New Jersey Sustainable Affordable Pilot Program

Final Report

April 23, 2002

U.S. HUD PATH
Demonstration Project

Steven Winter Associates, Inc.
Norwalk, CT & Washington, D.C.

West Side Village

Springfield Village

Executive Summary

New Jersey is one of the first states to legislate resource efficiency into affordable housing. This paper discusses the two completed projects of a total of eight that qualified for the New Jersey Sustainable Development/Affordable Housing Pilot Program.

PATH tailors its approach to each project in the interest of larger, defined goals. These approaches vary considerably; one project may be designed from the ground up by PATH whereas another may receive not much more than publicity assistance. PATH's involvement in the New Jersey Sustainable Affordable Demonstration Project ranges from the latter, exemplified by Newark's West Side Village project, to energy and green materials consultation, specification, sourcing assistance, and follow-up documentation as provided for the Springfield Village project, also in Newark. Due to the seminal nature of New Jersey's program and the commitment of the builders, both projects are sustainable and affordable, and, by subsidizing the demonstration of these technologies, the New Jersey program advanced all the goals of the PATH initiative.

Introduction

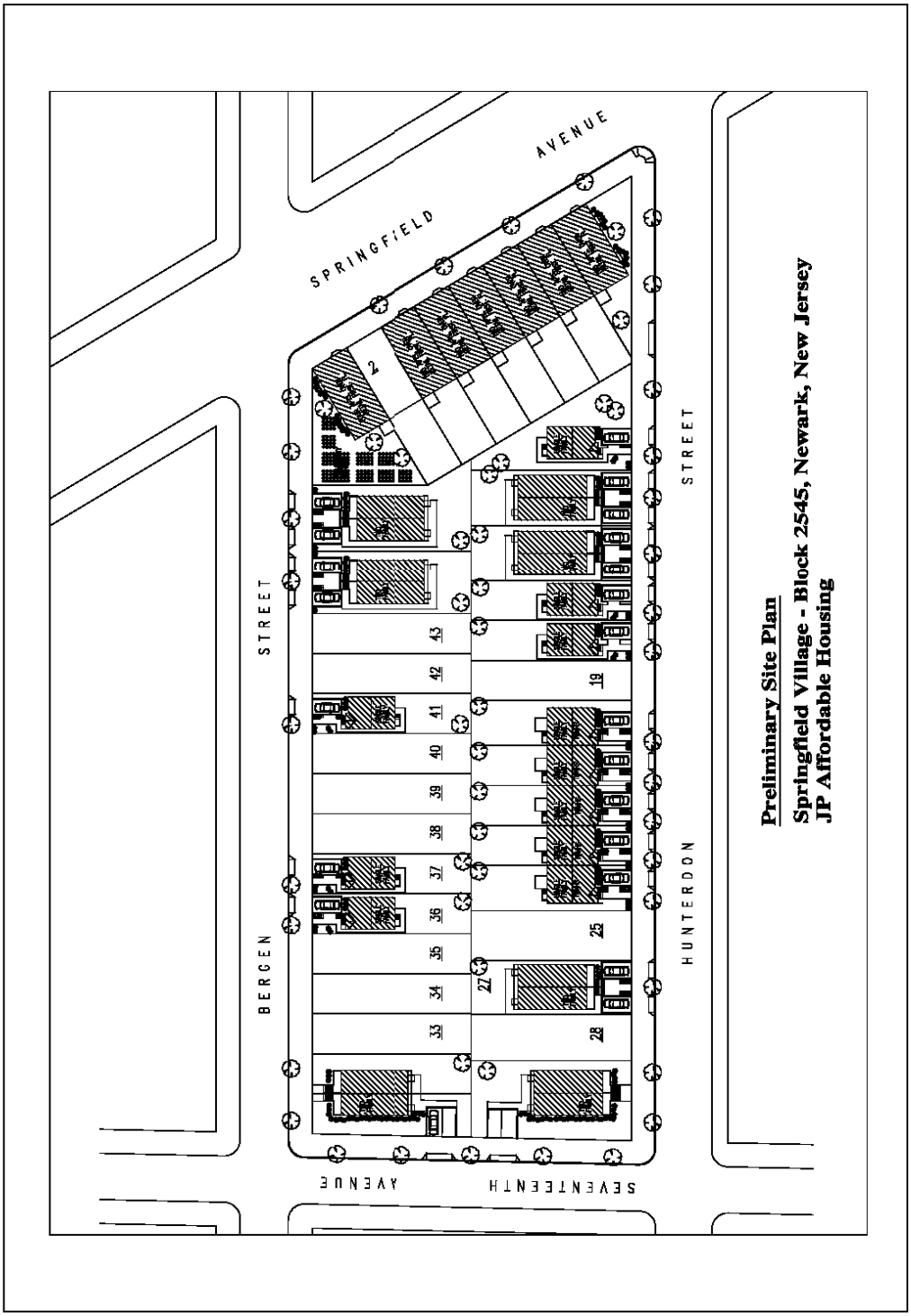
The New Jersey Sustainable Development/Affordable Housing Program Pilot Initiative is unique among PATH Demonstration Projects undertaken thus far. The project is comprised of multiple sites, each with a different developer, whereas a typical Demo has a single developer on a single site. Immediately noteworthy about this project is the attempt to integrate sustainability and affordability on a large scale; New Jersey is spending $17 million on the eight-project pilot. Rarely does a state legislate sustainable measures into projects to serve as examples for affordable housing (defined here as for those earning between 50% and 80% of area median income) across the state. Further, the motivation to incorporate resource efficiency is internally generated through the state program, mitigating any perception of PATH "hawking its wares."

