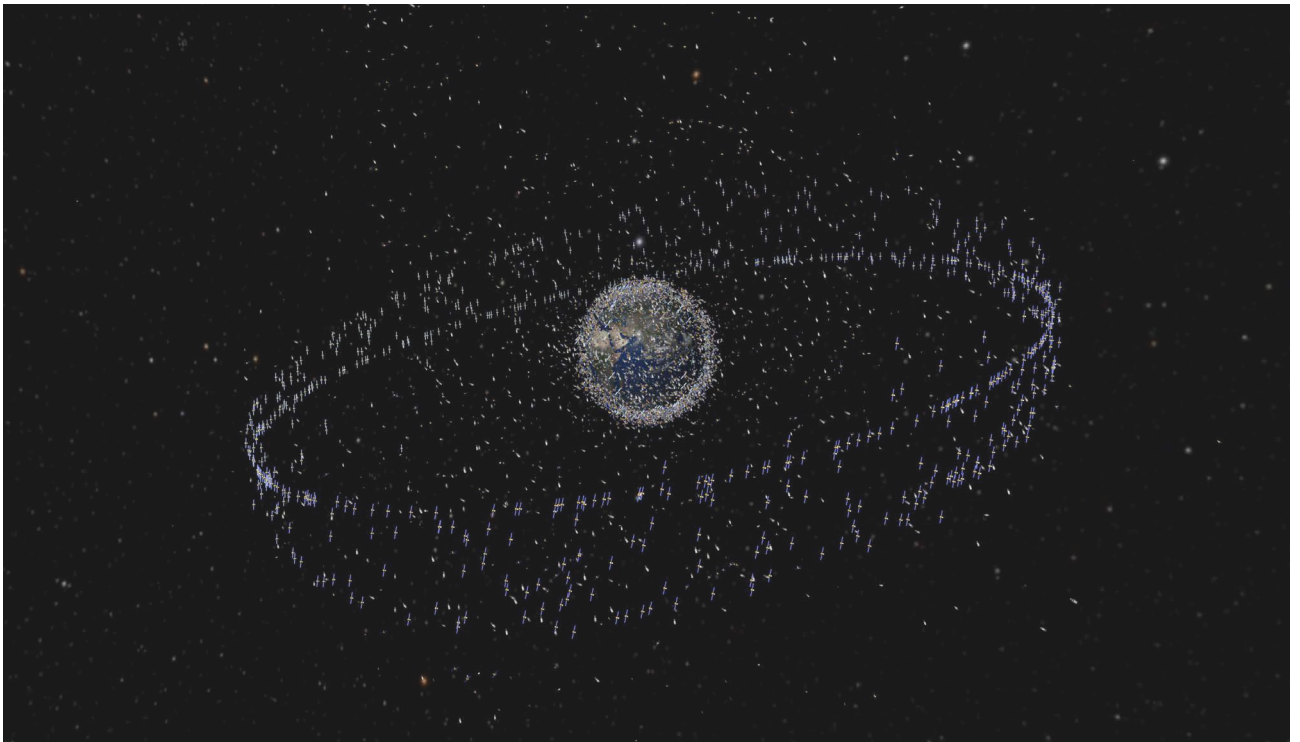
4. The Dialectical Method

Lecture: A four-fold process:

- 1) Identify and frame site,
- 2) Extract layers separately with individual graphic identities,
- 3) Combine graphic layers to form spatial systems,
- 4) Contextualize building as an environmental totality, i.e., a relational loop of nature + technology + production + reproduction + aesthetics.

Activities: table reviews.

- HARVEY, David. "Dialectics." In *Justice, Nature and the Geography of Difference*, 46–68. Malden, MA and Oxford, UK: Blackwell, 1996.
- WILLIAMS, Raymond, *The Country and the City*. Oxford and New York: Oxford University Press, 1973.



Top: European Space Agency, map of all trackable satellites and space debris orbiting Earth, 2008.

Bottom: Comparative diagrams of Mercator projection, Gall-Peters projection, and Oblique Mercator projection with curved rhumb lines.

6. GIS Workshop with Aurèle Pulfer (ALICE)

Lecture: In coordination with EPFL ALICE. The GIS data processing cycle: abstraction, acquisition, archiving, analysis, display, anticipation. Paralels with the ‘analogue’ work mode. How to think with GIS: possibilities, misconceptions, biases, and correct use. Beginner user guide and direction towards open data sources.

Activities: GIS exercise and table reviews.

