

TITLE:: BIOCELLAR PROTOTYPE STUDY: PHASE II

PROJECT TEAM::

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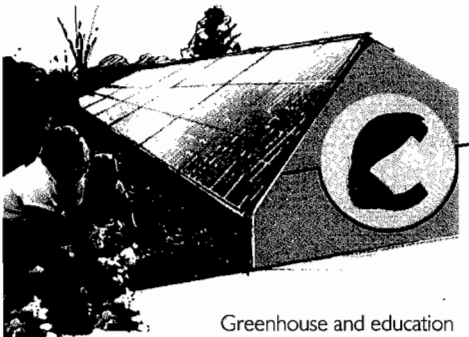
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PROJECT BACKGROUND::

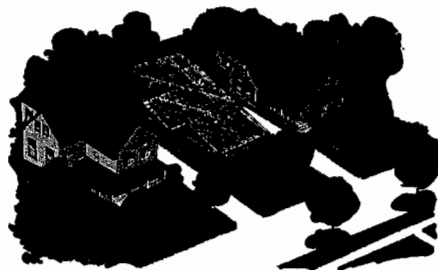
For the past year, the Cleveland Urban Design Collaborative has been working with the City of Cleveland and Neighborhood Progress, Inc. on strategies for managing urban vacancy. This collaboration also included the Cleveland Botanical Garden, the Ohio State University Extension, the GreenCityBlueLake Institute, ParkWorks, the Cleveland MetroParks, the Cuyahoga Planning Commission, the Cleveland Neighborhood Development Coalition, and numerous community development corporations. The group produced a citywide vacant land plan entitled *Re-imagining a More Sustainable Cleveland*. The plan is the first of its kind in the country—a detailed and holistic series of policy recommendations and proposed pilot projects aimed at returning vacant properties to productive use. The Re-imagining a More Sustainable Cleveland initiative identifies a range of strategies for extracting value from vacancy, including:

- Holding strategies to stabilize transitional neighborhoods and preserve vacant properties for future development,
- Green infrastructure to improve water quality, reduce environmental contamination, restore urban ecosystems, and increase access to parks and green space, and
- Productive landscapes that derive an economic return by using vacant properties for agriculture and energy generation.

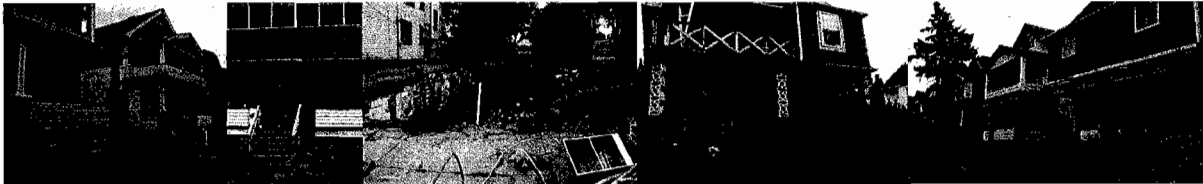
The Re-imagining a More Sustainable Cleveland plan was recently adopted by the Cleveland City Planning Commission. A series of pilot projects will be implemented in 2009 to test the ideas in the plan. This proposed BioCellar Prototype Study is an outgrowth of the Re-imagining initiative, intended to test an experimental idea for reclaiming the foundations of demolished houses for productive new uses.



Greenhouse and education



The scale of a nodal BioCellar unit in a neighborhood, maintaining the scale and fabric of the neighborhood



