

**REALITY HOUSE: CHALLENGE INTO OPPORTUNITY
DECONSTRUCTION, JOB TRAINING, REUSE, RECYCLING**

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SUMMARY: Columbia University's Reality House project successfully combined deconstruction, job training, reuse, and recycling, bringing together many different organizations to share skills, opportunities and benefits. Reality House was 36,000 square feet of unbuilt and partially built-out space on two floors packed with steel framing, used furniture, unused building materials, tons of cardboard and paper, computers and monitors, universal wastes, scrap metal, and more. Columbia and the Institution Recycling Network designed a project with the following elements: (1) Jobsite training for local workers; (2) Local reuse of building materials; (3) Reuse of surplus property locally and in international relief; (4) Recycling of paper and cardboard, including destruction of potentially confidential information; (5) Environmentally appropriate recycling of universal wastes, computers and monitors; (6) Recycling of scrap metal including unusable furniture; (7) Recycling of mixed debris, including primarily wood and wallboard. With a final reuse/recycling rate over 88% at a cost much less than simple demolition, Reality House epitomizes the multiple benefits that can be achieved when sustainability is planned into a project from the start, and when the skills of multiple parties are brought together for common goals.

The Challenge

Through the late 1990s, Reality House was a drug treatment center occupying a 72,000 square foot, four-story building at 637 West 125th Street in northern Manhattan. Early this decade, Columbia University acquired Reality House as part of its Manhattanville project, a 30-year, \$30-billion initiative to develop a new mixed-use campus in West Harlem. Columbia rehabbed the bottom two floors into Manhattanville's project headquarters. The top floors remained as they were when Reality House closed:

- Partially built-out space. Reality House started and then abandoned a project to fit out its top floor into offices and client space. Some 30 rooms and hallways were framed in, with rough wiring, door frames, switch and outlet boxes.
- Abandoned furniture. Reality House used its unoccupied third and fourth floors as a dumping ground for used furniture. In the past few years Columbia added more of its own.
- Thousands of pounds of books, files, photographs, and other documents, including an unknown quantity of confidential client and financial records.
- Dozens of old monitors, TVs, copiers, and computers (potentially storing confidential personal and financial data).
- Piles of scrap metal - unused building materials, vents and light fixtures, ancient typewriters and mimeograph machines, motors, darkroom equipment, lockers, etc.

- Cardboard boxes. Some empty. Hundreds more filled with files, office supplies, clothing, video cassettes, toys, plastic Christmas trees, and thousands of other random things accumulated over the 25+ years that Reality House operated.
- Wallboard, insulation, fireproofing, new and used doors, two steel rollup doors, exit lights: a variety of miscellaneous junk.
- Dozens of fluorescent lamps and ballasts.

With Reality House slated for demolition, the typical plan of action would be to ignore the junk and let the demolition crew handle it. But Columbia chose a much different approach, for several reasons:

1. Reality House contained sensitive and regulated wastes, including personal and financial records, computers and monitors, and fluorescent bulbs, ballasts, and batteries. These were scattered through two floors of built-out and partially built-out space.
2. Columbia recognized that there was reuse potential in the building materials, if someone could get at them. Most of the surplus could also be reused, if someone could reach and find a use for it. Scrap metal, paper and cardboard were all recyclable, if someone could collect and haul them away.
3. Columbia has a serious commitment to make sustainability a centerpiece of the Manhattanville project.

The straightforward path, demolition with or without limited recycling, wasn't an option. But attempting to reuse and recycle aggressively, or even simply to assure the appropriate disposition of regulated materials, was anything but straightforward. Everything – the regulated and the unregulated, the reusable and recyclable and the trash – was strewn, piled, thrown, and jumbled through 36,000 square feet and two floors. There was a freight elevator, but there was no loading dock, no parking, and a single garage door to bring materials in and out of the building.

Columbia faced a challenge.



