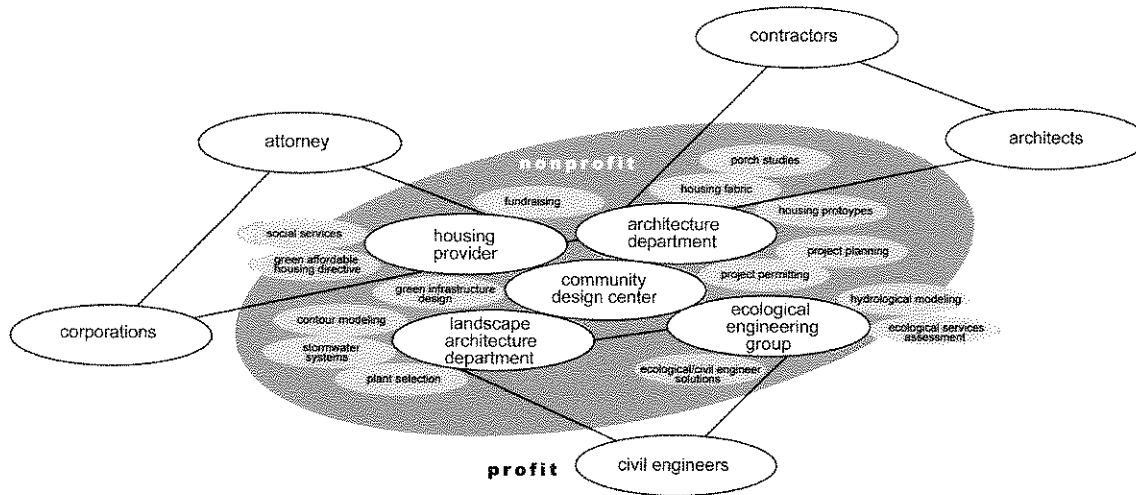


# Habitat Trails:

from infill house to green neighborhood design

*"Affordable housing should be understood as a commitment of time rather than simply an immediate solution to a pressing need. Eschewing the current fervor for disposability, and the swift and inevitable waste it entails, and departing from the low-cost model... (we need models) for expanding the life span, potential, and quality of the house beyond its economic limits."*

**16 Houses: Designing the Public's Private House**, Carlos Jimenez



## Beyond Work Integration: to the Advancement of Models

The studio objective is to provide an affordable housing provider with a Low Impact Development (LID) that offers high-value, affordable residential solutions to underserved populations and their surrounding communities. The challenge is to create *place* from the housing provider's modest single-family home specifications on a greenfield site. The studio is organized as a collaborative venture among architecture, landscape architecture, and ecological engineering departments. Architecture students were responsible for design of the housing fabric and held accountable for integration of LID technologies developed by students and faculty in the allied disciplines.

Studio methodology proposed a neighborhood transect consisting of interface strategies between public and private territories with the porch as a hinge component. Architecture students began with collective research into porch typology and its role in establishing urban and architectural fabric. Using typomorphological thinking (geography + typology), each student designed individual house types responsive to neighborhood planning concepts developed collaboratively with ecological engineering and landscape architecture departments. The underlying lesson addresses the role of integrated design processes in leveraging value within ordinary contexts.

Students participated in activities that supported the implementation of their design (which required 30 code variances), including a regional fundraising gala and exhibition, media interviews, current homeowner visits, code research, municipal planning agency meetings, and publication of *Porches*.

The studio publication: *Habitat Trails: from infill house to green neighborhood design* now serves as a statewide advocacy platform for advancing LID protocols with state agencies, municipalities, designers, and the development industry. Several cities, the regional planning commission, the state EPA, a converted civil engineering firm, and three area developers are now pursuing LID as a result of the studio. The institutional goal is to move beyond work integration to develop feedback loops between professional practices, the political arena, and the academy.