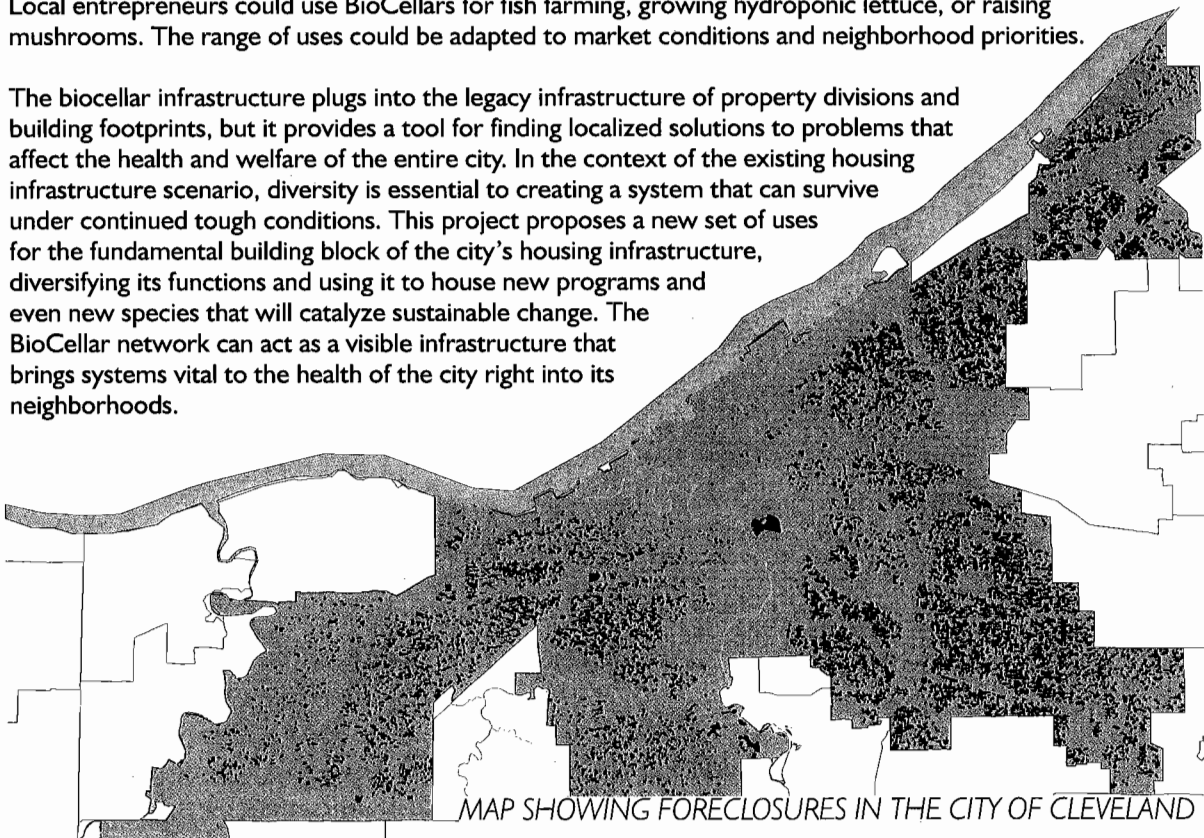
PROJECT OVERVIEW::

Persistent population loss has resulted in a glut of vacant and abandoned houses in the City of Cleveland. This situation has been accelerated by the on-going foreclosure crisis. Vacant houses are frequently targeted by scavengers who steal all valuable materials (especially aluminum siding and copper plumbing) and leave the houses in a state that makes future rehabilitation cost-prohibitive. In response to this situation, the City of Cleveland demolished almost 1,000 houses in 2007 and 1,200 more in 2008. In 2009, the goal is to demolish 2,000 additional houses.

Although these demolitions are necessary to stabilize neighborhoods and eliminate blighted conditions, large-scale demolition programs have a detrimental impact on the fabric of urban neighborhoods. Through the BioCellar prototype study, we hope to identify a functional new use for a valuable part of these vacant houses—the masonry foundation. An existing foundation wall, surrounded by earth, is an insulated container that can store energy and serve a variety of productive new functions. We propose to assemble a team of local experts who will explore these functions and assess the feasibility of re-using residential foundations for green houses, solar collectors, aquaculture facilities, stormwater filtration, and other new uses. Instead of demolishing houses and removing thousands of potentially valuable foundations across the city over the next several years, we propose to preserve some of these foundations and return them to productive use as neighborhood assets. The rehabilitation of the most viable housing stock, interspersed with BioCellars, community gardens, and small-scale green spaces, will help establish a network of sustainable, eco-friendly neighborhoods in the city.