Figures 1, 2, 3: Reality House Before. The stud forest filled with surplus and other junk. Just plain junk on the fourth floor. Abandoned computers and monitors.

Challenge to Opportunity

Columbia and IRN have cooperated before on complex reuse/recycling projects – recently, for example, finding ways to reuse 15 tons of kitchen equipment from Columbia’s Faculty House renovation. So it was natural for Columbia to ask for IRN’s assistance at Reality House.

The crux of the project was the partially built-out space on the fourth floor of Reality House – the stud forest. IRN could find users for the building materials and surplus property, markets for the fibers and metal, and qualified recyclers for the regulated wastes. But most of these materials were packed into the maze of framed-in space on the fourth floor. There was no way to reach the materials without dismantling the walls, but there was no way to wreck the walls without moving the materials. There wasn’t nearly enough budget to pay union wage scales to move recyclable materials, but skilled labor was needed to perform demolition.

Skilled labor proved to be the key to the Reality House project. Like the rest of the country, New York has nearly limitless need for capabilities in deconstruction, but has few, if any, established deconstruction crews. The city’s vocational schools and unions recognize that green practices represent the future for the construction industry, but have taken only baby steps toward their realization. Columbia itself has made green construction and green job creation a focus for Manhattanville, but with the project in its early stages had not found a way to move toward this goal.

Reality House addressed all of these issues. The partly built-out areas of the structure were an ideal training site for deconstruction, with learning opportunities for disassembly and teardown of framing; removal and handling of wallboard and insulation; testing and removal of wiring; disassembly of ductwork; material handling; tool use; jobsite management and safety. Together, Columbia and IRN identified organizations who could take advantage of these opportunities:

- Nontraditional Employment for Women (NEW) is a nonprofit that works with New York’s unions to bring women into skilled, higher-paying jobs in the construction trades. NEW offers pre-apprenticeship training programs that combine classroom and jobsite experience.
- The School of Cooperative Technical Education (SCTE) is an alternative school within the New York City Department of Education that provides students with the opportunity to learn both traditional trades-based skills along and a variety of state-of-the-art technologies.
- Build It Green – New York City (BIG) is New York’s only non-profit retail outlet for salvaged and surplus building materials. BIG’s mission is to keep these materials out of the landfill, while offering deep discounts on their resale to New York residents and small businesses.

The project that emerged was simple in concept, if complicated in implementation: NEW and SCTE would provide student crews and instructors who would use Reality House as a training site for deconstruction, electrical, and other jobsite skills. The NEW and SCTE crews would also provide labor to handle and sort reusable and recyclable commodities. BIG would provide an outlet for the thousands of studs, doorframes, wiring and other building materials, injecting them back into the New York community. IRN would manage the project, identify markets for all of the reusable and recyclable materials, develop material handling procedures, and keep materials moving smoothly as they were sorted and prepared for shipment by the NEW/SCTE crews.

Implementation

The project was scheduled over four weeks from July into early August, 2009. The Scope of Work covered ten different material streams:

1. **Deconstruction:** NEW and SCTE crews disassembled framing, including wiring, door jambs, light fixtures, and other elements. Studs were sorted and bundled. Other reusable materials were palletized or placed in gaylord containers.
2. **Confidential Documents and Other Paper:** Rather than attempt to identify and segregate confidential documents, all paper was treated as confidential. Paper was deposited in gaylords on pallets, and sent for destructive recycling.
3. **Cardboard:** Boxes were emptied, flattened, and deposited in gaylords.
4. **Electronic Equipment** was sorted and placed in gaylords. Items with metal value and no universal waste or confidentiality issues (e.g., typewriters and printers) were recycled as scrap metal.
5. **Universal Wastes** were segregated and deposited in steel, fiberboard, or plastic drums. Ballasts were removed from fluorescent fixtures.
6. **Surplus Furnishings:** Surplus was split three ways. SCTE and NEW crews were offered anything they could use in their own homes, with the proviso that nothing be resold for profit. BIG took away items suitable for resale to the local community. For the rest, IRN identified nonprofit organizations that use surplus furnishings in relief and/or community development projects.
7. **Miscellaneous Materials for Reuse:** These included reams of office paper, hundreds of nearly new files, storage crates and boxes, binders, clothing, and hundreds of other items. These were boxed and placed in gaylord containers, and taken by BIG or other nonprofits.
8. **Scrap Metal** (including metal furnishings that were unsuitable for reuse) was bundled or placed in gaylords on pallets; large items were placed directly on pallets.
9. **Mixed Debris:** Consistent with Columbia's goal to maximize recycling at Manhattanville, mixed debris including wood, wood, plywood, and fiberboard furniture, wallboard, and other recyclable mixed wastes were segregated for recycling.
10. **Trash:** Six two-cubic yard containers were kept on site to handle miscellaneous nonrecyclable residuals like insulation, packing materials, mixed plastics, painted wallboard, and sweepings.



Figures 4, 5, 6: Reality House During. Dismantling studs, wiring, and wallboard. Loading out paper and cardboard. A NEW crew tackles a run of wall.

We relied extensively on gaylord containers set up on pallets to hold and move materials on the jobsite. This proved a wise choice. We were unable to leave dumpsters or rolloff containers on the street overnight, so we needed to store all materials in the building until they were picked up. Gaylords gave us this capability. We could set up and move gaylords quickly whenever and wherever we needed them, which was important given the many different materials we were handling. We could keep gaylords for several different materials close to active work areas, minimizing material handling and carries, and facilitating a neat, safe jobsite.

Safety was the highest priority throughout the project. Every workday started with a safety meeting. Columbia provided a full-time safety engineer, and hardhats, gloves, respirators, and eye protection were mandatory at all times. To the credit of all involved, on a messy, complex jobsite, handling heavy materials with as many as 35 workers, there were no injuries worse than bumps and bruises.

The work proceeded in overlapping steps. First an area would be cleared of junk – surplus furniture, paper, computers, whatever. Then teams would move in to do deconstruction. Others would take building materials away to be bundled, and to sort and organize materials for recycling or reuse. SCTE and NEW instructors were at the leading edge of the project, providing oversight and training in tool use, construction and disassembly techniques, wiring and testing circuits, and other jobsite skills. IRN swept the back end, assuring that materials were removed from active work areas, sorted and stored appropriately for reuse or recycling. We called in trucks or rolloff containers from BIG and other markets to haul materials away every time we could make up a full load.

Over four weeks, the project was divided into three broad phases. First, we concentrated on cleaning out the debris-filled third floor. This gave NEW workers an introduction to the project and to the deconstruction skills they would use in the built-out areas of the fourth floor. Meanwhile, the SCTE students began to clean out the fourth floor to create space in which to work, tested wiring, and ran temporary lighting circuits throughout the fourth floor.

Second, NEW and SCTE concentrated on deconstruction and cleanout of the fourth floor. Their instructors organized teams and shifted assignments from day to day so that all workers could be exposed to the many aspects of deconstruction, material management, and recycling on the jobsite.

Third, we moved into the remaining fourth floor space, which offered additional opportunities for deconstruction, and housed about half of all of the usable surplus. Again, deconstruction proceeded apace with cleanout and organization of surplus.

Materials were consolidated and prepared for shipment continuously. Bulky metal and wood items were disassembled by hand or sledgehammer to minimize volume and subsequent handling costs. We brought in trucks and waste containers as needed to haul materials from the site, as follows:

Building materials and surplus: Build It Green took five truckloads from the site on four different days. IRN organized shipment to nonprofit Food for the Poor of two shipping containers loaded out on the same day.

Scrap metal: 30-cubic yard rolloff containers were filled on each of two days. Local scrap dealer TNT Enterprises took approximately 20,000 pounds of scrap metal in five truckloads.

