



A bridge linking housing research and practice

volume 4, number 10

## HUD's M2M Goes Green to Preserve Affordable Housing



*The M2M Green Initiative encourages Section 8 property owners to improve energy and resource efficiency using green building techniques during property rehabilitation.*

Currently enjoying renewed media interest, green building principles can improve energy and resource efficiency in all real estate projects, but because early inclusion is cheaper than retrofitting, they are most often applied in new construction. "There is a perception that green technologies are luxuries when it comes to rehabilitating affordable housing," says Theodore Toon, Deputy Assistant Secretary for HUD's Office of Affordable Housing Preservation (OAHP). HUD's recently announced Mark-to-Market (M2M) Green Initiative is working to change that perception. The initiative, unveiled in July 2007, encourages owners of multifamily housing to incorporate green building principles when undertaking property rehabilitation and developing plans for long-range operations. The initiative also offers financial incentives for adopting green technologies.

The voluntary pilot program is open to properties within HUD's Section 8 portfolio, specifically those in the M2M program administered by OAHP. M2M works with owners and purchasers of affordable multifamily properties to restructure financing and bring the property up to market standards through initial rehab and subsequent repairs and replacements over a 20-year period.

### Going Green

"Over the 20 years the project is in M2M, almost every system can be replaced with a green alternative as part of its repair and replacement schedule," says Toon. Greening opportunities begin modestly during initial rehabilitation, which covers only those items that need to be replaced immediately. Green principles that can be applied to a property include:

- Improving the property's energy efficiency or using renewable energy sources;
- Reducing the property's environmental impact by using recycled materials and installing landscaping that requires less water and maintenance (xeriscaping);

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- Conserving resources by using recycled materials, increasing energy efficiency, and reducing water consumption; and
- Improving indoor air quality by improving ventilation, using materials with low levels of volatile organic compounds (VOCs), and employing integrated pest management that uses prevention and other alternatives to chemical pesticides.

The Green Initiative is taking shape within the existing structures of M2M. Every M2M property undergoing debt restructuring and rehabilitation must have a Physical Condition Assessment (PCA). During this code-level assessment, the inspector reports the immediate rehabilitation needs and estimates long-term repair and replacement requirements. The assessment is expanded for the Green Initiative to note where green alternatives can be incorporated. The PCA also provides a cost-benefit comparison of green and traditional systems and materials. During the underwriting process, the PCA will be used to determine which green techniques should be included in property rehabilitation and in long-term improvement scheduling.

One challenge to Green Initiative implementation is the amount of information available on green building. "HUD has a fiduciary responsibility. We will need to decide which green building technologies to fund in a way that considers the longevity of the products," says Toon. Property owners and the underwriting team will adopt only those green technologies that fit the property location, need, and deal structure.



*Solar energy can help reduce utility costs for Section 8 owners and residents.*



*No- or low-formaldehyde cabinets help contribute to a healthier environment for residents.*

In addition to completing the agreed-upon green rehabilitation, the initiative specifies that property owners must maintain the property beyond the 20-year schedule of repairs and replacements, and develop a Green Operating and Maintenance Plan that includes resident involvement and outreach. Property owners will receive special financial incentives for going green. Owners of M2M properties are normally required to contribute 20 percent of the initial rehabilitation costs. Under the pilot initiative, however, a system or material designated as green can be labeled as a significant addition, which reduces the owner's required contribution to 3 percent. HUD also encourages owners to pursue all available grants from federal, state, and local sources that are available to fund green technologies.

### **Benefiting Owners and Residents**

Going green has many potential benefits for property owners and residents, as well as for HUD. Green property updates can result in lower utility and operating costs for owners, which can be passed along or shared with residents. HUD will closely monitor all savings that properties accrue under the Green Initiative, but expects to share most in the energy savings. Drops in utility costs will mean lower HUD utility subsidies to property owners, with a commensurate potential for substantial savings to both taxpayers and HUD.