Specific uses for a BioCellar would be neighborhood-based and flexible. In neighborhoods where community gardens or urban farms exist, one or more BioCellars could be developed as greenhouses that would extend the growing season for local agriculture. In other neighborhoods, a BioCellar could function as a solar collector, providing energy to neighboring property owners through a co-operative agreement. Local entrepreneurs could use BioCellars for fish farming, growing hydroponic lettuce, or raising mushrooms. The range of uses could be adapted to market conditions and neighborhood priorities.

The biocellar infrastructure plugs into the legacy infrastructure of property divisions and building footprints, but it provides a tool for finding localized solutions to problems that affect the health and welfare of the entire city. In the context of the existing housing infrastructure scenario, diversity is essential to creating a system that can survive under continued tough conditions. This project proposes a new set of uses for the fundamental building block of the city's housing infrastructure, diversifying its functions and using it to house new programs and even new species that will catalyze sustainable change. The BioCellar network can act as a visible infrastructure that brings systems vital to the health of the city right into its neighborhoods.



PROJECT DESCRIPTION:

Vacant houses slated for deconstruction are candidates for retrofit to BioCells. The architectural shell of the BioCellar is the partially deconstructed housing unit with an added solar envelop. The new environment becomes habitat for living systems designed to provide beneficial ecosystem services. These include the production of food and medicine, water purification and soil detoxification, nutrient cycling and pollination, plus cultural benefits such as recreation and aesthetics. The BioCellar is architecture plus biology to yield mini-economic units. Solar energy is the driving force.

To assess the viability of the BioCellar concept, the project team will identify an individual house that is targeted for demolition—one that is typical and meets a set of criteria we identify for the study. This house will provide the basis for the design analysis. The conclusions we reach in working with one specific property will be generalized and expanded to determine the applicability of the BioCellar model to vacant properties across the city and region.

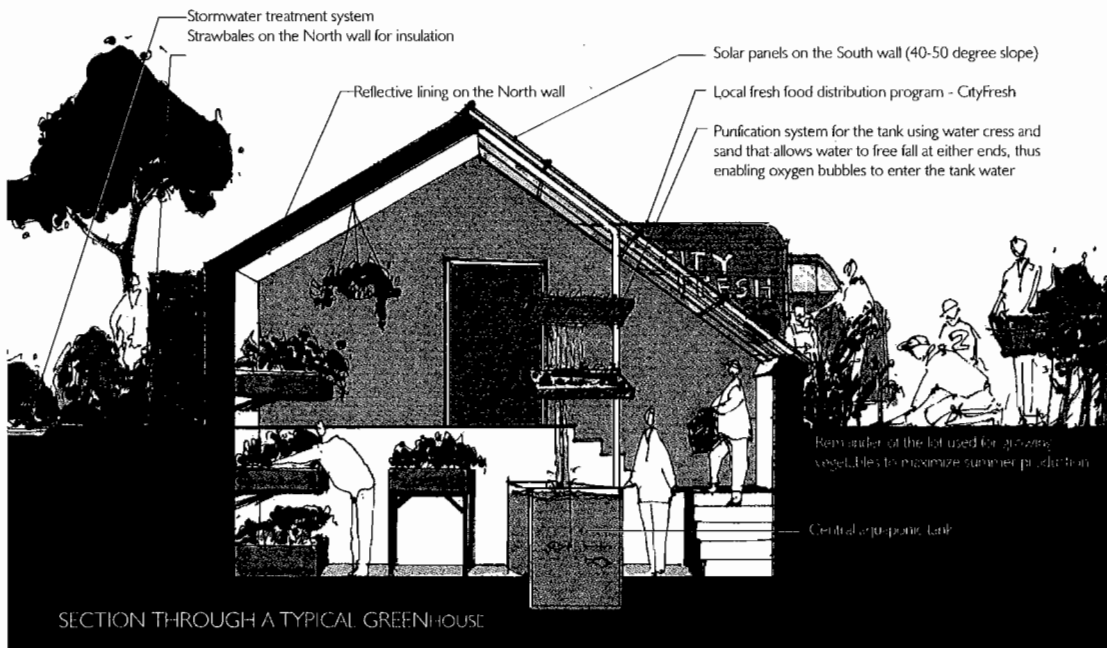
We have been involved with the BioCellar research work for the past 5 months, completing Phase I of the research study, which included:

1. Architectural Alternatives: A BioCellar must be functional, energy-efficient, attractive, low-cost, and appropriate to neighborhood context. The BioCellar Prototype Study included the study of a range of design alternatives for retrofitting an existing foundation. We focussed on developing an architectural template that will allow a single BioCellar to be replicated on a larger scale.