As such, this Demo offers the opportunity to study a number of individual projects linking sustainability and affordability. New Jersey's Balanced Housing program begins its Sustainable Affordable Pilot with eight projects: West Side Village and Springfield Village, both in Newark, are completed and occupied. The other sites are located in Eastampton, Trenton, Camden, East Orange, and Jersey City.

Profile of the units

Although PATH is involved to varying extents in several of the Pilot's sites, West Side Village (WSV) and Springfield Village are the two completed projects at the time of this writing. WSV comprises two parts: A 62-unit rehab of a former watch factory on 113 North 13th Street in Newark and 66 units located at 354 Park Avenue, also in Newark, totaling 128 very low-income apartments: 2 efficiencies, 22 one-bedroom, 83 two-bedroom and 21 three-bedroom units.

Springfield is composed of 25 two-story, infill, single-family and two-family detached homes on one city block along 348 - 376 Bergen Street and 329 - 367 Hunterdon Street.



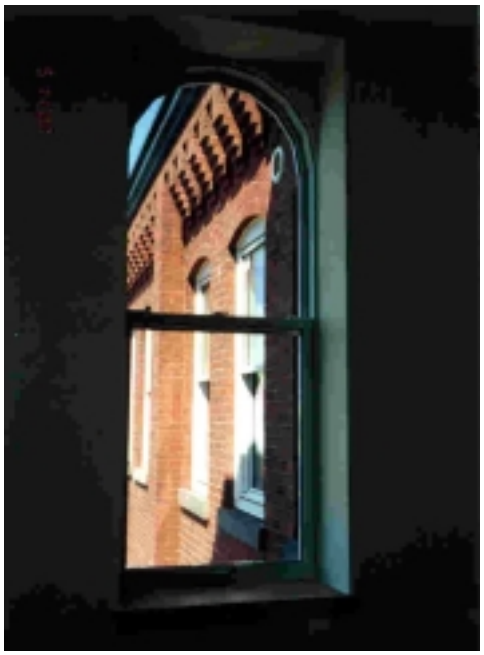
There are three slightly different single-family home plans: Types A and B are 1,216 sq. ft., type C is 1,255 sq. ft., and type D is 1,237 sq. ft. Each unit of the two-family homes is 1224 sq. ft. All the units have a powder room on the lower level, three bedrooms and a bathroom on the upper level, and a front porch (see plans).

Project Teams and Project Partners

Players on both teams are all located in New Jersey, with the exception of Vermont Energy Investment Corporation and Steven Winter Associates, Inc. West Side Village was developed by RPM Development Group of Montclair. Springfield Village was developed by JP Affordable Housing of Jersey City; John C. Inglese of Rutherford served as architect and engineer. Partners in the project include the New Jersey Department of Community Affairs Green Homes Office, the New Jersey Sustainable Business Office, and Public Service Electric and Gas Company (PSE&G). Developers receive ongoing technical assistance and logistical support from MaGrann Associates of Mt. Laurel and Vermont Energy Investment Corporation of Burlington, Vermont; both are consultants to PSE&G.

PATH-Identified Technologies

PATH-identified technologies in West Side Village include: HVAC located within the conditioned space, rain-screen exterior walls, controlled ventilation, high-efficiency refrigerators, blower door, duct blaster, low-VOC paint, and low-water plants, akin to xeriscaping. Additional technologies not currently listed as PATH-identified on the website include: construction site recycling, hi-efficiency fiberglass windows, cellulose insulation, and extensive sealing to mitigate infiltration.



Custom-made, fiberglass-framed, low-e windows were installed in rehab portion of West Side Village.

Existing walls were furred-out to provide a cavity for the blown-in cellulose insulation.

PATH-identified technologies in Springfield Village include: HVAC and duct installation within conditioned space, fiber-cement siding, recycled-content carpet, low-VOC paint, controlled ventilation, high-efficiency refrigerators, low-flow plumbing fixtures, blower door, and duct blaster.

Path Goals

Affordability

To qualify for the program, homes in the program must be affordable to homeowners earning 50% to 80% of their area's median income. This is possible through $17 million from the State, $12 million in low-interest loans, and $5 million in below-market rate mortgages. PSE&G, a partner in the program, provides the developer $1,500 plus 42 cents per square foot for each home that meet the program's standards. Another way the housing ultimately enhances affordability is by siting near community resources and mass transit links, reducing reliance on the automobile.

