

Abstract

Using the constant temperature of the earth Afterhouse is a new urban typology that transforms concrete foundations of derelict houses into passive solar subterranean greenhouses allowing crops to be extended and moderated in temperate climates. By using readily available materials and techniques while maintaining the scale of the neighborhood, Afterhouse empowers communities to transform blighted homes into productive spaces for growing and celebrating food during the winter.

Overview

With 3,400 homes facing demolition in 2014 alone, Detroit is radically changing the way we understand postindustrial urbanity. The typical 1600 square-foot residence has nearly 70 tons of concrete in its foundation that is land-filled in during demolition. In addition to losing the embodied energy of the concrete, the foundation removal is energy and labor intensive. Afterhouse is an alternative to this demolition.

Many Detroit houses are irreparably damaged by disuse, vandalism and fire and as a result must come down. Rather than razing them and leaving fallow land they can be de-constructed and their foundations reused to build semi subterranean, passive geothermal greenhouses, a new type of house we call Afterhouse. Using just the heat of the sun and the constant temperature of the earth, Afterhouse requires no artificial heating in the winter or cooling in the summer and provides an environment where it is possible to raise crops that grow in climates far warmer than Detroit's.

The footprint of the original house is maintained, and vernacular materials used, so that Afterhouse can blend into residential neighborhoods and honoring stories of its home's history. Distinct from large scale urban agriculture projects that require a lot of space, Afterhouse is discrete, almost hidden, making it appropriate for denser urban settings where conventional hoop houses and greenhouses are not.

A derelict house transformed from a hazard to a thing of beauty and of use, drawing from what once was to become a part of what Detroit is now, Afterhouse serves as a prototype for other abandoned houses in post-industrial communities.







This can be avoided!

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Excavation of a house foundation after demolition. -Detroit, summer 2013

Casestudy Prototype

The Blue Collar Bungalow

3347 Burnside, Detroit, Michigan Before



3347 Burnside, Detroit, Michigan After

A Casestudy:

3347 Burnside's history is not unique. Demographic shifts, economic booms and busts all contribute to its story and the story of many parts Detroit. A typical Blue Collar Bungalow built in the 1920's, it is a part of the first wave of the procedural construction industry as we know it today. Inexpensive, "cookie cutter" houses were built across large neighborhoods for the city's rapidly growing auto worker force, utilizing the same cost savings available through standardization that the auto industry did.

The small, cheap to maintain and heat homes are still attractive to people looking for affordable housing. However, the inexpensive materials and cheap construction present a barrier to restoring the derelict and damaged houses throughout the neighborhood. Rather than see this solely as a problem, Afterhouse takes advantage of this as an opportunity for an alternative intervention to demolition that contributes to the community and can even be replicated.

Detroit's booming auto industry brought masses of immigrants who used their factory earnings to build or to buy one of the small homes that sprung up almost overnight on the city's open land. Quickly built, using inexpensive materials, Blue Collar Bungalow became a popular neighborhood style. Advertisements such as this could be found in catalogues throughout the 1920s.

After World War II, union-negotiated wage and benefit packages made auto work more secure. At the same time, New Deal programs gave white workers and veterans access to federally-backed mortgages and loan guarantees that made the American Dream more accessible. Homeownership rates skyrocketed and the neighborhood filled in.

1955 Bungalow Density

Even as much of the city suffered a drastic drop in population, thousands of Bangladeshi immigrants moved to this part of Detroit- so many that the area has been dubbed Banglatown. This influx of people helped the neighborhood maintain its vibrancy and some of its density and made it an attractive place for artists and others to settle despite, or maybe because of the fact that the cheaply built housing stock does not lend itself to gentrification.

The damaged houses that dot the neighborhood are not salvageable, but the embodied energy of the house foundations could be a resource transformed into an asset for the community. Afterhouse is a where food and community will be grown, shared, and celebrated.

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2013

2013 Bungalow Density (outlined = blighted sites = possible AFTERHOUSE's)

The Porch

The porch is what personalizes each house making it a home. The porch is where the street meets the house. It is the architectural device that mediates between the public space of street and the more private space of the sunken garden. The Afterhouse porch is a built up planter/ fence that maintains the scale of the neighborhood. The Afterhouse porch can be customized by its owner within the red envelop without affecting solar performance. Seasonal crops can be grown so as to reduce solar gain in the summer months.