Green properties offer a more healthful living environment for residents. Improved ventilation, low levels of VOCs, reduced presence of allergens, and addressing the risks of mold-related illnesses all contribute to a better quality of life. Going green offers a unique marketing opportunity for owners, who can capitalize

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In fall 2005, an urban infill subdivision in Lincoln, Nebraska became the site of a field evaluation of cross-linked polyethylene (PEX) water piping. This alternative to the more widely used copper pipe in residential plumbing is attracting growing attention from homebuilders, designers, and trade contractors. PEX is a result of a chemical process that makes piping freeze-resistant, flexible, and durable at temperatures up to 200°F. PEX comes in lengths of up to 1,000 feet that route around framing and mechanical obstructions in gentle bends, reducing the need for fittings to change direction or connect different pipe lengths. Each water use has a dedicated PEX tube that runs from a central distribution manifold, thus eliminating virtually all hidden fittings and connections.

The homes included in the Nebraska field evaluation were similar in size and floor plan. Each home was fitted with either a PEX or copper system by the same crew, which was experienced in installing both. Evaluators recorded each crewmember's installation time and the tasks involved, capturing the detail of the work and number of labor minutes required for installing both systems.

Once the homes were completed, evaluators measured the performance of the PEX and copper plumbing in each home according to system pressure, flow rate,

and delivery time of hot water. The system pressure and flow rates were measured at the bathroom fixtures, kitchen sink, and powder room lavatory. Evaluators also measured water flow rates from a shower under a worst-case scenario, in which the other shower, powder room lavatory, and kitchen sink were also operating.

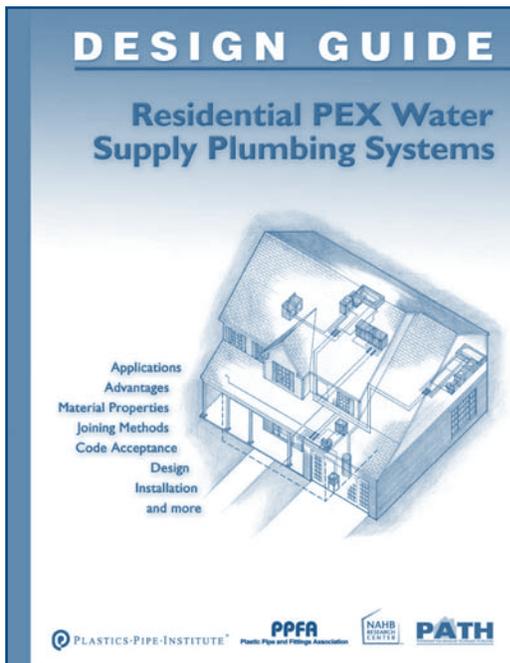
### Cost, Time, and Performance Characteristics

The savings in labor time, materials, and hot water delivery times found in this field evaluation point to PEX as a competitive alternative to copper pipe. Based on installation time, Bureau of Labor Standards wage rates for the area, and material costs, the PEX system cost 20 percent less than the copper system. Installing the PEX system saved an average of 16 labor hours, equivalent to a full day's work for a two-person crew. Materials required to plumb one house with copper cost \$378.32, compared with \$505.12 for a PEX-equipped home (recent increases in the cost of copper pipe would reduce this difference today). No significant difference in system pressure was observed, but the PEX system delivered 100°F water to the furthest fixture in 15 seconds, compared with 32 seconds for the copper system. Wait time for hot water delivery correlates with the volume of water wasted by purging the system of cold water, which was 0.45 gallon in the PEX system and 0.96 gallon in the copper system — a significant difference in wasted water.

In addition to wastewater reduction, using PEX also eliminates the costs associated with the theft of copper pipe on residential construction sites.

### Adopting and Using PEX

The 2005 Annual Builder Practices Survey from the National Association of Home Builders (NAHB) indicates that 41 percent of new homes are equipped with copper pipe, and only 19 percent are plumbed with PEX. Some resistance to PEX stems from a stigma attached to plastic piping traceable to the unfortunate failures of polybutylene piping (PB), which was used until recently in residential construction; however, stringent testing indicates that PEX is far more reliable, durable, and safe than PB. Although the PEX piping industry is highly regulated and all major residential building codes approve its use, some jurisdictions do not allow it. Others have yet to update code specifications to incorporate the difference in system design details when using PEX instead of copper.