Paper and cardboard: The majority of paper and cardboard were loaded into a tractor trailer and hauled directly to market; the balance were loaded out into a 26-foot IRN box truck on the final day of the project.

Electronics and universal wastes: These gaylords and drums were loaded out into an IRN box truck.

Mixed debris: Mixed debris was hauled from the site on three occasions in a 30-cubic yard rolloff container.

Trash: Trash was accumulated in 2-cubic yard rolling dumpsters small enough to be moved freely throughout Reality House. These were picked up four times during the project, along with smaller quantities of solid waste in gaylords and trash barrels.

Results

The project succeeded beyond reasonable expectations. After four weeks, 72,000 square feet of messy construction site were emptied and left broom-clean. Over 30 young men and women moved through the NEW and SCTE training programs, and 77 tons of materials were recycled or reused (Table 1).

Construction Skills Training: NEW sent two crews to Reality House. A total of 21 NEW women completed a two- or four-week shift on the jobsite. SCTE’s crew of 14 young men and one woman were on site for three of the four weeks. Training covered jobsite safety; hazard identification; hand and power tool use (drills and screw guns, hand and portable power saws, hand tools); construction and deconstruction techniques; basic wiring including circuit testing; material handling; work team and task management. Additionally, NEW’s and SCTE’s instructors used break and lunch periods to discuss the practicalities of jobsite cooperation, jobsite organization, and working in a union and nonunion environment.

Table 1 Reality House Reuse and Recycling Results			
Material	Market	Tons Disposed	Tons Recycled or Reused
Surplus	Build It Green – NYC		7.5
Surplus	NEW & SCTE		1.25
Surplus	Food for the Poor - Nicaragua		16.00
Surplus	IRN Warehouse		3.45
Building Materials	Build It Green – NYC		4.50
Metal	Sims Metal Management, NYC		9.00
Metal	IRN Warehouse		1.03
Metal	TNT Enterprises, NYC		10.00
Paper (to shred)	Northstar Pulp & Paper, MA		11.31
Cardboard	Northstar Pulp & Paper, MA		2.72
Computers	Allied Computer Brokers, MA		0.62
Ballasts	Complete Recycling Solutions, MA		0.26
Batteries	Complete Recycling Solutions, MA		0.07
Fluorescents	Complete Recycling Solutions, MA		0.11
Mixed Debris	Filco Carting, NYC	1.71	9.32
Trash	Filco Carting, NYC	6.00	
Trash	Filco Carting, NYC	0.75	
Totals		8.46	77.12
Recycling Rate			90.1%

Building Materials: Build It Green removed six truckloads of reusable building materials from Reality House, a total of some ten tons. These included over 1,000 steel studs and other framing members, over 1,000 pounds of armored cable, 34 new doors in frames, reinforcing steel, sheet metal, dozens of never-used vents and louvers, over 100 fluorescent fixtures, an industrial band saw and radial arm saw, outlet and switch boxes, many

dozens of assorted construction-related items, and over 100 pieces of usable furniture (desks, work tables, file and storage cabinets, chairs, etc.).

Surplus Furniture: Two container loads (approximately 16 tons) of surplus were shipped directly from Reality House to charitable reuse in Nicaragua. Included were over 200 invaluable school desks and chairs, as well as file cabinets, work and drafting tables, doors and similar items, plus several gaylord containers filled with school and domestic supplies.

Recyclable Materials: Fibers, Electronics, Universal Wastes, Metals, and Mixed Debris: Eleven tons of paper and nearly three tons of cardboard were taken from Reality House and recycled. Over a half ton of computers, monitors, and other electronics were removed and destructively recycled. Universal wastes sent for recycling included some 200 fluorescent tubes plus 400 pounds of ballasts and 200 pounds of batteries. Eleven tons of scrap metal were hauled from Reality House in rolloff containers. A neighborhood scrapper came by the site, emptied and removed another ten tons of metal collected in gaylord containers.