The Porch

West-Facing Street

01. Derelict

02. Demolished

03. Insulated Platform

05. Rotate to Face South

06. Slice to Fit Foundation

07. Readjust Shape

08. Allowable Planting Envelop

04. Simple Shed Greenhouse

09. Customized Growing "Porch'

Components

Original House to Be Demolished Double Wall Polycarbonate - SIP's Roof Built-up D.I.Y. Trusses - Scrap SIPs Wall Insulation - Reclaimed Corrugated Steel Siding - Standard Wood Framing - Zone 7 Winter baring Fruit - Hardwood Cut-off Slats Scrap SIPs Foundation Insulation - Scrap SIPs Planter Box Hardwood Cut Off Decking - Waterproof Membrane Scrap SIPs ground Insulation

Existing Foundation

A Place of Warmth

AFTERHOUSE is a place of warmth. By taking advantage of the constant temperature of the earth, it requires no active heating in the winter or cooling in the summer to grow crops that grow in climates far more temperate than Detroit's. Pomegranates, pistachios, mangos and citrus are just a few possible crops. Distinct from many urban agriculture projects that require a lot of space, AFTERHOUSE is discrete, almost hidden, because it maintains the scale of the original house.

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- (a) Existing Foundation
- **b** New Stairwell
- © Out Door Bed Thermal Mass

- d Tree Planter Bed
- Shrub Planter Bed
- f) 6" SIP Scrap
- (9) 12" SIP Scrap
- (h) Polycarbonate
- ① Hardwood Scrap Slats
- ① Corrugated Metal
- & Gutter for Rain Water Collection
- ① Pomegranates
- ⑦ Pistachios

(9)

SIP Scraps International building materials supplier Insulspan, has generously agreed to donate Structural Insulated Panels (SIPs) cut-offs from other projects to Afterhouse. R-Value @ 6-1/2" = 25 R-Value @ 12" = 48

Hardwoods of Michigan sawmill is collecting and donating the irregular slats created through industry standard practice of trimming down irregular 4-Quarter rough planks to square off their edges. These slats are will be used as an inexpensive rainscreen material.

industry standard material for highperformance greenhouses, due to its insulative qualities and high lighttransmissivity.

R-Value @t 8mm double-wall = 1.6

DIY Truss

High performance and low cost, made using standard 2x4s, steel strapping, pipe, and cable, the DIY Truss enables the Afterhouse to withstand relatively high loads while allowing for maximum light transmission.

Yusu Citrus

Mango

Pomegranate

Kiwi

Fig

Ginger

Rosemary

Pistachio

Olive

Yuzu Citrus Citrus ichangenisis Exposure: Full Sun Spacing: 4 ft Water Use: drought-tolerant Cold Hardiness: Zone 8 Soil preference: Poor soil, Flower Season: Late spring Harvest Season: Early winter Self Fertile	Mango Mangifera ind Exposure: Full Sun Spacing: 8 ft Water Use: water regularl Cold Hardiness: Zone 8 Soil preference: well drain loamy Flower Season: Late wint Harvest Season: Spring Self Fertile
Kiwifruit Actinidia deliciosa Exposure: Full/Part Sun Spacing: 10 ft Water Use: water regularly Cold Hardiness: Zone 7 Soil: Well drained, acidic Flower Season: Early spring Harvest Season: Late fall Self Fertile	Fig Ficus carica Exposure: Full Sun Spacing: 5 ft Water Use: drought tolera Cold Hardiness: Zone 7 Soil: well drained, loamy Flower Season: Early Spr Summer Harvest Season: Spring, I Summer Self Fertile
Rosemary Rosmarinus officinalis Exposure: Full/Part Sun Exposure: Full Sun Spacing: 18" Water Use: drought tolerant Cold Hardiness: Zone 8 Soil preference: well drained Flower Season: winter Harvest Season: anytime	Pistachic Pistacia ver Exposure: Full Sun Spacing: 6 ft Water Use: drought tolera Cold Hardiness: Zone 7 Soil preference: adaptable Flower Season: Mid sprin Harvest Season: Late sur Self Fertile

