

Deconstruction

An Ecological Performance Standard

Building In Nature's Image
Northeast Green Building Consulting, LLC
July 02009

Coevolutionary Design
MYCO+Evolution, LLC



UNFINISHED
DRAFT

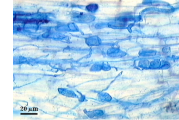
Mission

Adapt Central New York's decomposing ecosystem of deteriorated homes into a lasting inherently local deconstruction economy that creates living wage jobs, provides building science, forensics and energy-efficiency training for sustainable construction careers while, simultaneously, diverting hundreds of millions of pounds of valuable building resources, unique, and historical architectural elements from landfills, saving millions of dollars, augmenting local tax bases, reducing climate change, protecting ecosystems and preserving Life's free ecosystem services, and enhancing community resilience.



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Proof of Concept

Deconstruction creates living-wage jobs, augments local tax bases and reduces municipal costs, preserves ecosystem services, improves community health and safety, and generates high-quality, low-cost and unique building materials. Demolition intensifies economic & ecological costs.

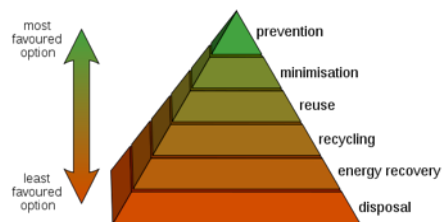
NO COMMUNITY HAS EVER DEMOLISHED ITS WAY TO ECONOMIC PROSPERITY OR ECOLOGICAL HEALTH.



319 Marcellus Street (front), hands-on deconstruction training at 319 Marcellus, timber from 319 Marcellus Street salvaged for a new garage on the same site.

On July 8 - 10, 2009, Northeast Green Building Consulting, LLC (Northeast), with Fred Smith Roofing and a business that provided 6 trainees, undertook the first complete deconstruction in Central New York, the full disassembling of 319 Marcellus Street, a 1,956 square foot single-family home, to its foundation in approximately 10 hours (the “Project”).

Deconstruction, essentially the reverse of construction, safely disassembles and salvages valuable building materials for reuse and recycling and better manages the remediation of preexisting toxins present in older buildings. This Project demonstrates that, as in other cities, deconstruction should replace demolition in Syracuse, as the way to reduce the adverse consequences and costs created by this community’s 1,370 abandoned homes.



Proof of Concept

The Project demonstrates that all of the elements needed to form a healthy community deconstruction infrastructure exist in Central New York. Though this Project identifies a higher first cost of deconstruction (roughly \$1,089.55 per project), it is undeniable that, when all of the costs and benefits are integrated, deconstruction becomes holistically profitable for communities while demolition imposes severe and unalterable environmental and economic costs.

First Cost

Approximately 300 homes are demolished each year in Syracuse (Post Standard, Feb. 24, 2008). Despite that, as of May 31, 2009, the number of abandoned homes in the City of Syracuse rose to 1,370, from approximately 1,000 in 1999. In current form, these homes decay community fabric, depress property values and local tax bases, deplete scarce and diminishing municipal resources (police, fire and landfill), degrade human and ecological health, and draw crime and fire. For example, an average of 12 to 24 fires broke out in vacant homes, each year, between 2004 and 2007 (requiring 5,512 man-hours of fire inspection yearly) Post Standard, Feb. 24, 2008.

Currently, the City intends to demolish 67 homes using \$1.2 Million dollars in federal stimulus money (Syracuse Post Standard, May 30, 2009), earmarking an additional \$1.0 Million dollars for demolition. Therefore, assuming a rough cost of demolition at \$17,910.45 per home (\$1.2 Million/ 67 homes), it will cost the City \$2.2 Million dollars to demolish 127 homes.

The Project, as the first deconstruction of an entire building in Central New York, cost \$19,000 (not including \$6,000 for a firm proving trainees or the cost of asbestos abatement), \$1,089.55 higher than demolition. However, as in “green” building, no cost is accurately measured in isolation. All financial expenses, such as a higher first cost of deconstruction over demolition, are part of larger, complex, non-linear and intrinsically interconnected systems. It is essential to evaluate costs and benefits as holistically as current understanding allows, because externalities and other costs are still incurred even if not accounted for in the “first” cost.