Environmental Impact and Energy Use

Springfield homes discourage resource depletion by utilizing post-consumer materials such as recycled-content carpeting, recycled concrete backfill, recycled-content insulation, and storage sheds made from recycled content plastic. Water use is reduced through low-flow showerheads and faucet aerators and low-maintenance grass. Siting near shopping and transit reduces automotive pollution.

All the houses built under this program must pre-qualify for PSE&G's 5-Star (Now Energy Star) program, which generally requires homes to be at least 30% more efficient than a HERS reference house. A number of energy-efficient strategies are used to reach this level, including high-efficiency boilers and high-SEER air conditioning, programmable thermostats, efficient gas water heaters (EF=0.62 min), and shade trees. All HVAC elements reside within conditioned space. Air infiltration is reduced through airtight outlets and tight construction. Low electric consumption is encouraged through compact fluorescent lighting fixtures, high-efficiency exterior lighting with light sensors, and high-efficiency refrigerators.

Sealing around windows. Note sheathing is not interrupted by rim joist.

Durability and Maintenance Costs

The Springfield houses use Fiber cement siding and 30-year asphalt roofing shingles to reduce maintenance. Fiberglass windows exhibit greater structural stability through freeze-thaw cycles and over time, increasing their longevity and dimensional integrity as well as the likelihood that the glazing unit seals will continue to discourage air infiltration.

Safety

Springfield houses address occupant health through attention to indoor air quality. Low-VOC paints improve working conditions during construction and air quality for chemically sensitive residents. Controlled ventilation is effected through outside air ventilation—Panasonic with an Airetrak programmable control. Insulation was added to the ducts not so much for energy reasons as much as for reducing condensation on duct surfaces that might encourage mold and mildew and their attendant health concerns. CO sensors were installed to guard against this dangerous combustion gas. And siting near shopping and transit links discourages an unhealthy, sedentary lifestyle dependent upon the automobile.

Case Study

Pre-Construction

JP Affordable has been using the same basic resource-efficient house design with slight modifications for different sites. SWA was called in to review its materials, consider current energy strategies, and make recommendations on how to most economically achieve the energy and environmental goals established by the Green Homes Office. (These goals are detailed in "Objectives and Goals of the Program," on the web at http://www.state.nj.us/dca/dhcr/31501gho.pdf)

JP had previously bought into the idea of sustainability and was already incorporating several of the technologies SWA was recommending in the Sustainable/Affordable Specifications (SAS), as well as other measures. These include storm water collection on site (through drywells), low-e windows, airtight drywall, sealing and caulking verified by blower door testing, SEER-12 air conditioners, programmable thermostats, high efficiency furnaces, airtight outlet boxes, efficient gas water heaters, recycled plastic storage sheds, owner's manuals, and homeowner's seminars.

The New Jersey program requires that the units qualify as Energy Star homes. Using REM/Design software, SWA modeled JP's two-story affordable homes to establish a baseline for performance

SWA used REM/Design software to evaluate JP's current strategies and gauge various incremental energy measures. MaGrann and Associates ran simulations to confirm SWA's values, which were run preliminarily to flag any early issues and maximize PATH impact. Essentially, SWA confirmed the strategy for JP, who had built 5-Star before, and suggested additional measures. (JP's base case, at 25% better than a house meeting the Model Energy Code, was already close to Energy Star.) SWA then looked specifically at lighting options, distinguishing between areas recommended for incandescent vs. fluorescent, and suggesting a combination with fluorescent used in high-use areas. (10 fixtures are the maximum amount funded by the Balanced Housing program.) SWA sent a list of efficient appliance recommendations. SWA revised JP's glazing specification to a higher performing low-e to reduce cooling loads. SWA suggested better air sealing methods and sent details to JP depicting caulking and gasketing at top and bottom wall plates.

Bulk Purchasing

Due to the homogeneity of the projects—the pilot includes eight New Jersey affordable housing developers adhering to similar material recommendations—it was thought that a bulk purchasing program, in which manufacturers would supply sustainable product for a large number of units, would reduce costs due to an economy of scale. This formed part of the impetus behind the Sustainable Affordable Specification (SAS); it would be distributed to the developers as a tool to obtain pricing for products that meet sustainable and functional requirements. It details performance standards and categorizes products, manufacturers, and suppliers. The assumption was that suppliers would lower unit pricing due to the potential for an increased and sustained market through the visibility of the Pilot and New Jersey developers participating in the program in the future.

However, a number of variables inhibited discounting on the part of the suppliers. The preliminary nature of most of the projects did not allow for material take-offs or other estimates. The only quantity information the suppliers could go by was the bid invitation's statement "up to 400 units of housing," which may be so ambiguous as to deter suppliers from submitting a serious bid for fear of getting locked into a unit price for a much smaller quantity of material. The other deterrent for quantity pricing is widely divergent construction schedules, with as much as several years' difference between one project's construction and another.