*PEX plumbing supply systems cost less to install than copper systems and perform competitively with copper.*

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The overall U.S. homeownership rate, bolstered by 10 years of economic expansion, low mortgage rates, and focused efforts on the part of government and industry, has increased to 68.2 percent. Although minority homeownership rates have also risen, they remain lower than that of white Americans. As of the third quarter of 2007, only 51 percent of minorities owned their homes, compared with 75.3 percent of whites. In addition, the homeownership rate of households making less than the median family income lagged 31.8 percentage points behind those earning at or above that level.

### HUD's Research Strategy

The Bush administration considers increasing homeownership to be an important policy issue. In 2002, the president challenged the housing industry to create 5.5 million new minority homeowners by 2010; the nation has already seen a net gain of more than 3.19 million. As part of this initiative, HUD's Office of Policy Development and Research (PD&R) undertook research to identify major causes of racial and income gaps in homeownership, document the homeownership experience of low-income and minority families over time, and determine the barriers to homeownership that Hispanics face.

A mid-2007 issue of *Cityscape*, PD&R's journal of policy development and research, highlights the results of this research initiative. The articles in this volume



Since 2002, more than 3.19 million minority families have become homeowners.



Minority homeownership rates have risen in the past decade, but are still lower than that of white Americans.

examine several key questions about homeownership barriers and gaps. The first article, "Homeownership Gaps Among Low-Income and Minority Households," reviews and synthesizes existing data on factors that affect homeownership rates by income, race, and ethnicity. The authors found that the propensity to form a household, the decision to own or rent, access to single-family housing, location, and access to mortgage credit significantly affect homeownership rates. They conclude that future research should focus on "the differences in household circumstances by race and ethnicity—including wealth, income, and marital status—that account for a large majority of observed differences in homeownership rates." Such research would entail further investigation into conditions that affect socioeconomic standing, but are generally not addressed in housing policies.

In a similar vein, "Factors Affecting Hispanic Homeownership: A Review of the Literature" describes how demographic and socioeconomic characteristics affect the homeownership rate of the U.S. Hispanic population and identifies major barriers to Hispanic homeownership. This investigation concludes that factors such as "income, age, education, family type, gender, and characteristics of the housing market where Hispanics reside" explain between 50 to 75 percent of the Hispanic homeownership gap. The remainder appears to be attributable to the recency of many Hispanics' migration to the U.S. Recent immigrants often lack information about how to buy a home, establish financial credibility, and qualify for a mortgage. Housing prices, discrimination, low wealth and

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on a rehabilitated property's improved indoor air quality, higher efficiency, and healthier living environment to effectively market the properties and boost occupancy levels.

### Getting Underway

Still in its initial stages, the Green Initiative is already creating interest. Several property owners, including one of the country's largest affordable housing property owners, have expressed interest in participating. Two projects are currently underway: a 64-unit project in Lawton, Oklahoma and a 900-unit complex in Cincinnati, Ohio. The Lawton project incorporates

reflective roofing materials, blown-in foam insulation to improve energy efficiency, low-E windows (which reduce heat loss and gain), native plantings, and no- or low-formaldehyde cabinetry. The Cincinnati project is in the underwriting stages. These first green projects are helping HUD fine-tune our implementation guidelines, which will be available in the fall.

An outline of the M2M Green Initiative is available at [www.hud.gov/offices/hsg/omhar/index.cfm](http://www.hud.gov/offices/hsg/omhar/index.cfm). For more information about the M2M Green Initiative, contact Theodore Toon, HUD Deputy Assistant Secretary, Office of Affordable Housing Preservation, 202.402.8386. **HJ**

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## A New Direction in Plumbing Technology continued from page 3

On the other hand, a significant rise in copper prices—up 400 percent between July 2002 and July 2007, according to the U.S. Geological Survey—has sparked interest in PEX for residential plumbing, as well as for other applications made possible by PEX's physical properties, such as:

- Radiant floor heating systems that use heated water flowing through flexible PEX piping mounted inside or under the floor to warm a room.
- Piping for municipal water systems that connects to standard compression joints, valves, and fittings, yet is also resistant to impact and freeze damage.
- Snow and ice melt systems for sidewalks, driveways, entrances, and ramps. A heat transfer fluid, usually antifreeze and water, circulates through PEX pipes buried beneath the surface, eliminating the need to shovel snow.
- Underground circulation systems that gently warm plant roots to provide optimal root zone temperatures. These systems extend the growing season for grass surfaces in golf courses and sports fields, and protect bedding plants and other foliage in greenhouses.
- Piping systems for UL-approved residential fire sprinklers.