7. Midterm Reviews

Deliverables

- Drawing exercises: to show during pin up.
- Tracing exercise: print and pin up for review, include original photo at same scale.
- Mapping exercise: aerial photo and map, print and pin up side-by-side on the same scale and same frame.
- Architectural object: extra drawings, historical maps, and photos.

Presentation (5–7minutes)

1. *Object*: what is it, where is it, when was it built, who is the architect (use photos).
2. *Frame*: what you take to be part of your object's environment (use aerial photo).
3. *Layers*: what cartographic layers you extract from aerial view, how you represent them, how you combine them (use map and extra layers if needed, use historical maps).
4. *System*: how your layers combine to make territorial systems.
5. *Totality*: what that building does environmentally, how it interacts with the territorial systems and how it becomes an agent of spatial contradictions. Explain relational loop of: nature + technology + production + reproduction + aesthetics. At this moment this last point is only a sketch.



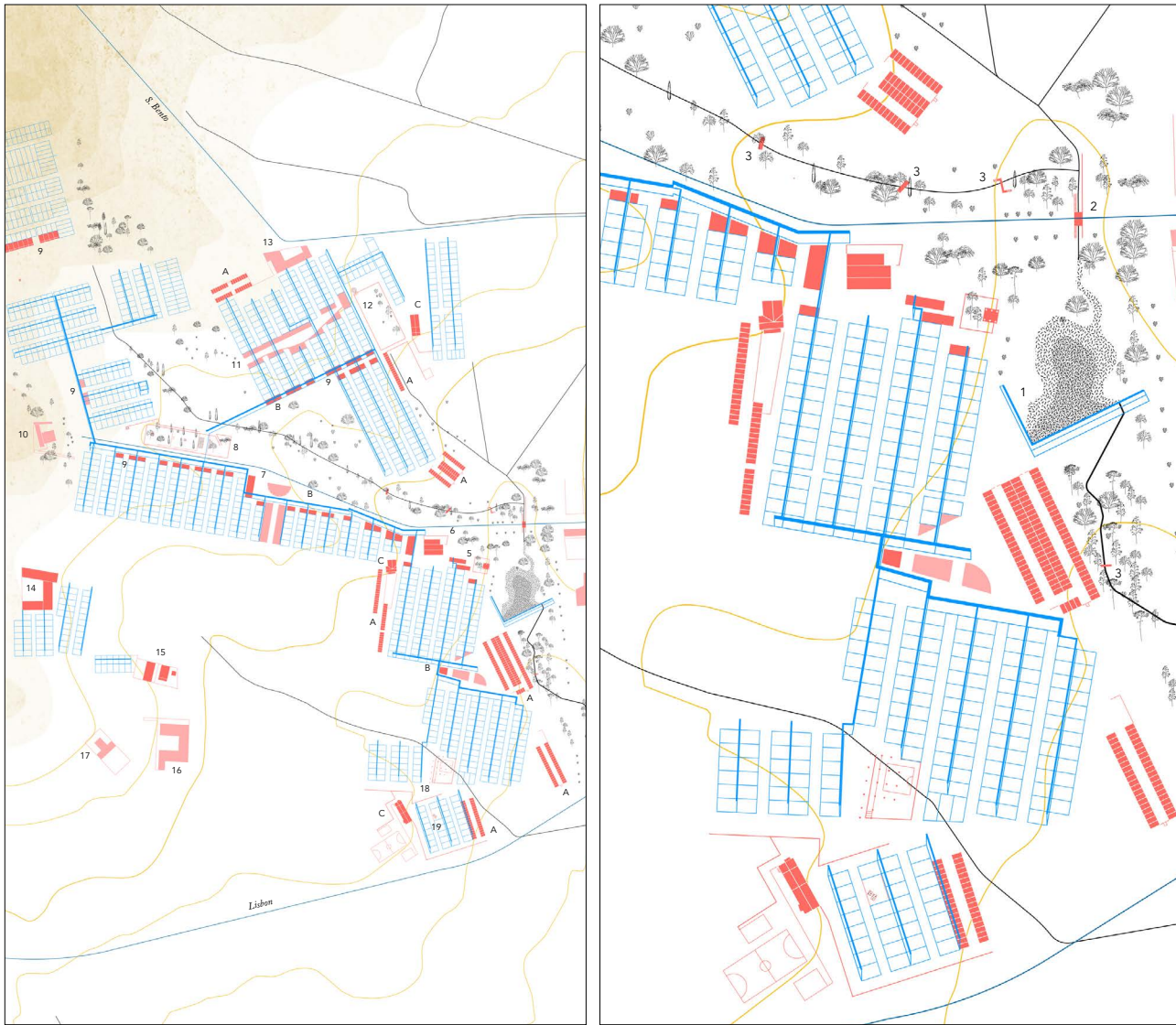
OMA (Rem Koolhaas and Zoe Zenghelis), *The City of the Captive Globe*, New York, 1972.