Technologies

JP and SWA proposed, in addition to those already used, methods and materials to be incorporated into Springfield as listed in the SAS. This list was assessed for appropriateness of each technology in consideration of climate, compatibility with other methods and materials, and the scale of the project, resulting in a number of technologies being rejected.

The smaller list included only items under serious consideration by JP, for which they obtained availability, pricing, lead times, and other pertinent information. These included:

- recycled concrete backfill
- **HVAC and Duct Installation Within Conditioned Space**
  - Optimum value engineered framing: two-stud corners
- optional wood/polymer rails at deck
  - skylights in rental unit corridors
- Fiberglass windows
- 1" rigid insulation under entire slab
- recycled fiberglass insulation
- airtight drywall
- Sealing and caulking (blower door tested to verify 0.35 ACH maximum)
- **Fiber-Cement Siding** (15-year, factory prime/paint)
- Local or recycled brick
- **Fiber-Cement Roofing Shingles**
- recycled-content extended-warranty roof shingles
- **Recycled Content Carpet** (Recycled PET Carpeting)
- **Low-VOC Paint**
  - low-VOC adhesives and sealants (contractor error)
  - low-VOC stains and varnishes (no staining or varnishing done in field)
  - ceramic tiles with recycled glass content
  - Local ceramic tiles

- Wood flooring or trim from certified well-managed forests
- Prefinished drywall corner trim
- Encapsulation in lieu of MDF for kitchen cabinets
- solid plywood cabinets
- high-efficiency furnace
- high-efficiency boilers
- radiant floors
- high-efficiency air conditioning
- added duct insulation (kept because of sweating issue)
- **Controlled Ventilation (**outside air ventilation—Panasonic with Airetrak)
- high-efficiency air filters
- programmable thermostats
- airtight outlets
- phone/computer hookups in multiple rooms
- compact fluorescent lighting fixtures
- fluorescent lighting at vanities
- compact fluorescent torchieres
- high-efficiency exterior lighting with light sensor
- photovoltaic-powered security lighting
- **High-Efficiency Refrigerators**
- energy and water efficient dishwashers
- horizontal axis clothes washer (washers not supplied to homeowners)
- humidity sensing gas dryers (dryers not supplied to homeowners)
- efficient gas water heater (EF=0.62 min.)
- tank jacket insulation
- insulation for the piping
- drainwater heat recovery
- **Low Flow Plumbing Fixtures** (shower heads)
- low flow faucets (aerators)
- semi-pervious paving at walkways and/or driveways
- recycled-content patio blocks
- low-maintenance grass
- shade trees
- xeriscaping
- compost bins
- storage sheds made from recycled-content plastic
- CO sensors
- Owner's manual/seminars
- **Blower Door**
- **Duct Blaster**
- individual recycling bins per unit
- construction recycling (contractor agreed to; may have been done)

Construction

In the above list,

- indicate measures built into the houses.

PATH-identified technologies are shown **boldface**. Because resource-efficiency was planned into the project since its inception, many practices were incorporated, including 9 PATH-identified technologies—more than any multifamily PATH Demonstration project (aside from Takoma Village Cohousing). An additional six potential PATH-identified technologies are incorporated, plus several other practices that are resource-efficient or green but represent more than 5% of their market. This counters the oft-held assumption that affordable housing and energy/environmental awareness are incompatible.

Construction site open house at a two-family model

JP installed the entire HVAC system within the conditioned space, used 12-SEER air conditioning, and provided controlled ventilation, all as per SWA recommendation. (JP decided to upgrade only the refrigerators because that is the only appliance they normally install.)

Installed Costs

Included in the appendix is a spreadsheet entitled "Costs Per Single Family Home" listing unit cost differences between the technologies and the items they replaced. A few examples are mentioned here.

The use of recycled concrete backfill, at $250 per truckload, actually costs less than non-recycled backfill. Installing the HVAC within the conditioned space, at a $200 upcharge per unit, will yield a quick payback through energy savings.

Recycled concrete backfill obtained from a local demolition site.

The compact fluorescent lighting cost four times that of incandescent lighting. Total upcharge amounts to $310 per house, which could be recouped in approximately two years of electrical and replacement bulb savings. High efficiency refrigerators cost 30% more. This could be recouped in one to two years. Low flow showerheads cost twice that of a standard unit; however, at $12 per head, water savings exceed that in one year.

Sales and marketing

According to JP Affordable, "the market is built in to affordable housing," in that housing prices have risen so much in comparison to homebuyer income that demand for affordable housing outstrips supply. JP, and likely the other participating builders, does not need to build efficiently or sustainably to sell homes, so sales and marketing is not as important an issue as in other kinds of housing. Marketing will be more an issue in terms of informing builders about the New Jersey program.