Ingredients

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Pomegranate Punica granatum

Exposure: Full Sun Spacing: 6 ft Water Use: drought tolerant Cold Hardiness: Zone 8 Soil preference: Poor soil, Flower Season: Early spring Harvest Season: Late fall Self Fertile

Ginger

Zingiber officinale

Exposure: Part Sun Spacing: 12 inches Water Use: do not allow to dry out Cold Hardiness: Zone 9 Soil preference: moist, drained, loamy Flower Season: N/A Harvest Season: After the first year

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ant

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Olive

Olea europaea

arbequina

Exposure: Full Sun Spacing: 6 ft Water Use: drought tolerant Cold Hardiness: Zone 8 Soil preference: Poor soil Flower Season: Early spring Harvest Season: Late fall Self Fertile

Afterhouse is not only a project, a prototype, a building system. It is about people and their stories. The only way Afterhouse can be successful is if it is loved, cherished and a fully integrated element of the community that built it.

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Stories

Kid graffiti on the walls of 3347 Burnside, graphite on siding

OMAR

"I broke up a fight in front of this house

once."

"see that tire? It's been there for forty years."

"I remember a family with five little girls lived in that house. Their father would ask to borrow money every time I saw him."

"We used to run an extension cord to the house next door for electricity. The only running water was in the bathtub. We washed dishes, washed clothes and drank water from the tub. Can You imagine?!?"

"This schizophrenic guy lived here with his Mama. Sometimes he'd just go off on you. He would mess with people's cars and yell from the front porch. I felt sorry for his Mama."

"My Brother and I used to build model airplanes in the basement. We also had a hammock down there!"

"I remember the first time I jumped from our roof to the house next door. I felt like superman!"

"To była moja babcia w kuchni. Miała piękny ogród w podwórku."

"It's amazing what the fire did to the inside of this house. All of the walls are pitch black. It's depressing and beautiful at the same time"

"I have good memories of this house, and I have faith that something good will happen here again"

The Owner

Artist and committed Detroiter that lived and worked in a house down the street. Concerned about safety, he bought the abandoned, fire damaged house at 3347 Burnside so that he was empowered to discourage vandalism and squatting. As he used his own home as an alternative exhibition space, he hoped that the 3347 house could also be used as a place of artistic or architectural intervention. He collected stories of people who lived there, or remembered people who did and he made drawings that told their stories, and those stories and memories informed the design of Afterhouse.

The Neighbors

Aside from the owner and the custodian, Afterhouse will serve as a place of warmth for the community in which it resides, transforming the problem of a dangerous structure into a source of engagement and nourishment. The neighborhood surrounding this intervention is diverse and changing. Here are three examples of members of the community:

Long Term Members

Until very recently, the neighborhood was populated mostly by people of Polish origin and their descendants.

The Farmer

A Farmer and Artist bought the house next to 3347 Burnside a few years ago as a place to live and work. She subsequently started the urban agriculture project Burnside Farm in the 6 empty lots at the end of the block. The farm and her home are a part of her creative practice and she describes the whole place is a giant studio of sorts. She and her collaborators developed a creative CSA that not only distributes fresh local produce to its shareholders, but curated art objects as well. She will use and maintain Afterhouse as a part of the Burnside Farm, greatly extending her growing season and crop diversity.

As job opportunities moved away, so did many of these citizens, but some life long residents remain, and enrich the neighborhood.

New Members

Over the last 30 years, thousands of Bangladeshi immigrants have moved into the neighborhood. This phenomenon has increased the neighborhood's ethnic, cultural and culinary diversity and kept it relatively stable, even as many long term residents moved out.