### Technical Assistance is Available

HUD's Office of Policy Development and Research has e-published a design guide for anyone considering

the use of PEX piping in a residential plumbing system. The NAHB Research Center prepared the guide for the Plastics Pipe Institute, the Plastic Pipe and Fittings Association, and the Partnership for Advancing Technology in Housing (PATH). *Design Guide: Residential PEX Water Supply Plumbing Systems* discusses the properties and advantages of PEX piping, explains various types of fittings and joining methods, describes and compares three types of PEX piping system designs, and offers layouts for common house configurations and detailed instructions for installation. The guide also offers information on major plumbing codes and relevant jurisdictional code provisions, quotes from plumbers and homebuilders on their experiences with PEX, lab testing data, an installation checklist, an appendix of additional resources, and a glossary.

Those who have little or no exposure to PEX will find *Design Guide: Residential PEX Water Supply Plumbing Systems* a good introduction to the technology. Building code officials, builders, and experienced plumbers will also find that it serves as a useful reference for the application of PEX piping. The guide is available as a free download at [www.huduser.org/publications/destech/pex\\_design\\_guide.html](http://www.huduser.org/publications/destech/pex_design_guide.html).

In partnership with HUD's PATH program, the Technology Inventory on the ToolBase website ([www.toolbase.org](http://www.toolbase.org)) has additional information on the use of PEX in residential construction. **HJ**

# Fannie Mae and Freddie Mac Meet 2006 Affordable Housing Goals

An examination of the recent goals and activities of the Government-Sponsored Enterprises (GSEs) Fannie Mae and Freddie Mac reveals their significant impact on Americans' housing opportunities. In 2005, Fannie Mae's mortgage purchases of \$582 billion financed 3.9 million housing units, while Freddie Mac's mortgage purchases of \$563 billion financed 3.8 million units. Of all the housing units the GSEs financed in that year, 88 percent of the total dollar volume and 77 percent of all units were in one-family, owner-occupied properties. Single- and multifamily rental properties accounted for the remaining housing units financed.

## About Fannie Mae and Freddie Mac

Counted among the largest corporations in the United States, Fannie Mae and Freddie Mac are in the business of providing a secondary market for conventional residential mortgage loans. These privately owned entities sell stock on the public exchanges, but also carry out some activities under the GSE designation. Congress chartered the two GSEs to provide stability and liquidity in the secondary mortgage market and to promote access to mortgage credit throughout the nation, but especially in underserved areas to benefit low- and moderate-income families. The GSEs accomplish this by purchasing conventional mortgage