Post-construction and occupancy

SWA used REM-Rate/REM-Design software, which is designed to evaluate residential specifications for Energy Star Homes Program compliance, to compare energy benefits of different strategies. REM calculated the single-family houses would save 32% in cooling costs and 7% in non-cooling costs (see Table 1). Springfield residents completed fuel record release forms prepared by JP Affordable. SWA forwarded the signed forms to Scott Williams of PSE&G, who supplied fuel records covering the 2001 **cooling season**. Costs of electrical usage for the period 12 June through 10

September are tabulated below. A preliminary analysis of energy use records indicate the homes used less energy than was predicted by software modeling. PSE&G bills indicate cooling costs were approximately 47% lower than those of the REM-modeled identical home—JP's standard product—without the above-mentioned energy features (see Table 2). However, this preliminary analysis does not factor for a probable tendency among low-income homeowners to ration their a/c use, particularly in the first months of occupancy when they do not know how much it might cost to use the central a/c.

Table 1: REM/Design Modeling Results, Detached House

Load	Base case, summer costs ($)*	Enhanced specifications, cooling season costs ($)*	Projected savings, cooling season
Cooling (setpoint 78°)	**151**	102	32%
Water heating	37	33	11%
Lights and appliances	127	118	7%
Service charges	23	23	N/A
Total	**339**	276	29%
Non-cooling total	188	174	7%

***Results based on PSE&G rates $0.11/kWh electric and $0.59/Therm gas**

Table 2: Energy Costs 12 June through 10 September 2001, Detached House

Address (#)	Cost electric and gas ($)*		Savings, total	Approx. cost cooling only ($)*		Savings, cooling
	Actual	Base case, REM		Actual (est.)	Base case, REM	
House #1	254	339	25%	90	151	40%
House #2	342	339	-0.01%	135	151	11%
House #3	421	339	-24%	170	151	-13%
House #4	138	339	59%	15	151	99%
House #5	196	339	42%	50	151	67%
House #6	179	339	48%	25	151	83%
Average	255	339	25%	80	151	47%

***Results based on PSE&G rates $0.11/kWh electric and $0.59/Therm gas**

Non-cooling savings correspond to REM estimates. Records indicate non-cooling loads (including lighting, appliances, plug loads and gas water heating and cooking) for the summer months averaged approximately $175 compared to $187.50 for the base case, yielding the predicted 7% savings (see Table 1). Fluorescent lighting accounts for a significant portion of this; JP installed 10 fixtures, the maximum amount PSE&G credits, in high-use areas recommended by SWA.

Conclusion

Technology Inventory Updates

As previously mentioned, a number of technologies and materials were included that are not yet PATH-Identified. For West Side Village, these include construction site recycling, hi-efficiency fiberglass windows, cellulose insulation, extensive sealing to mitigate infiltration, blower door, and duct blaster. Non-PATH-Identified technologies in Springfield Village include:

- Recycled concrete backfill
- Wood/polymer decking and/or rails
- High performance fiberglass windows
- Insulation under slab
- Recycled fiberglass insulation
- Airtight drywall
- Sealing and caulking (blower door tested to verify 0.35 ACH maximum)
- Local or recycled brick
- Recycled-content extended-warranty roof shingles
- Encapsulation in lieu of MDF for kitchen cabinets
- High-efficiency furnace
- High-efficiency boilers
- High-efficiency air conditioning
- Ducts insulated against condensation
- Programmable thermostats
- Airtight outlets
- Phone/computer hookups in multiple rooms
- Compact fluorescent lighting fixtures
- High-efficiency exterior lighting with light sensor
- Efficient gas water heater (EF=0.62 min.)
- Insulation for the piping
- Low-flow faucets (aerators)
- Low-maintenance grass
- Shade trees
- Storage sheds made from recycled-content plastic
- CO sensors
- Owner's manual/seminar

Upon further investigation, at least some of these could be PATH-Identified technologies with write-ups for the website.

Overall, the NJ Sustainable Affordable Pilot Program as a PATH Demonstration Project is considered a success, blending environmental concerns and energy efficiency with affordability.

Although PATH has documented many successful sustainable yet affordable projects through *Technologies in Practice* located on the website *www.pathnet.org* as well as through the Demonstration Project program, these projects tend to be difficult for builders to learn of through the day-to-day venues of building department, utility company, state offices, and grant agencies. One of the unique aspects of the New Jersey initiative is the spotlight it places on exemplary projects due to their identification with a single program. Through the Sustainable Affordable Pilot Program and NJ DCA's Green Homes Office (GHO), one can now point to a growing bank of information on the best

examples of sustainable affordable projects in the state. The program fulfills its promise by providing funding and technical resources for other builders to achieve similar levels of excellence.

There is always room for improvement. SWA identified four of these areas; two concern Springfield Village and two are general. Some of the technologies were less cost effective than others in Springfield's specific application. JP identified two of these as fiber cement siding and fiberglass windows. Both of these substitute vinyl products, which are substantially less expensive but have reputed environmental impacts that JP chose to avoid in this project.

Initially, there is little or no energy penalty for vinyl windows compared to their fiberglass counterparts. Fiberglass windows reportedly cut infiltration (saving energy dollars) longer into their service life, which itself is longer than vinyl due to the thermal stability of fiberglass. According to JP, the fiberglass windows cost three times that of the vinyl windows that would have been installed.