Holistic Measures

319 Marcellus Street weighed approximately 213,188 pounds (including the foundation), of which 86% (181,657.5 pounds) was salvaged, recycled, or diverted from landfills. Only 14.79% of materials were landfilled, primarily painted wood and mixed construction & household debris

that remained from the home's prior tenants. Deconstructing the home to its foundation in approximately ten hours, which included intensive hands-on deconstruction training activities for six trainees.

Setting this lightly-framed, one-story shotgun style home as a conservative baseline (for example, 133 South Avenue, demolished last week, was a two-story, 4,096 square foot unique home embodying the City's illustrious past), the consequences of demolishing 127 homes would be to:

1. Landfill 23,070,502.5 pounds (11,535.25 tons) of high-quality building materials and unique architectural elements at a cost of \$484,480 dollars (assuming the same 86% salvage, recycling and recovery rate as the Project).
2. Emit _____ of carbon

Deconstruction of 127 homes could instead:

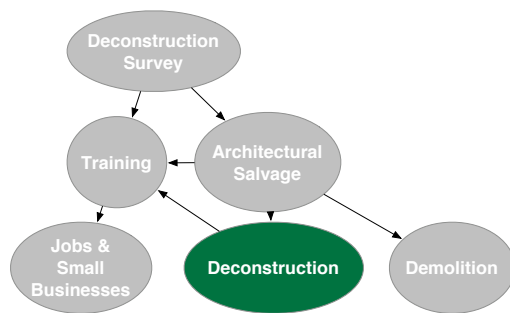
1. Reduce resource flows to landfills from 11,535.25 tons to 1,706 tons, saving \$412,828 in landfill fees (at current landfill rates). The cost of landfilling nevertheless will be substantial, approximately \$72,645.
2. Create \$321,390.01 in salvaged building materials and unique architectural elements (assuming a 50% discount from 'new' materials, a substantial benefit to local residents).
3. Provide roughly 20,000 man-hours of work, paying a living wage of \$11.42 (with health care) or \$13.11 (without) per hour (www.syracuse.com/news/index.ssf/2009/06/committee_to_amend_living_wage.html), creating approximately \$235,915 in wages for local community residents.
4. Employ demolition contractors to recycle concrete foundations, and direct their efforts at larger, commercial projects for which no suitable deconstruction capacity now exists.

These estimates are variable, based on dynamic factors including the demolition contractor's practices, the skill of the deconstruction crew, the amounts of potential materials to be recycled, and nature of each home to be deconstructed. For example, most demolition contractors appreciate the immediate financial value of recycling metal (as well as the lower landfill fees by reducing the amount of materials landfilled). Concrete is also recyclable; depending on size of concrete pieces, different recycling fees apply. Asphalt shingles and sheetrock may also be recycled, if sufficiently aggregated to offset the transportation costs of shipping these materials to distant recycling facilities.

Immediate Work & Critical Path

Surveying and salvaging abandoned homes for high-value & unique building materials, and conducting hands-on deconstruction, building science & forensics training, can begin immediately.

JUST AS WHEN BUILDING A HOME, THERE IS A CRITICAL PATH IN SEQUENCING DECONSTRUCTION PROFITABLY.



Salvaged wood remade into “brand-new 100 year old” flooring; David, a deconstruction trainee at 319 Marcellus

Deconstruction requires careful sequencing of work and integration with the preexisting social-ecological community of laws, regulations, markets, sources and destinations of toxins, salvaged lumber and recyclable resources. Northeast drafted a pattern language of deconstruction, embodying the ecoliteracy of deconstruction, including how the community can holistically and profitably capture the highest economic and ecological value. The following work can begin immediately.

Immediate Architectural Surveys

It is essential to first truly measure the extent of what will be lost if demolition continues without first evaluating these homes for the salvage value of their highest value, historical and unique materials. Northeast can, immediately, begin identifying and inventorying the abandoned homes

slated for demolition to determine whether they hold any unique, historical, or high-value architectural elements such as fireplace mantels, wide-plank flooring, large timbers, architectural trim, and stained or leaded glass windows, as well as potential toxins such as mercury in thermostats. Based on this ‘first sort’ of abandoned homes, Northeast can begin sequencing and salvaging the highest value and unique materials while identifying latent and typically ignored toxins such as the mercury in older thermostats.