2. BioCellar Matrix of uses: We worked on developing a matrix of a wide range of uses for the BioCellar and juxtaposing that with proximate geographies (topography, demographics, existing land use patterns, economic opportunities, and beneficial proximity, etc.), and system structures (nodal, collaborative, loop, directed, etc.)

3. Detailed study of three specific type of BioCells:

- FoodCellar: greenhouse, fish production, solar cells, poultry
- HealthCellar: healing hut, herb garden, micro-sauna
- eCellar: energy (Methane production), earth (Soil production), education (composting culture)



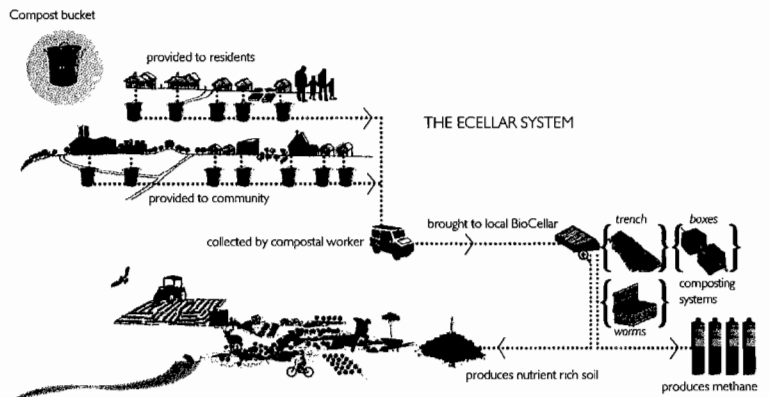
SCOPE OF WORK::

We will refine the work from Phase I to move the project toward implementation. The specific objectives of the Phase II work include:

- **Architectural Alternatives:** Further understanding of the architectural possibilities in converting a vacant home into a BioCellar.
- **Implementation Framework:** We will establish guidelines for site selection, community involvement, performance goals, the use of LEED standards, and biomimicry.

Phase III of this project (not included in the scope of work for this grant) includes:

- **Economic Feasibility:** We will determine the cost of retrofitting existing foundations using the design alternatives in item I for the range of uses identified from the Phase I study. From this analysis, we will determine the best and most cost-effective uses for a BioCellar. We will draft a pro forma for implementing the BioCellar prototype.
- **Prototype Implementation:** We will put together a proposal for the first prototype for a house in a Cleveland neighborhood and pursue further funding to implement the project. We will seek community partners for a pilot project and outline a mechanism for replication.



BUDGET::

We are requesting \$4,000 from APA Urban Design and Preservation Division to conduct this study. These funds will be used to support the time of CUDC staff and consultants on the project team needed to complete the study. A detailed breakup of the budget includes:

Budget

BioCellar Prototype Study: Phase 2

	Rate	Hours	Total Budget
Personnel			
Principal Investigator (Vernon)	\$85.00 hour	60	\$5,100.00
Co-Investigator (Torgalkar)	\$55.00 hour	80	\$4,400.00
Research consultants	\$75.00 hour	40	\$3,000.00
Sub-total			\$12,500.00
Direct Costs			
Design/Production Supplies	\$800.00		\$800.00
Sub-total			\$800.00
PROJECT TOTAL			\$13,300.00

Funding	Amount	Status
APA Urban Design and Preservation grant	\$4,000.00	Requested
Sears Swetland Foundation	\$5,000.00	Committed
Cleveland Foundation	\$2,000.00	Requested
Kent State University (In-kind support)	\$2,300.00	Requested
PROJECT TOTAL		\$13,300.00