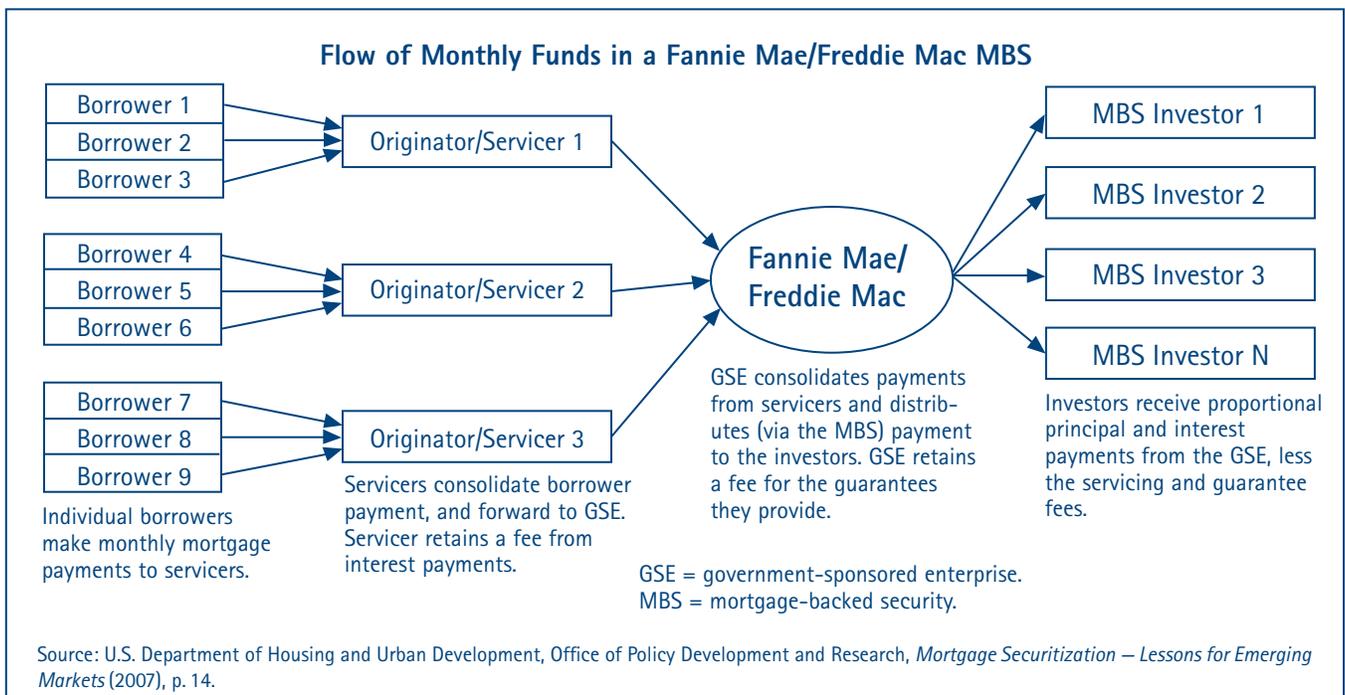
loans from original lenders, pooling them, and creating mortgage-backed securities (MBS). They retain some of these MBS in their own portfolios, but sell the majority to investors in the private capital markets. This process reduces lenders' credit and interest rate risk and increases their available cash supply, allowing them to make new mortgage loans to other borrowers. In exchange for these services, the GSEs receive benefits such as exemptions from state and local taxes (except property taxes), conditional access to a line of credit from the U.S. Treasury Department, low borrowing rates, and lower capital requirements than those applicable to other comparable financial institutions.

## Housing Goals

The HUD Secretary and the Office of Federal Housing Enterprise Oversight (OFHEO) share regulatory responsibility for overseeing Fannie Mae and Freddie Mac. OFHEO ensures that the GSEs have adequate capital and follow financially sound business practices. The HUD Secretary sets and enforces affordable housing goals, reviews new program requests, monitors compliance with fair lending requirements, and has general regulatory authority over the GSEs.

The affordable housing goals established by HUD are minimum percentage targets for the types of mortgage purchases Fannie Mae and Freddie Mac make

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## The Investigation of Homeownership Barriers and Gaps Continues continued from page 4

income, a poor credit history, and not having required documentation can all deter a Hispanic immigrant from owning a home. The research also indicates that existing homeownership programs in the United States may not adequately address the needs of Hispanic immigrants.

Additional studies in this issue of *Cityscape* illustrate how mortgage financing alternatives and rates contribute to homeownership differences across population segments, how household wealth and income influence the transition to homeownership, and how downpayment assistance affects homeownership among minority and low-income households.

### From Research to Innovation

During the past decade, government and industry groups have made enormous strides in closing racial and income gaps in homeownership by offering greater flexibility in industry underwriting guidelines and affordable mortgage products. The findings presented in this issue of *Cityscape* encourage these groups to pursue innovative ways of achieving even greater progress. The entire issue (volume 9, number 2) can be downloaded at no cost at [www.huduser.org/periodicals/cityscape/vol9num2/index.html](http://www.huduser.org/periodicals/cityscape/vol9num2/index.html) or ordered in print for a nominal fee by calling 800.245.2691, option 1. **HUD**