## **Habitat Trails:**

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Fall 2005-present

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**Non-profit affordable housing providers may be the primary vector for mainstreaming the use of “green”, or Low Impact Development (LID), neighborhood technologies.**

### **Collaborators**

- School of Architecture Community Design Center
- Department of Architecture
- Department of Landscape Architecture
- Department of Biological and Agricultural Engineering
- Civil Engineering Firm
- Architecture Firm
- (2) General Contractors
- Real Estate and Development Attorney
- Structural Engineer
- Affordable Housing Provider

### **Program’s Place Within the Curriculum**

- Fourth Year Upper Division Architecture Design Studio in a Five Year BArch Program  
Elective Architectural Design Studio at the School’s Community Design Center
- Ecological Engineering Students: Senior Thesis project in a Four Year BS Program and one graduate research student in MSB Program

### **Educational Goals: Learning “Critical Practitioner Thinking”**

#### **Work Products**

1. ***Porches***, student publication investigating porch traditions in North America (now in major architectural bookstores)
2. ***Habitat Trails: from infill house to green neighborhood design***, community design center publication on project and LID technologies.
3. Eight home prototype designs for 17 dwelling unit development
4. Design-Build of Hydrological Infrastructure
5. Exhibit of work for fundraising

#### **Upper Division Curriculum Goals**

1. Introduce students to a combined social-environmental condition (in this case affordability and sustainable neighborhood development) for which design may offer integrated solutions. This initiates the question of creative practice and the role of “critical practitioner” thinking for upper division students.
2. Structure collaborative studios in which students engage allied knowledge fields and disciplinary practices while developing their own design proposals.
3. Introduce research and/or case study components into upper level design studios to enhance design resourcefulness.
4. Establish an outreach culture of producing well-crafted, publication-ready work for application by other schools, the profession, and local communities.

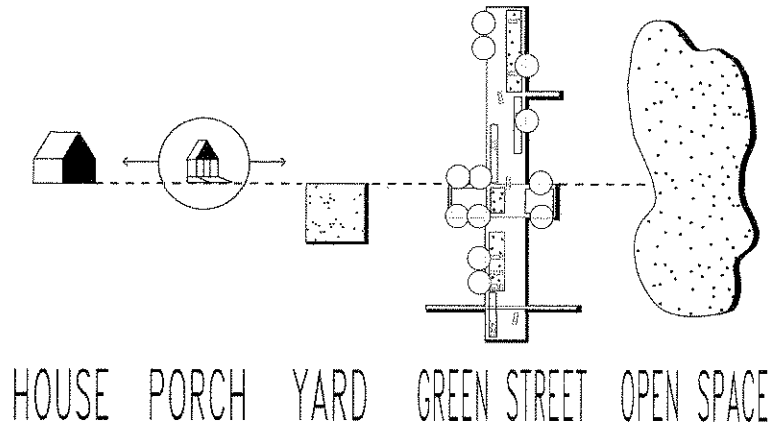
#### **Studio Educational Goals**

1. Provide new housing design and planning solutions for the housing provider as they retool their development model from infill development to the planning of entire

neighborhoods. This shifts attention from the design of a signature structure to the design of serial prototypes.

2. Devise approaches to creatively design within affordable parameters and ordinary contexts, the contexts in which most of our architectural graduates will be practicing.
3. Introduce new planning models for Low Impact Development.
4. Introduce a recombinant design model based on synthesizing multiple measures of success: ecological, economic, and social.