8. Environmental Thresholds

Lecture: The Backgrounds of Objects. The fetish of the object and its secret: the building-commodity circulating abstractly in the market. The politics of environmental crisis: habitation vs. improvement. The Anthropocene vs. Capitalocene debate. Dialectics vs. atomism. Subject-object, foreground-background, architecture-nature. Autonomy vs. alienation. From alienated object to mediating threshold: conduits, enclosures, frontiers.

Activities: table reviews.

- HARVEY, David. "Section 4: The Fetishism of the Commodity and Its Secret." In *A Companion to Marx's Capital: The Complete Edition*, 40–49. London and New York: Verso, 2018 [2010].
- MANGOLD, William. "Money-Tecture... or How Architecture is Exploited by Capitalism." *99th ACSA Annual Meeting Proceedings: Where Do You Stand* (March 3–6, 2011): 74–78.



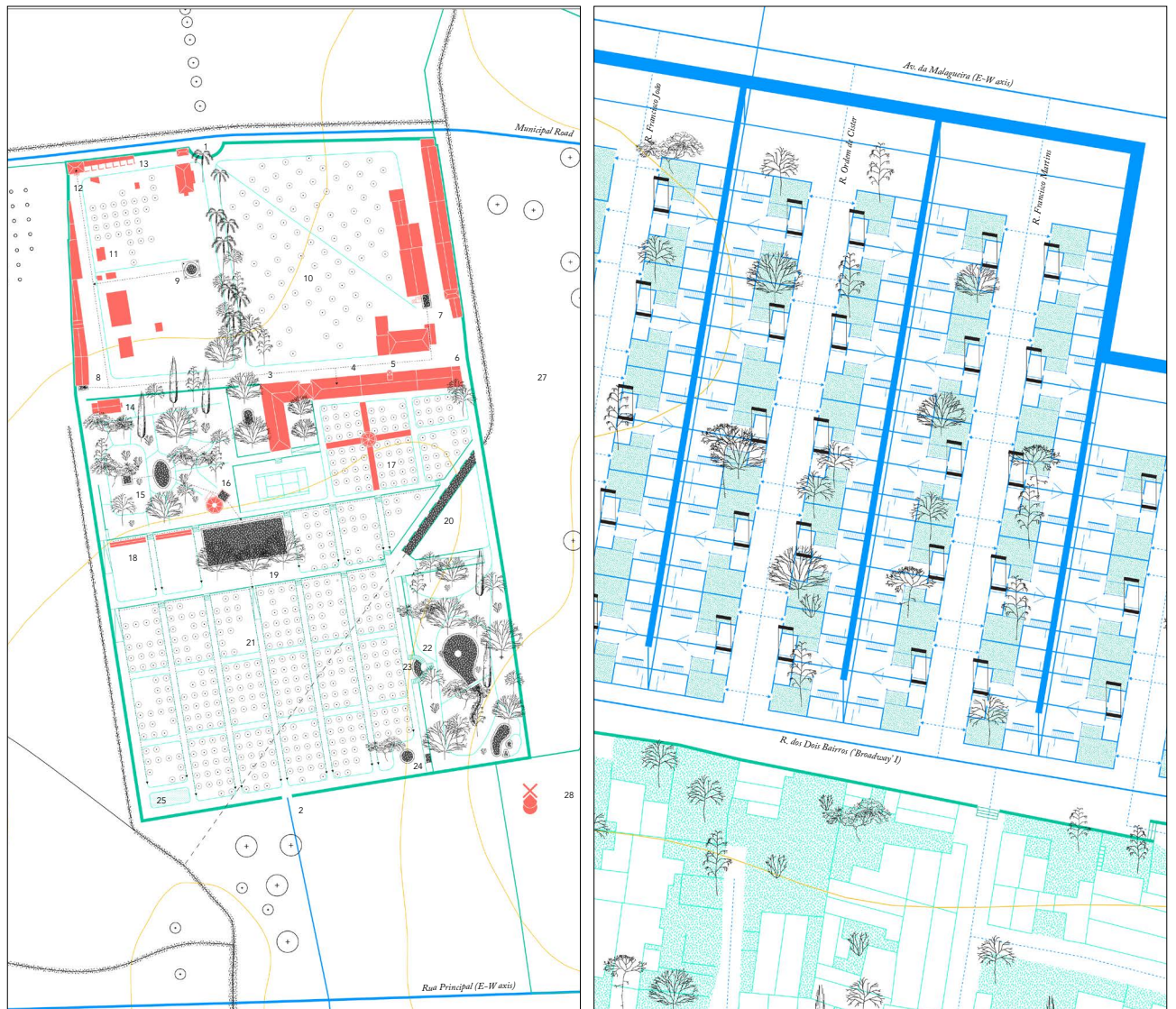
Bárbara Mações Costa, Bairro da Malagueira's conduits from "Conduit, Patio Waste," Ph.D diss, EPFL, 2021.