Architectural Salvage, Building Science & Forensics Training

As part of an immediate architectural salvage evaluation and operation, local residents that have or are forming deconstruction companies can receive hands-on training including: 1) preparing written deconstruction resource surveys (that evaluate the value of timber, dimensional wood, flooring and architectural elements in each house), 2) identifying potential toxins and safety issues, including how to properly brace structures while deconstructing them, and 3) developing a schedule, staging, and sequencing of deconstruction. Northeast also can provide trainees with building forensics and building science education – the best teaching tool for sustainable construction is to evaluate in the field what has failed in these homes and why.

The Syracuse Center for Excellence and SUNY ESF also can play active research roles in this effort. NGBC also intends to evaluate deconstruction through the lens of urban “resilience,” to develop an “Ecological Assessment Tool” for deconstruction and establish metrics by which to evaluate abandoned homes.

Ecology of Deconstruction

Syracuse’s abandoned homes are a decomposing ecosystem of high-quality, low-cost building materials for the local human-built environment.

THESE HOMES ARE THE FORESTS, MINES, AND OIL WELLS OF TOMORROW’S HOMES.



133 South Ave, demolished last week, was as much as source of high-quality lumber as the Northern Forest, at a much lower ecological and economic cost.

This decomposing local ecosystem of abandoned homes (in a state of succession that ecologists call the “late K” phase) is no different than Earth’s standing forests, buried oil and metal reserves, and stocks of sand, gravel and aggregate. These homes, functionally, are a literal Home Depot, simultaneously forest and lumberyard, oil well and refinery, stone quarry and showroom, and local mine of sand, gravel and aggregate. And the timbers and wood salvaged is of intrinsically higher quality; a sampling of timber deconstructed from 319 Marcellus indicated that the original timber had 22 growth rings, a sign of older growth while wood from the most recent addition had only 7, indicating faster-growing, younger trees.

In this ecosystem also are unique architectural elements, hand-hewn timbers and stone, custom-built fireplace mantels and handmade stained and leaded glass windows, made by our ancestors, and found nowhere else in the world. We must begin viewing our human infrastructures as a part of natural ecosystems. The first step is “Return,” the closing of nutrient cycles.

Ecology of Deconstruction

Construction activity consumes 60 percent of all materials used in the US economy, excluding food and fuel (US Geological Survey, 2000). Ecosystems are being damaged by these one-way, “take-make-waste” flows of resources through human communities, more rapidly and extensively than in any comparable time in human history; approximately 60% of ecosystem services surveyed are being degraded or used unsustainably, including fresh water, air and water purification, and regulation of regional and local climate (Millennium Ecosystem Assessment, 2005). It is no stretch to state that a community should not claim to be sustainable or “green” until it establishes a community deconstruction infrastructure.

The home previously located at 133 South Avenue, above, at 4,096 square feet, likely weighed 127,058 pounds (not including its hand-cut stone foundation, which appears to have been pushed in and buried). At 63.5 tons, the landfill cost would be \$2,668. Given its unique character and affluent origin, the home likely contained unique architectural elements, i.e., handmade fireplace mantels, tile, wide-plank flooring, and heavy timber. 319 Marcellus, a typical working class shotgun-style home at 1,956 ft², had already been gutted and did not hold any unique elements; still, however, the value of timber salvaged from the home, at a 50% discount from today’s retail price was \$2,090. Historic fireplace mantels, stained or leaded glass windows, and large timbers typically sell for more than 100 percent of retail. Consequently, using only 319 Marcellus as a guide, the value of salvaged wood products from 133 South Avenue would approximate \$5,283.84. The landfill fees would have dropped from \$2,668 to \$373.80.

Inherently Local Jobs

Deconstructing 133 South Avenue also would have employed the same 18 workers that deconstructed 319 Marcellus Street, only for substantially longer and more profitably (due to the unique elements and structural timbers that likely existed). At 319 Marcellus Street, workers took approximately one full day to deconstruct the home to its foundation, another to denail and transport the materials, and a third to recycle the foundation and fill the excavated hole, remove a length of chain link fence, seed & straw the disturbed area of the lot. The Project created approximately 19.35 days of work, or jobs for 4 workers for a 40 hour week at a Syracuse living

wage of \$11.54 per hour. The benefits of 133 South Avenue, due to that home's size, would have been much greater to the local community.



A local resident, Michael Jackson, arrived unannounced requesting to recycle the metal.