### Teaching Strategies: The Green Neighborhood Transect



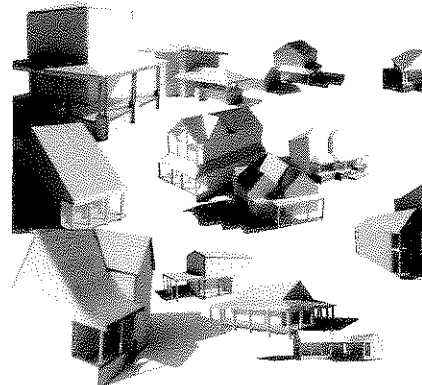
For architecture students, the studio consisted of two major parts: Part I: Precedent Studies, *The Porch: Between House and Neighborhood*, and Part II: *Single-Family House Typologies and Design*. The first part involved a group effort to develop a taxonomy of porches based on five organizational strategies found in North American porches: 1) L-shaped, 2) extension, 3) gallery, 4) recessed, and 5) portal. The resulting *Porches* publication served as a design instrument for simultaneously engaging house design and neighborhood planning—two different scales of development with their own methods of inquiry. The second part of the semester required each student to propose and develop five housing types followed by detailed design of one selected type.

**The neighborhood transect was both a teaching instrument and a management strategy for organizing collaboration among the various disciplines.**

Architecture students engaged readings, design methods, and professionals (landscape architects, ecological engineers, civil engineers, social workers) in all five categories (see diagram above) of the neighborhood transect.

#### ***Part I: Precedent Studies: The Porch: Between House and Neighborhood***

In the first six weeks students collectively produced a research book, *Porches*, chronicling residential porch organizations. Each student selected ten precedents that demonstrated exemplary architectural and planning principles. Three essential components common in all porch construction: 1) platform, 2) column, and 3) roof were redrawn and built at 1/8" scale, foregrounding proportions, spatial concepts, massing and architectural strategies. The objective was to understand the porch's role in creating social and environmental value as an enriched interface between private and public realms.



*Porches* (now available in bookstores)

The porch came to be understood as a context-producing component, which for the most part lacks an architectural pedigree.

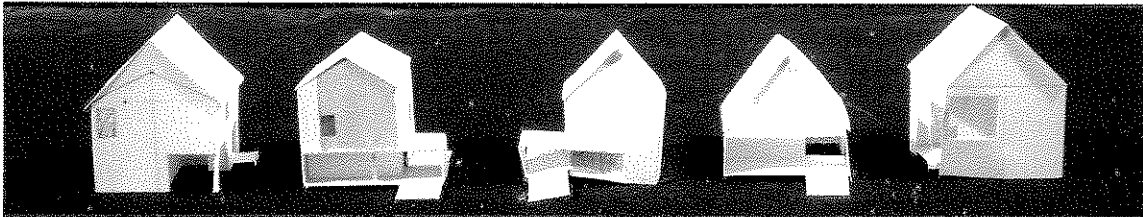
## **Part II: Single-Family House Typologies and Neighborhood Design**

*"With a weaving of fabric for dwelling—a weaving of people to places, houses to setting, indoors to outdoors—the discipline of architecture is reinserted into the suburban housing debate."*

**Suburban Space: The Fabric of Dwelling**, Renee Chow

### **Iterations: Arriving at a Building Grammar**

The studio developed affordable house designs based on typological principles in residential design. Students initially proposed five iterative typological proposals responsive to emerging neighborhood concepts developed by collaborating team members. The objective to achieve architectural merit from simple and affordable building metrics focused investigations on singular forms without dormers, gables, and other additive volumes (most porches became recessed into house forms). While each student authored their own typological solutions, the class simultaneously developed shared building standards such as the elevation of all finished floors two feet off of the ground. Only two different window sizes and standard French doors were used, but were combined in different arrangements. House plan and section dimensions, roof slopes, and truss types were standardized among the various types. Living areas were to have an open section (i.e. loft, cathedral ceiling, or double story) and physically connect to the porch, creating an expansive sense of space in an otherwise modest home. The open sections in both one-story and two-story houses were designed to facilitate convective ventilation.