Three 30-cubic yard containers (11 tons) of mixed debris were shipped for recycling. The majority of this tonnage was wood and wallboard.

Trash: About nine tons were ultimately discarded as trash, most of it early in the project when crews were struggling simply to make space to work, and when many crew members were still new to the concept of aggressive recycling.

Recycling Rate: With a total of nearly 80 tons reused or recycled, the overall project reuse/recycling rate was 90.1%.



Figures 7,8: Reality House After. Studs and doorframes bundled for shipment. Paper, metals, and other materials prepped to go away. See Figure 2 for photo location.

Summary: Winners All Around

This was truly a project with nothing but winners.

Columbia took a huge first step toward sustainable building at Manhattanville. The school is already using Reality House to induce reluctant contractors to adopt an aggressive approach to recycling. Columbia also resolved potentially thorny concerns with regulated wastes, achieved its first example of green employment and training at Manhattanville, and saved tens of thousands of dollars compared to conventional demolition.

Build It Green and local neighborhoods are benefitting from tens of thousands of dollars of building materials and usable furnishings kept and distributed in the community. Fiber, universal waste, and metal markets are providing local jobs and economic activity.

And most important, close to 30 workers have taken serious steps toward a career in deconstruction and/or the building trades. NEW and several Reality House graduates have expressed serious interest in setting up a permanent enterprise focusing on deconstruction and recycling. IRN is already proposing NEW crews on more New York projects, and Columbia's Harlem Small Business Development Center will be working with NEW to plan and set up a business area focused on deconstruction and green building.

On many fronts, momentum from Reality House will be sustained far into the future.



Figure 9: NEW crew No. 2 with instructors in the deconstructed, cleaned out, and cleaned up stud forest

Postscript: Only in New York

With no loading dock, we needed a forklift to load trucks and shipping containers. But we needed it just a few days, two or three hours a day. Rental was a stupid expense. Just up 130th Street was hardware supplier Pearlgreen, who had a forklift that they used only a couple of hours a day. It was a New York match; for a \$10 or \$20 dollar bill, and with his boss's blessing, Nixon the forklift driver would come down the street, load for twenty minutes or an hour or however long we needed him, then head back to his real job. The dollars we handed Nixon saved thousands in rental costs. And Nixon was a really good forklift man.

As noted above, we put a lot of scrap metal in gaylord boxes. But gaylords are a lousy way to ship metals to markets, who want only bulk material. Gaylords are also difficult and time consuming to pack into a rolloff container. As we stared at a couple of gaylords on the street wondering what to do with them, a white van pulled up and five guys piled out: TNT Enterprises. They wanted the metal, and they had no problem about unloading gaylords. They ended up taking five truckloads, nearly ten tons. This was a no cash transaction for IRN and Columbia that put some hard cash into the hands of local entrepreneurs. Another NYC solution.

Acknowledgements

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Greg Lempin picked up the project when it was still an amorphous idea and steered it to completion, a calm but firm and consistent hand on the rudder.

NEW instructors Steve Flynn and Bruce Stubbs deserve the highest praise for their instruction and support of the NEW women. Always patient, always thoughtful, always generous, not only with their time, but with their experience and practical advice about making a career in construction.

Donald Ferguson and Jose Guerrero, SCTE's instructors, motivated a crew of high schoolers through a hot, dirty job with energy, patience, and understanding – a tough mix to master on any jobsite.

Hardly least, Ed Sinnott, safety engineer. Not only was Ed a constant, quiet, sensible voice keeping us all out of trouble and stupidity, he was always willing to lend a hand moving or loading the grungiest and heaviest of materials. And when we needed to load out, Ed was our parking space animal – found the traffic barriers, set them up, and arrived early each morning to bird-dog our spots. Without Ed, we'd have tons of material still tied up on the third and fourth floors.