Fiber cement siding cost two times that of the vinyl siding that would have been installed. There is no real energy benefit, and while it is durable and rot-resistant, it does need to be painted. Its primary benefits are the reduced environmental impacts mentioned above, and the fact that in the long run, fiber cement will maintain greater visual integrity than vinyl. Fiber cement also does not require painting as often as wood siding.


Fiber cement siding at Springfield Village

The "Goals and Activities" drafted by the GHO are ambitious and identify apparently effective strategies for implementing sustainable projects in the state. Proposed activities include articles, bulletins, and presentations at various venues; establishing agency partnerships to maintain funding for the office; maintain a website; refine and update a set of minimum specifications; and create and implement industry workshops. However, there is a question as to whether existing staffing is sufficient to "capture the momentum of the Pilot Program" as stated in the draft. Sufficient funding for the educational portion of the program may be more important than subsidizing a large number of projects.

The second issue that arose concerned the accessibility of the developer to inquiry. Since an objective of PATH is to publicize builders' real experiences with advanced technologies, detailed feedback from the builder is important. However, it may not be practical to get enough useful information

from the builder, who is sometimes too busy, does not return calls, etc., and may not see the business sense of taking valuable time to share hard-earned experience with competition. It was possible to collect information to compile the above case study mainly because SWA played a central role in refining the builder's strategy, plus the builder was unusually forward and plainspoken; but this is often always the case, particularly when PATH takes a more background role. For these projects, PATH may consider what the real or perceived incentives are that motivate the builder to submit detailed and useful information.

Processing delays are not uncommon when it comes to municipal fund disbursements and reimbursements, sometimes taking years from the application date. Builders tend to avoid situations that demand bureaucratic entanglement and, though they may pay off in the long run, this could inhibit builder participation in programs such as these. A delay in state funding to JP was felt acutely in the face of increased development costs due to the unfamiliar and advanced technologies JP incorporated. However, the delay appeared to be a simple oversight that, through JP's persistence, had a bright enough light shined on it that it should not be typical to the program.

Recommendations for Followup Research

Two of the eight projects of the Pilot are yet occupied at this time. It is recommended that the remaining six be documented and assessed in ways appropriate to their specific context and issues. Emphasis should be placed on how costs of innovative technologies affect initial and long term affordability of the units. In addition, it is recommended that a sampling of residents be interviewed in depth at a later date, after they have had time to adjust to their homes, to determine how the various features of the houses do or do not fit the needs of their particular demographic. This will be necessary to determine the future direction of the program.

Appendix

West Side Village

Building Component Evaluation

Springfield Village

Plans and Elevations, Single-Family House

Plans and Elevations, Two-Family House

Costs Per Single Family Home spreadsheet

REM Design Report

NJ PATH Press

Home Energy May/June 2002

The New York Times 28 November 1999

EnvironDesign Journal

Interiors and Sources

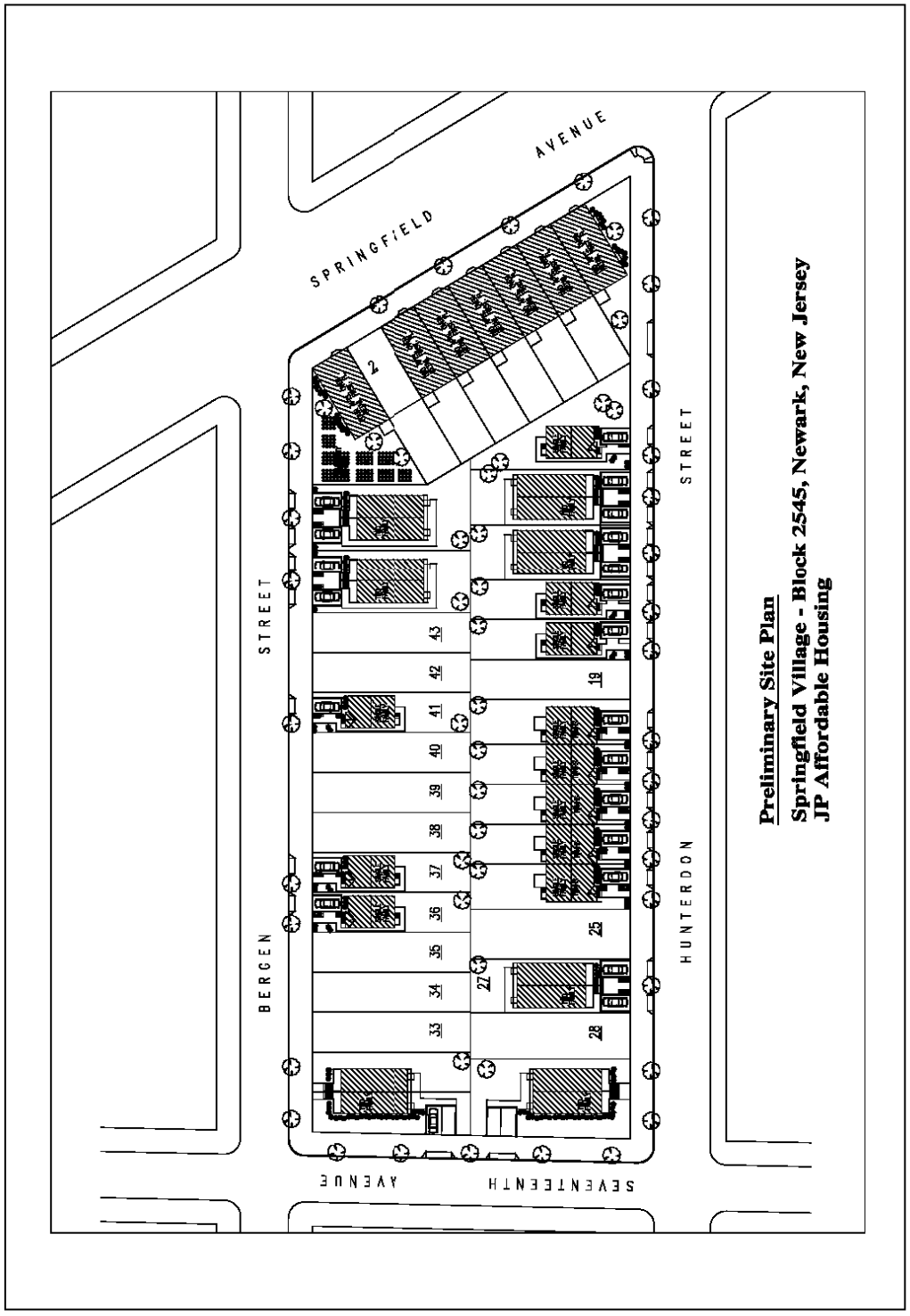
W EST SIDE VILLAGE
SI E 1 - AT PARK AVENUE : SITE 2 - NORTH 13th STREET