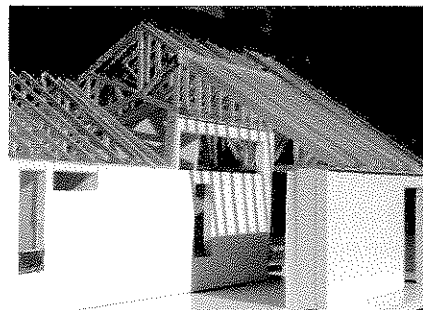
Five iterations of one type: the "urban vernacular"

### **Disciplining The House Proposals**

Each student selected one typology for detailed design development, using the housing provider's planning standards and shared project metrics. Roof and floor framing models at 1/4" were constructed ensuring that construction technology was integral to design studies.

**Architectural quality wasn't measured in terms of unique and signature solutions, but rather in the elegant development of ordinary systems.**

Cladding materials could not be specified in the planning stage since the housing provider's corporate donor model relies on immediately available surplus material. However, proportion, composition, natural light, and flexibility were emphasized as planning values in shaping an extended living transect.



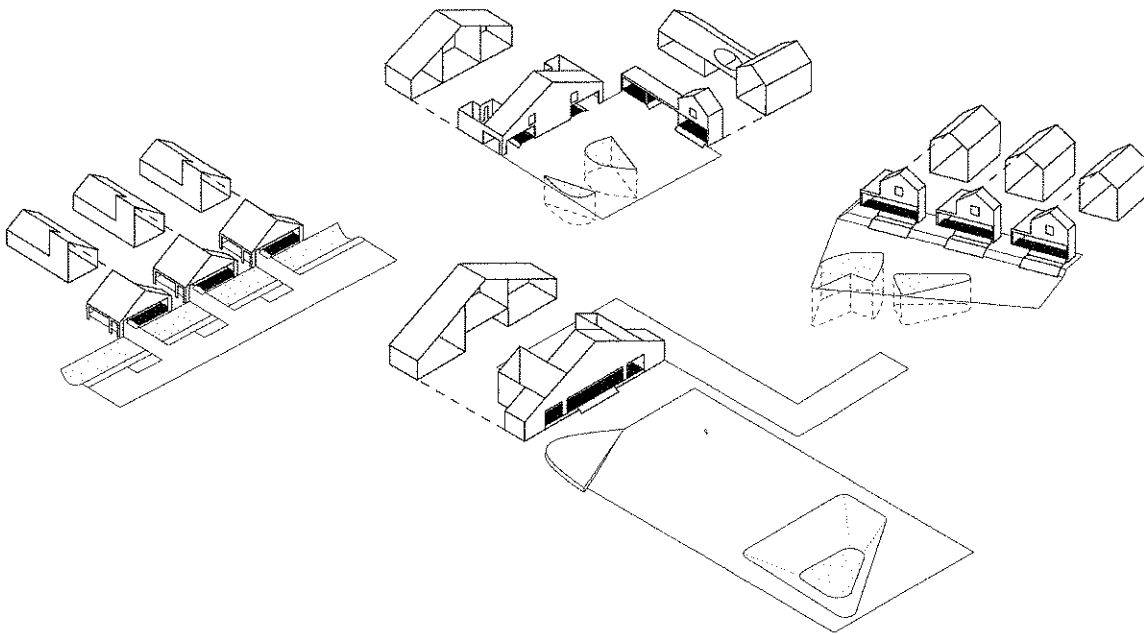
Framing Studies

### **Weaving Environment and Inhabitation: House + Porch + Street**

Employing the neighborhood transect, architecture students finalized integration of type-based house designs with neighborhood planning concepts developed in collaboration with the center's staff, and the ecological engineering and landscape architecture departments. Though architecture students did not unilaterally execute the neighborhood plan, their housing types, in part, projected neighborhood fabric rules (e.g. inside/outside relations, the automobile's fit on site, and site specific massing strategies) to which collaborators responded. Ecological engineering students and faculty, in collaboration with a civil engineering firm and the school's community design center, designed and built the project's hydrological system.