Site/Floor Plan

Roof/Framing Plan

Sections

C. Section

- ⓐ Farmer's House
- b Existing Foundation
- © New Stairwell
- d Equinox Sun Angle
 e Out Door Bed Thermal
- f Mass
- Iree Planter Bed
- (h) Shrub Planter Bed
- ① Thermal Mass Water Tubes
 ① Dry Well with Gravel
- & SIP Scrap

- ① Polycarbonate
- Mardwood Scrap Slats
- Corrugated Metal

PRV CASE NO. 2014 00853 An other interretation of the strength

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City of Detroit penartment PERMIT NO.: BLD2014-01600		
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Building Permit

3341 BURNSIDE STREET

SITE DATA	
ZONING - RESIDENTIAL - R1	SINGLE FAMILY
PROPOSED STORAGE SHED	616 S.F.
EXISTING HOUSE	1,062 S.F
LOT AREA	5,951 S.F.
MAXIMUM LOT COVERAGE	35%
LOT COVERAGE (1,678 S.F./5,951 S.F.)	28%

LEGAL DESCRIPTION:

LOT 86 AND 87: HARRAH & SOSNOWSKIS HAMTRAMCK SUB, OF N. BURNSIDE, CITY OF DETROIT, RECORDED IN LIBER 31 PLATS, OF PAGE 25 OF WAYNE COUNTY RECORDS (9/133)

LOCATION:

3341 BURNSIDE STREET DETROIT, MI 48212

RESIDENTIAL DETATCHED STORAGE SHED REMODEL

SITE PLAN: 1/16" = 1'-0"

MAY 1, 2014

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Site Plan

RESIDENTIAL DETATCHED STORAGE SHED REMODEL

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PLAN: 1/4" = 1'-0"

MAY 1, 2014

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PAGE 2/5

2X2 PURLINS 24" 0.CC 8MM. POLYCARBONATE SHEETHING ABOVE FASTENED WITH #10 X2 2" WOOD GRIP SCREWS, 1" UMBRELLA WASHERS AND 1" THERMAL SPACERS 24" O.C. TYP.-

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Polycarbonate

Elevations

PAGE 4/5

ROOF

RAFTERS: AS INDICATED RIDGE BEAM: 3 PLY 16 LVL HIP RAFTER: 2X10 RAFTER HANGERS: SIMPSON LRU210 POST UNDER RIDGE BEAM: 3 1/2" X 3 1/2" LVL

ROOFING DETAILS

NORTHSIDE SHEATHING: 1/2" O.S.B. 15# FELT/ ASPHALT MEMBRAIN ASPHALT ROOF SHINGLES SOUTHSIDE 8MM POLYCARBONATE SHEETING ON 2X2 PURLINS @ 24" O.C.

WALLS

STUD: 2X4 @ 16" O.C. UNLESS OTHERWISE NOTED PLATES: 2X4 DOUBLE PLATE AT TOP WEATHER TREATED LUMBER FOR SILL PLATE ANCHOR BOLT: 1/2" X 10" 6FT. O.C.

SIDING DETAILS

SHEATHING: 1/2" OSB UNLESS NOTED SIDING: 3/4" WOOD SLATS

DOORS

OPENING WIDTH: 3'-0" HEADER: 2- 2X6 UNDER 2X10 HIP RAFTER

FOUNDATION

EXISTING 8" BLOCK NEW 8" X12" PORED IN PLACE CONCRETE REINFORCED BOND AROUND ENTIRE PERIMETER FOR NEW SILL. CONNECT TO EXISTING CMU WALL WITH 1/2" X 10" STEEL DOWELS @ 6'-0" O.C. MAX.

RESIDENTIAL DETATCHED STORAGE SHED REMODEL

SECTION S1: 1/4" = 1'-0"

MAY 1, 2014

Wall Section

 POLYCARBONATE SHEATHING
 2X2 PURLINS ALUMINUM RIDGE FLASHING 3 PLY 16 LVL TRIDGE BEAM 2X10 @ 16 O.C. TRAFTER 7/16 O.S.B. SHEATHING
DOUBLE 2X4 PLATE
 2X4 STUD WALL 2X6 STUD WALL 2X4 TREATED SILL PLATE W/ SEAL SEALER
 1/2"X10" ANCHOR BOLT 8"X12"REINFORCED 2,500 LB. CONTCRETE BOND BEAM - POURED IN PLACE
 EXISTING GRADE
 EXISTING 8" CMU FOUNDATION
 EXISTING CONCRETE SLAB

01. Beginning of demolition

03. Home being manually deconstructed

07. 3 courses of block removed so foundation wall could be strengthened

02. Second floor being demolished

06.Home after floor joist and wall joist stripped

08. Foundation wall awaiting bond beam to be poured in place.

2 x 8 Hardwood floor joists that were salvaged.

