Framing Research for Design: Investigating the Context of Mass-Customized Dwelling in San Francisco

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The ability to comprehensively understand the context of a future design proposal is essential to reducing generalizations and assumptions about place and user. A deeper understanding comes through intensive investigative research which seeks to reveal connections within a complex system. This project demonstrates one of several examples from an interdisciplinary design studio where students were challenged to interrogate the context of mass customized dwelling in the context of San Francisco, and to do so through the lens of seven systems.

1. Transportation: roadways, railways, infrastructure, rivers, airports, pedestrian ways, bicycle paths, etc.
2. Soft: information networks, money, government, energy, information, communication networks, etc.
3. Natural: ecology, environment, climate, wildlife, hydrology, soils, migrations, etc.
4. Social: rituals, culture, domestic structure, family structure, neighborhoods, community, government, etc.
5. Economic: money, import/export, GDP, taxes, incentives, job markets, industries, etc.
6. Jurisdictional: zoning, government, property lines, covenants, land rights, ownership, etc.
7. Construction: manufacturing, materials, fabrication, construction approval, workforce, regional techniques, trades/unions/organizations,

Design teams were asked to uncover information and communicate the synthesis of their understanding through a series of information graphics, maps, and diagrams which collectively communicate the foundation of their collaborative design research project. Building from the framework proposed by Kate Orff, systemic interrelations detailed key touch points and opportunities to intervene with thoughtful design projections. Orff's framework consists of the following:

1. Maps [orientation]: A layering of spatial data, geographical characteristics, and community narratives.
2. Data Narratives [analysis]: A decoding of the image by analyzing and revealing associated industrial or ecological processes.
3. Eco Portraits [synthesis]: Synthetic moments where a series of data prints and observations converge into an overall ecology or process view, joining seemingly isolated phenomena into a perceptible whole. 1

The graphic narrative communicates connective and dynamic traits of the systems offering a more robust and comprehensive understanding of place and user. Additional graphics expand or contract to describe alternative scale connections, flows, or movements. Publication spreads were restricted in quantity encouraging hybrid graphics with coexistent data and diagrammatic information.

In the end, the deliverables asked students to frame their subsequent design research investigation, outlined through (4) components. The DESCRIPTION is a contextual motivation intended to outline the connections and shortcomings/failures with a system, and leave the reader with a sense of urgency about a need to address it. The QUESTIONS outline the challenge and position the project inquiry with regard to mass customization, manufacturing and materiality, and the domestic structure. The METHODS describe the ways in which design teams engage the design process and issues outlined. Lastly, the SIGNIFICANCE positions the project in its disciplinary relevance.

Students followed this 2.5 week exercise with the design of a mass-customized dwelling fueled by the research generated. The results of the studio demonstrate the impact of a research for design phase which leads into intensive research by design efforts.

NOTE

1. Misrach, Richard, and Kate Orff. *Petrochemical America*. New York: Aperture, 2014.

FRAMING RESEARCH FOR DESIGN

Investigating the Context for Mass Customized Dwelling in San Francisco

Description

There is a severe lack of housing in California's major California Coastal Communities. In these areas, community resistance to housing, environmental policies, lack of fiscal incentives, and limited land hinder development. The high demand drives up cost and pushes the mid to low income population out of the city. The city of San Francisco has propelled the problem even further. In 2015, it was recorded that the city had built over double the housing needed for the high income population, leaving the mid to low income population with a severe lack of housing. The shoreline with the existing piers is an extremely underutilized asset, but according to NOAA projections of 2100, a large portion of the San Francisco Bay area will be under water as sea levels are projected to rise three feet.

Questions

1. Due to San Francisco's peninsular condition and lack of viable land, how might we analyze existing and propose methods to could community on water?
2. In response to the housing crisis in San Francisco, how might we design atypical housing for low to medium income users?
3. Because of the disparity in low and middle income housing, how might we utilize mass customization in a multi-family program to provide authorship for each user type?
4. In response to a fast paced non-permanent cultural mentality, how might we design a dwelling for its entire life cycle, considering materiality, disassembly, and recyclability?

Methods

1. Research into fabrication methods of construction and erection through use of adaptive component modeling and small-scale prototyping as an approach that minimizes impact on the existing ecological site in the Bay area.
2. Employing parametric design and building performance modeling to optimize decisions and results, presenting the opportunity of mass production, customization and efficiency in design.
3. Establishing the program, form, location, and materiality of the design through iterative studies relating to historical, cultural and social, understandings of the site.

Significance

The potential impact of this investigation could foster a dialog around possible solutions for the housing crisis of San Francisco and cultivate speculation on what dwelling means and in a contemporary society. The design will focus on systems of mass customization for varying user types and prefabricated design with the intention of building system and material recyclability. This investigation has the potential to challenge current housing types and construction life cycles in the United States.