**Typomorphological thinking—the fit between urban and building form—facilitated a dialogic process among collaborators, teaching architecture students the essentiality of *shared space* in establishing comprehensive architectural solutions.**

The learning environment fostered *meta-disciplinary* relationships where disciplines didn't just collaborate (interdisciplinary), but rather internalized the metrics and logics of one another's fields. Partner engineering firms who participated in the studio are adopting LID technologies developed by their university-based collaborators. The local municipality is also adopting the green neighborhood model developed in the studio. The collaboration provided the country's sixth fastest growing region with a model for affordable green neighborhood development and the attendant policy reform necessary for the project's realization.



House + Porch + Rain Gardens/Streets

### **Evaluation Methods to Assess the Semester's Work**

Given the challenge of place making through the housing provider's designated single-family house model, assessment of the architecture students' performance considered four measures:

1. Can the house typology be reproduced with thematic variations without compromising its underlying coherence?
2. What fabric-making potential do house typology proposals offer in terms of their relations to yard, street, open space, and other house typologies?
3. Are the construction technologies affordable and "volunteer-friendly"?

4. Does the porch serve architectural, urban, and social possibilities well? This ranges from the extension of interior living space, admittance of light to the inside, beauty and proportion, completion of the social and aesthetic life of street, to the facilitation of casual encounters.

### **Advancement of Model LID Technologies**

The institutional goal is to move to the next step beyond work integration called for by NCARB to the development of ongoing feedback loops between professional practices, the political arena, and the academy.

**The studio publication: *Habitat Trails: from infill house to green neighborhood design* now serves as a statewide advocacy platform for advancing LID protocols with state agencies, municipalities, designers, and the development industry.**

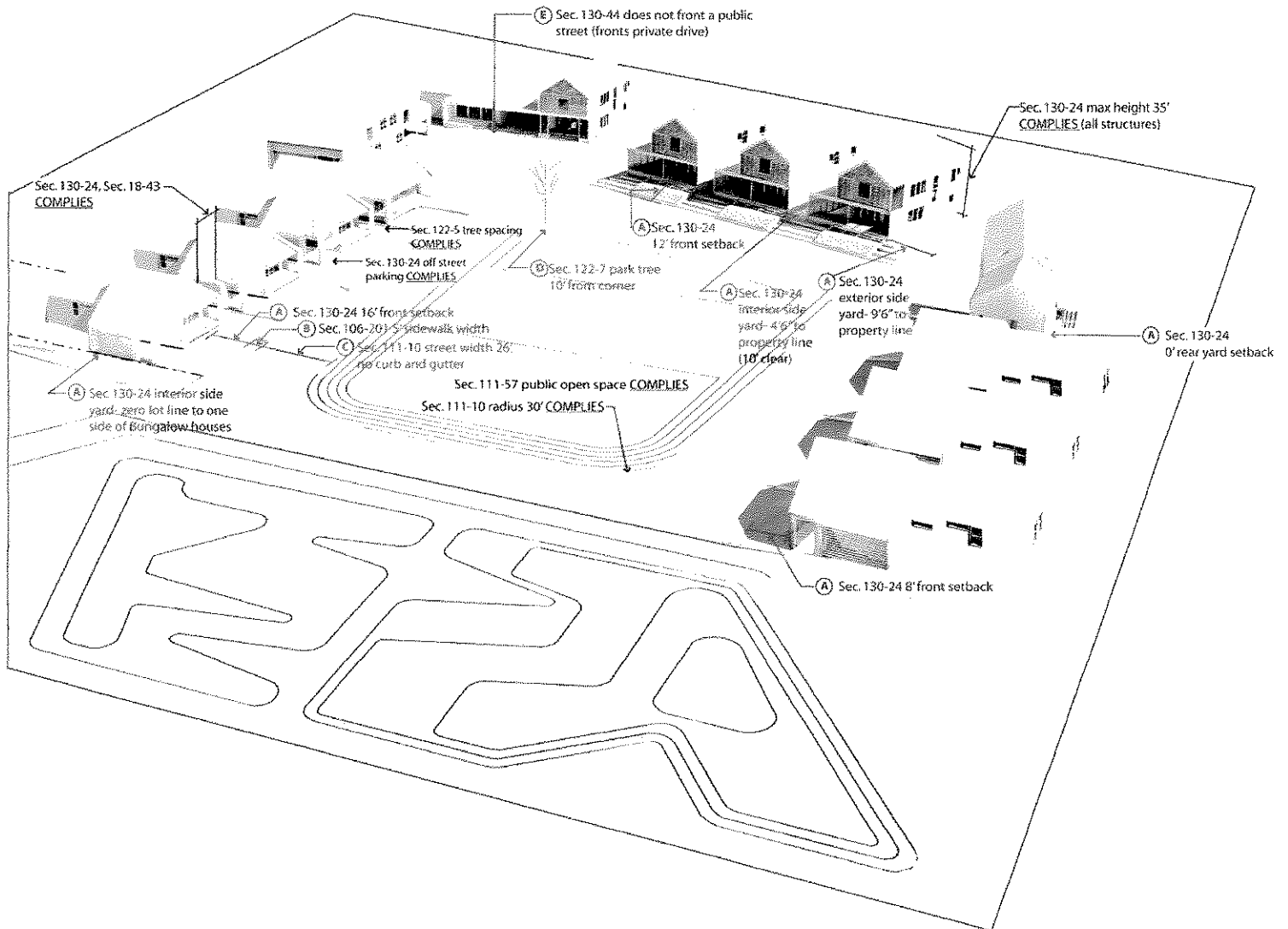
Most municipal land development codes prohibit planning configurations required for LID feasibility. *Habitat Trails* required and received 30 zoning variances. Several cities, the regional planning commission, the state EPA, a converted civil engineering firm, and three area developers are now pursuing LID as a result of the studio. The following list describes the school's impact and effort in creating a proactive knowledge community about LID application:



*Habitat Trails: from infill house to green neighborhood design*

- State Environmental Protection Agency (EPA) has approved funding for a new LID demonstration project with the same project team, pending approval of the U.S. EPA.
- Another affordable housing provider chapter has contracted with the community design center to implement an LID neighborhood.
- Three area cities are studying incorporation of LID technology and compact neighborhood design into their land development codes.
- The regional planning commission is studying adoption of LID technology into its comprehensive growth plans.
- The statewide Watershed Advisory Group has purchased *Habitat Trails* books for its biannual workshops with state developers and planners.
- Three area developers have solicited proposals for LID projects from the school's community design center.
- The participating civil engineering firm and general contractors, for the first time, are pursuing LID projects elsewhere. The civil engineering firm has adopted ecological engineering practices and hydrological modeling software.
- Participating ecological engineering faculty was keynote speaker at state AIA convention to present LID technology and *Habitat Trails*.
- The university's Department of Biological and Agricultural Engineering is now exploring the incorporation of design studios into their curriculum.
- *Habitat Trails* project material donors include green building suppliers interested in showcasing product applications for the first time in this growing region.
- *Habitat Trails* project has applied for participation in the LEED-Neighborhood pilot program being conducted in 2007 by the U.S. Green Building Council.
- A design center staff has received LEED accreditation, and design center has developed planning metrics to achieve platinum-level certification for neighborhood design.

- The participating affordable housing provider chapter has substituted new project house types for its existing houses plans used in other build programs. They now require porches on all homes.
- *Habitat Trails* has garnered five national and state design awards in engineering, landscape architecture, and architecture.
- Work products were instrumental in raising over one million dollars in the last year.
- *Habitat Trails* (designed for 100-year flood) experienced a 50-year flood event in November, outperforming surrounding subdivision development with conventional civil stormwater infrastructure. The project's hydrological design has demonstrated superior performance at two-thirds the cost of conventional infrastructure.



Map of code variances for *Habitat Trails* presented to city for approval