9. Territorial Conduits

Lecture: Territorial conduits are transportation infrastructures. A conduit is a "pipe" that extracts a resource from a place of abundance and transports it to a place of relative scarcity. It establishes a spatial link between source and destination, production and consumption. These resources are usually raw materials and/or labour. The construction and maintenance of such conduits requires a set of technologies and bureaucracies, typically coordinated by a centralized power or state. This implies a division of labour between those who plan and build, and a spatial separation between production, circulation, and consumption. The result is patterns of uneven development, spatialized in the fundamental contradiction between the metropolitan centre and the peripheral hinterland.

Activities: table reviews.

- ELDEN, Stuart, "Land, Terrain, Territory." *Progress in Human Geography* 34: 6 (Dec 2010): 799–817.
- HARVEY, David. "Fixed Capital" in *The Limits to Capital*, 204–238. London and New York: Verso, 2018 [1982].
- MAÇÕES COSTA, Bárbara. Chapter 5 in "Conduit, Patio, Waste," 121–200. Ph.D diss., EPFL 2021.



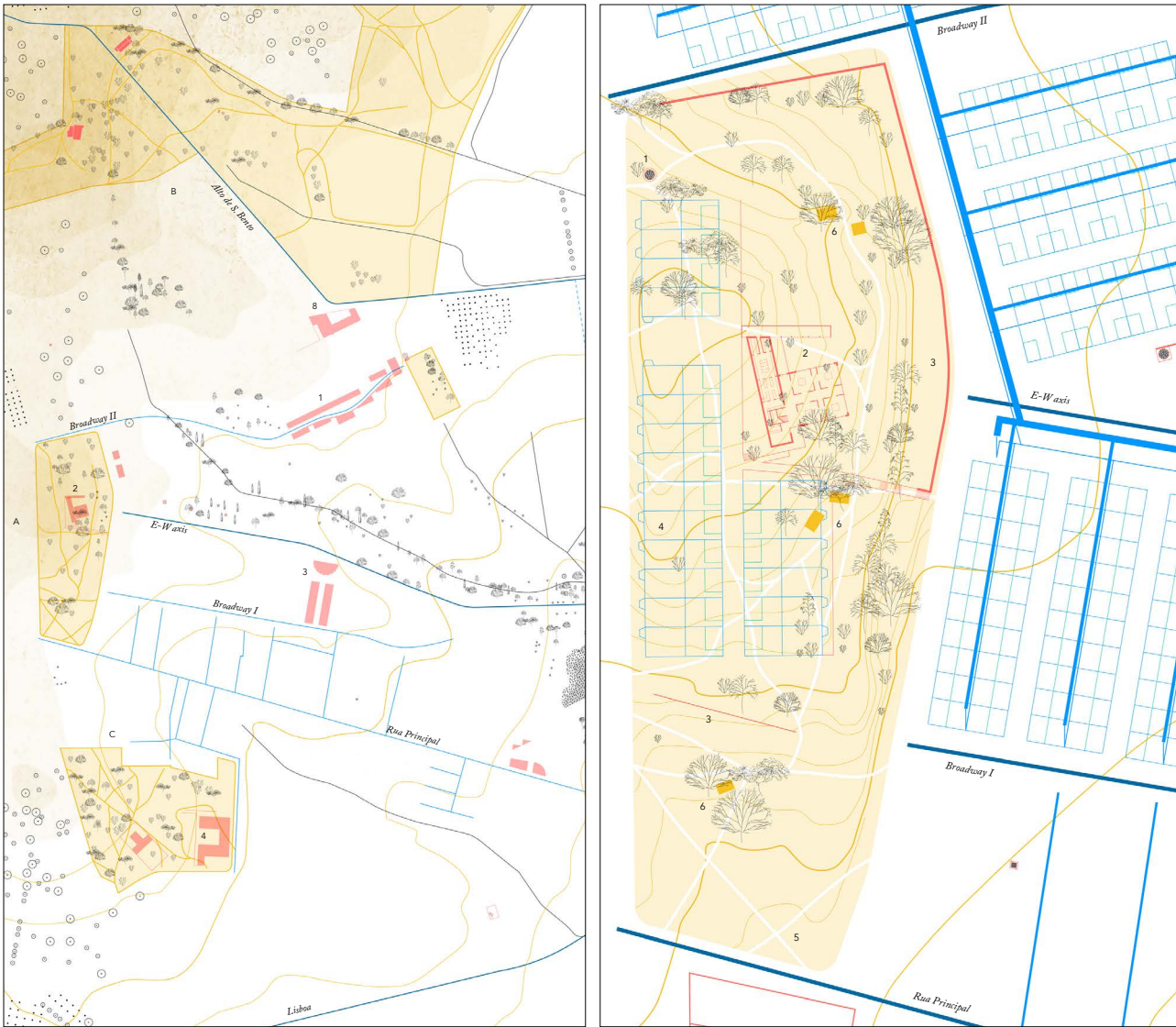
Bárbara Mações Costa, Bairro da Malagueira's patios from "Conduit, Patio Waste," Ph.D diss, EPFL, 2021.