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each year. For example, in 2006, at least 53 percent of the dwelling units financed by each GSE's mortgage purchases had to be for low- and moderate-income buyers; 38 percent had to be in underserved areas, defined as low-income and high-minority census tracts; and 23 percent were to target dwelling units in housing for "special affordable" borrowers (very low-income and low-income families living in low-income neighborhoods). On September 18, HUD announced that both GSEs exceeded these goals, as shown below:

| Performance         | 2006 Goal | Fannie Mae | Freddie Mac |
|---------------------|-----------|------------|-------------|
| Low-Moderate Income | 53%       | 56.9%      | 55.9%       |
| Underserved Areas   | 38%       | 43.6%      | 42.7%       |
| Special Affordable  | 23%       | 27.8%      | 26.4%       |

In 2006, both GSEs also met or exceeded the affordable housing subgoals that HUD established in 2004 to promote homeownership among targeted groups and in targeted areas.

### Performance Updates

Two recent additions to a working paper series on housing finance written and published by HUD's Office of Policy Development and Research examine how these GSEs are fulfilling their legislative intent, from both short- and long-term perspectives. The first, *Goal Performance and Characteristics of*

*Mortgages Purchased by Fannie Mae and Freddie Mac, 2001–2005* (Working Paper HF-017), analyzes how well the two major GSEs have performed over time in meeting HUD's affordable housing goals. The paper also contains information on borrower, location, and loan characteristics of single-family mortgages purchased by the GSEs. The second, *The GSEs' Funding of Affordable Loans: A 2004–05 Update* (Working Paper HF-018), compares the borrower and neighborhood characteristics of single-family mortgages purchased by Fannie Mae and Freddie Mac in recent years with the characteristics of loans originated in the primary market during the same period. This study documents recent improvements that Fannie Mae and Freddie Mac have made in purchasing home loans for lower-income families.

Both working papers are available to our readers as free downloads at [www.huduser.org/publications/hsgfin/workpapr.html](http://www.huduser.org/publications/hsgfin/workpapr.html). Lenders, planners, researchers, and housing advocates studying the flow of mortgage credit and capital in America's communities will find extensive data about mortgage purchases by Fannie Mae and Freddie Mac at [www.huduser.org/datasets/gse/overview.html](http://www.huduser.org/datasets/gse/overview.html). Additional mortgage-based studies are also the focus of two past issues of *Cityscape* (volume 5, number 3; volume 6, number 1), available for download at [www.huduser.org/periodicals/cityscape.html](http://www.huduser.org/periodicals/cityscape.html); printed copies of these volumes can be purchased for a small fee by calling 800.245.2691, option 1. **HUD**

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In the Next Issue of... <sup>research</sup> **works**

- In a recent study prepared for HUD's Office of Policy Development and Research, researchers used the American Housing Surveys from 1973 to 2005 to portray how American housing stock—as well as the nature and composition of American households—have changed over that 32-year span. This study includes an abundant set of tables and figures with detailed information on the housing stock and household characteristics. We'll highlight some of the most compelling findings.
- *The Applicability of Housing First Models to Homeless Persons with Serious Mental Illness* presents findings from a study of the Housing First approach that provides permanent supportive housing to chronically homeless adults with mental illness and co-occurring substance-related disorders. We'll be looking at strategies used by Housing First programs in Seattle, New York, and San Diego for stabilizing the housing situation of chronically homeless persons and addressing the root causes of their homelessness.
- Lean production manufacturing strives to eliminate the waste of time, money, and materials while creating a culture of continuous improvement within a manufacturing facility. A new report, *Pilot Study: Applying Lean to Factory Home Building*, examines nine manufactured and modular home production plants that have applied lean production methods. This article will examine how value stream mapping helped these manufacturers identify waste and target specific plant areas for intensive improvement in the production of affordable housing.
- Universal design, ENERGY STAR® appliances, and EarthCraft green building techniques will be on display in 13 duplexes currently under construction in Bristol, Virginia. EarthCraft is a green building program that develops healthy, comfortable homes that reduce utility bills and protect the environment. The Bristol Redevelopment and Housing Authority assembled a mixed financing package for the duplexes that includes public housing modernization and housing replacement funds, Low-Income Housing Tax Credits, and a loan from the Virginia Housing Development Authority. *ResearchWorks* will examine how the Authority was able to develop high quality, affordable housing while keeping debt on the property to less than \$500,000.

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