The more homes deconstructed, the more the community would benefit. For example, based on the deconstruction of 319 Marcellus Street (a one-story, nondescript “working class” shotgun style home with no significant architectural features), if 1,000 abandoned homes were deconstructed as a long-term economic development program, the benefits would approximate:

1. \$2,373,110 dollars in high-quality salvaged wood, metal, and unique architectural elements would be generated (a conservative estimate)¹.
2. 175,638,000 pounds (87,819 tons) of resources would be diverted from landfills, at a savings of \$4,390,950 in landfill tipping fees (at \$50 per ton), assuming 100% of the homes would be landfilled.

¹ This is an extremely low estimate of value since 319 Marcellus did not have any unique architectural elements such as fireplace mantels, stained glass windows, and wide-plank flooring. Many of the 1,300 abandoned homes hold high-value architectural items, typically the most profitable component of deconstruction, that can be sold for more than 100% of current market value.

To be completed as part of full
White Paper.

Community Infrastructure

As emerging artist's community and art destination, the Near West Side can become the City's center of deconstruction by co-locating businesses as part of a "Community Exchange."

ARTISTS, ARTISANS & CRAFTSPEOPLE CAN REMAKE SALVAGED MATERIAL INTO UNIQUE, HIGH-VALUE ARTWORK AND PRODUCTS.

Habitat for Humanity ReStore

Community Exchange

Artisan shops, wood working, furniture making, etc....

Inherently Local Economy

Deconstruction creates living wage jobs with multidimensional community benefits, training for sustainable construction, that workers for careers in the rapidly-growing field of sustainable construction, and integrates with existing City of Syracuse Green Initiatives such as the LEED property tax abatement and \$1 house programs.

DECONSTRUCTION CAN AUGMENT LOCAL PROPERTY, BUSINESS, AND WAGE TAX BASES, IMPROVES LOCAL NEIGHBORHOODS & PROPERTY VALUES, REDUCE MUNICIPAL COSTS OF PROVIDING POLICE AND FIRE SERVICES.

To be completed.

Toxins & Law

TO BE COMPLETED

Toxins

Precaution is an adaptive tool to manage uncertainty. With existing homes, there are patterns of common risks, laws, and with demolition, unmeasured externalities with proximately adverse consequences on human and natural life.

Virtually all abandoned homes, as well as new homes, hold both visible and latent toxins such as asbestos, lead paint, mercury, PCB's, vinyl, endocrine-disrupters, respiratory & reproductive toxins, and carcinogens.

Worker Safety

Minimum 10 hour OSHA training

Lead training

Tetanus shot required

Safety Equipment

“Clean Bag” - hard hat, gloves, HEPA respirator, dust masks, eye protection, protective clothing (to be laundered separately), hand-washing before breaks, lunch, and heading home, awareness of effects of toxins on family, first aid kit, flashlight/head lights

Law

A hierarchy of laws applies to both demolition and deconstruction. Some of these regulations deem deconstruction no different than demolition, while certain laws & regulations impose additional responsibilities on deconstruction.

Asbestos

Life as Model

Nature is the ultimate life cycle assessment (LCA). Human measures (economics, LCA software, virtual models) are rigorous but too isolated and incomplete to evaluate the true adverse consequences of demolition versus, alternatively, the holistic benefits of deconstruction.

“AFTER 3.8 BILLION YEARS...FAILURES ARE FOSSILS AND WHAT SURROUNDS US THE SECRET TO OUR SURVIVAL.” BIOMIMICRY GUILD.

Many types of life cycle assessment methodologies, systems, software, spreadsheets and calculators exist, many measuring the costs and benefits of deconstruction, demolition, and waste reduction on natural and human systems, using economic and ecological indicators. All are limited by our isolated understanding and knowledge of complex, non-linear living systems, i.e., intrinsically interconnected human/natural communities.

Metrics

While predominantly human models are too incomplete and isolated to accurately develop cost/benefit evaluations, it is nevertheless necessary to measure what is possible so that it can be managed. A University of Florida study summarized potential performance measures.

Essence

1. No community has ever demolished its way to economic prosperity or ecological health.
2. The City should leverage the \$2.2 Million allocated to demolition instead to deconstruction as a long-term job and small business creation tool. The availability of stimulus money poses a unique opportunity for Syracuse to immediately create living wage jobs (with health care)

and a local deconstruction economy that mutually-enhances human and ecological health for the next Seven Generations.

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