10. Domestic Enclosures

Lecture: An enclosure is a piece of nature transformed into landed property, a fenced-in open space that is domesticated and can be privately or collectively owned. From this appropriation, goods can be extracted, produced, and stored. This requires a set of specialized knowledge and technologies, such as irrigation and plant reproduction. These technologies require constant and systematic maintenance, adapted to the cycles of natural metabolism. Their rhythms dictate that labour be physically tied down, thus creating an identification with the reproduction of daily life. The enclosure spatializes a fundamental contradiction between the private domestic economy and the public politics of the city.

Activities: table reviews.

- AURELI, Pier Vittorio and GIUDICI, Maria. "Familiar Horror: Toward a Critique of Domestic Space." *Log* 38 (Fall 2016): 105-129.
- MAÇÃES COSTA, Bárbara. Chapter 6 in "Conduit, Patio, Waste," 201–265. Ph.D diss., EPFL 2021.
- MCKEON, Michael. "The Devolution of Absolutism." In *The Secret History of Domesticity*, 3–48. Baltimore, MD: Johns Hopkins University Press, 2005.



Bárbara Mações Costa, Bairro da Malagueira's wastes from "Conduit, Patio Waste," Ph.D diss, EPFL, 2021.

11. Wasteland Frontiers

Lecture: A wasteland is an empty piece of land that lacks investment. It is wasted because it has not yet been 'improved' and therefore does not yield a profit. This withdrawal from the market does not make it 'natural', since wasteland always awaits cultivation, and its borders are policed and politicized. Wastelands contain no official property rights and no formalized relations of production. When production does occur, it is operated under a regime of exception, which may be a distorted version of previous forms of land use (e.g., communal), or it may involve usurpation. It tends to serve subsistence needs of typically lumpenized classes that are often racialized. The wasteland spatializes a fundamental contradiction between the polite territory of the social contract and its external enclaves of dehumanization.

Activities: table reviews, general course debriefing and long Q+A.

- SMITH, Neil. "Mapping the Gentrification Frontier." In *The New Urban Frontier*, 186–205. New York, NY: Routledge, 1984.
- PALMA, Vittoria Di, *Wasteland: A History*. New Haven: Yale University Press, 2014.
- MAÇÃES COSTA, Bárbara. Chapter 7 in "Conduit, Patio, Waste," 267–326. PhD diss., EPFL 2021.

12. Final Reviews

Deliverables

- Drawing exercises: to show during pin up.
- Tracing exercise: print and pin up for review, include original photo at same scale.
- Mapping exercise: aerial photo and map, print and pin up side-by-side on the same scale and same frame.
- Architectural object: extra drawings, historical maps, and photos.
- Text in bullet-points following presentation structure.

Presentation (5–7minutes)

1. *Object*: what is it, where is it, when was it built, who is the architect (use photos).
2. *Frame*: what you take to be part of your object's environment (use aerial photo).
3. *Layers*: what cartographic layers you extract from aerial view, how you represent them, how you combine them (use map and extra layers if needed, use historical maps).
4. *System*: how your layers combine to make territorial systems.
5. *Totality*: what that building does environmentally, how it interacts with the territorial systems and how it becomes an agent of spatial contradictions. Explain relational loop of: nature + technology + production + reproduction + aesthetics. Consider having a second map on the building.

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