Architecturally stylish wood rack made from salvaged lumber houses other repurposed wood on site.

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Floor boards waiting to be de-nailed.

AFTERHOUSE PART I+II REPORT SUMMERY

AFTERHOUSE is a project on a dead end street called Burnside in a Detroit community just north of Hamtramck. Its basic premise is to convert a derelict house, the only one left on the street, into a greenhouse. AFTERHOUSE received two MSU/REI grants. The proceeding pages are a report that compiles our research made possible through both grants. The first grant covers pages 3-44 and the second covers pages 45-58 as well as significant design improvements on pages 9-10 and 23-26.

A Quick Overview

With the first REI grant we developed three designs and refined them to a single one that could not only fit on the Burnside property but numerous other abandoned houses the same foundation footprint, but different sun exposure in the NoHam (North of Hamtramck) neighborhood. With the assistance of a second REI grant we were able to get a building permit for the project, complete the partial demolition of the burned down house and purchase some materials to begin its re-construction. The demolition, completed manually, helped us salvage considerable amounts of construction material for our new greenhouse.

Neighborhood Transformation

Additionally after receiving the first REI grant and with the promise of the greenhouse on the horizon our project has spurred Burnside Farms to start a CSA program, transforming three vacant lots into urban farmland that helps created a more sustainable, safe community and that has actively fostered entrepreneurship contributing to a stronger community economic base. Since receiving our second grant and with the demolition of the 3347 the block no longer is blighted. In the evenings neighbors now stroll by the project watching its progress engaging in conversations on what we will be able grow there this coming winter. AFTERHOUSE has generated genuine excitement form all type of people, long-term residents and newly arrived ones as well.

Relations with Regional Manufacturing

Since receiving the second REI grant we have secured the donation of scrap insulated sheathing panels (SIPs) from Insulspan (page 27-28), a regional manufacturer and have received the donation of hardwood miss matched siding, a by-product of milling process from Hardwoods of Michigan. AFTERHOUSE is not only reducing the amount of industrial waste with the support of regional manufacturers, but through our design process is creating value for these materials by increasing their palatability.

Possible New Services

Since receiving the second REI grant we negotiated with a local demolition company who trained their employees to efficiently do partial demolitions by hand. This has become a significant savings for AFTERHOUSE because it removed the burden of hauling and land filling concrete, saved us the cost of regarding the lot and allowed us to salvage a considerable amount of structural lumber. With the completion of construction of the first AFTERHOUSE we hope our project could foster a new service in Detroit as an alternative to full demolitions.

Affect on Students

With our first REI grant our student leader, Travis Williams, a native Detroiter and other students have been involved in the design and community interaction aspects of the project; measuring and documenting the existing structure, researching historical precedents, designing high performance low cost transparent building envelops, testing solar angles to maximize thermal performance, learning to assemble construction documents and understand the nature of construction budgets. With the second REI grant students became familiar with the building permit process, experienced how different materials are properly assembled, learned some practical building skills, studied the logistics behind garden planting and passive irrigation systems and lastly they have been gaining some field experience seeing the project being demolished and preparing the foundation for the new greenhouse.

Additional Funding Made Possible

Since receiving our second REI grant our team has managed to raise \$14,800 from a crowd sourcing non-profit funding organization. As a way to raise these funds students developed a number of incentives. These not only include mementos of the project such as framed drawings and bumper stickers, but we have raised funds by promoting a series of charity dinners to be held in the completed AFTERHOUSE using food grown in the structure.

Project Dissemination, Press and Recognition

Since receiving our first REI funding, Andrew Malone, former owner of 3347 and local artist developed a collection of oral histories of the home he translated into a comic style visual narrative (page 33-34). Using this narrative and our design work we have managed to get national recognition of for the project through two prestigious design awards: an Un-built Architecture Award from the Boston Society of Architects and a 2014 R+D (Research and Development) Award from Architect Magazine. This an example of how REI has helped us diversify the way we disseminate the spirit of AFTERHOUSE to not only other urban farming and community gardeners in the region, but to nationally audiences as well. We greatly appreciate your support for this project.