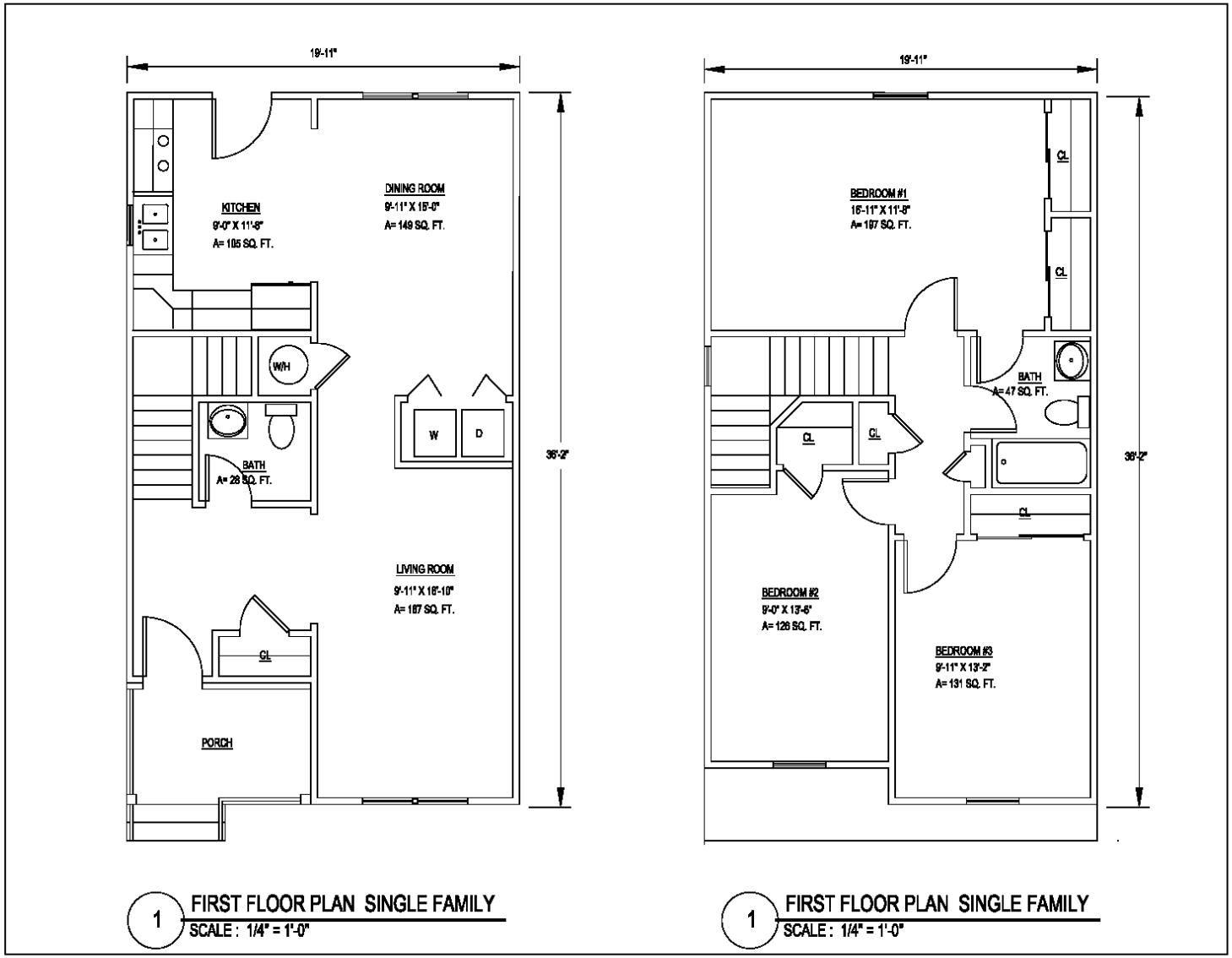
BU LDING COMI ONENT EVALUATION

RE CAP

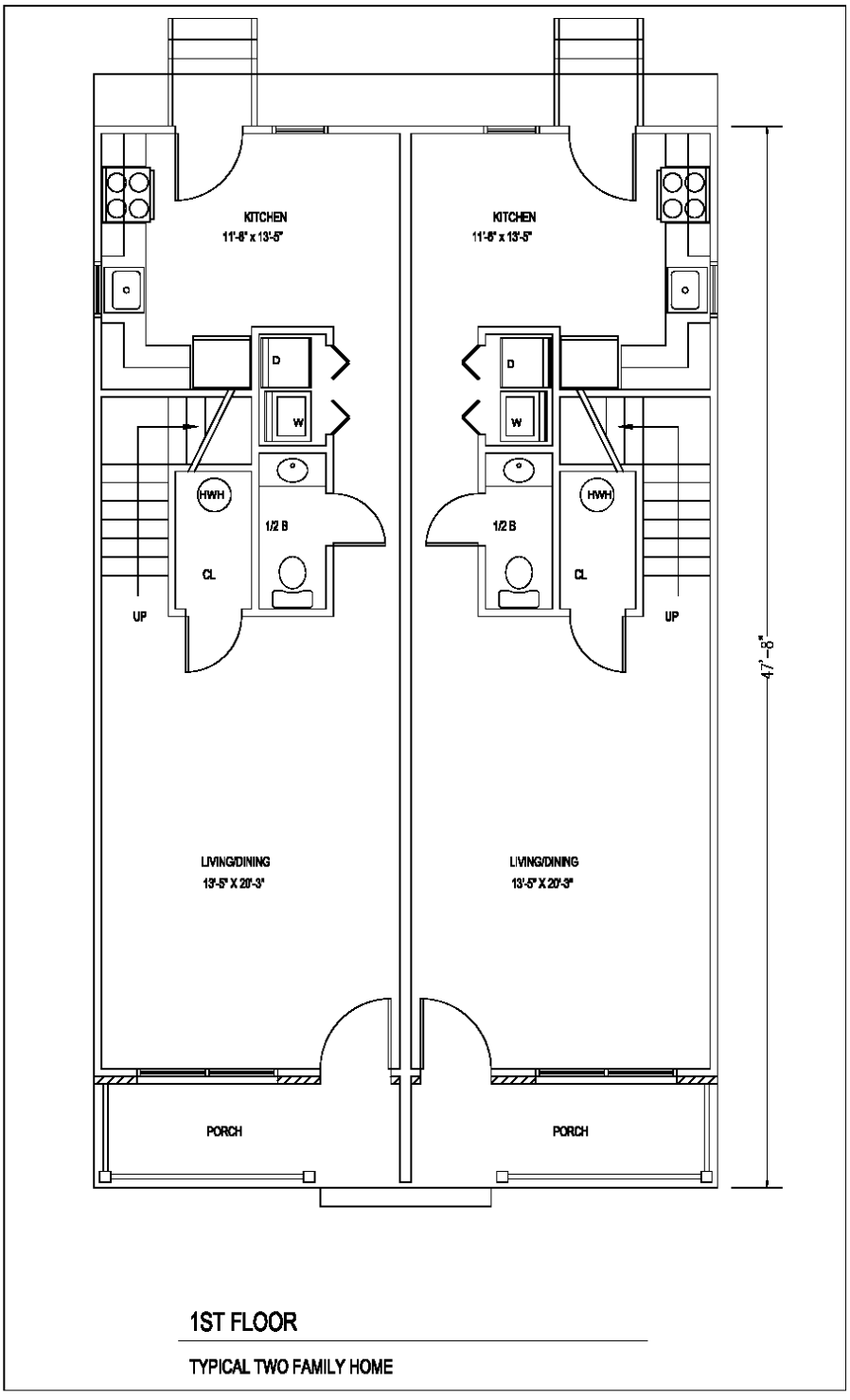
THE AMOUNTS ENTERED HEREIN REFLECT THE ADDITIONAL COSTS
FOR EACH ALTERNATIVE BUILDING COMPONENT.
COS TS ARE CALCUL/.TED TO INCLUDE BOTH BUILDINGS

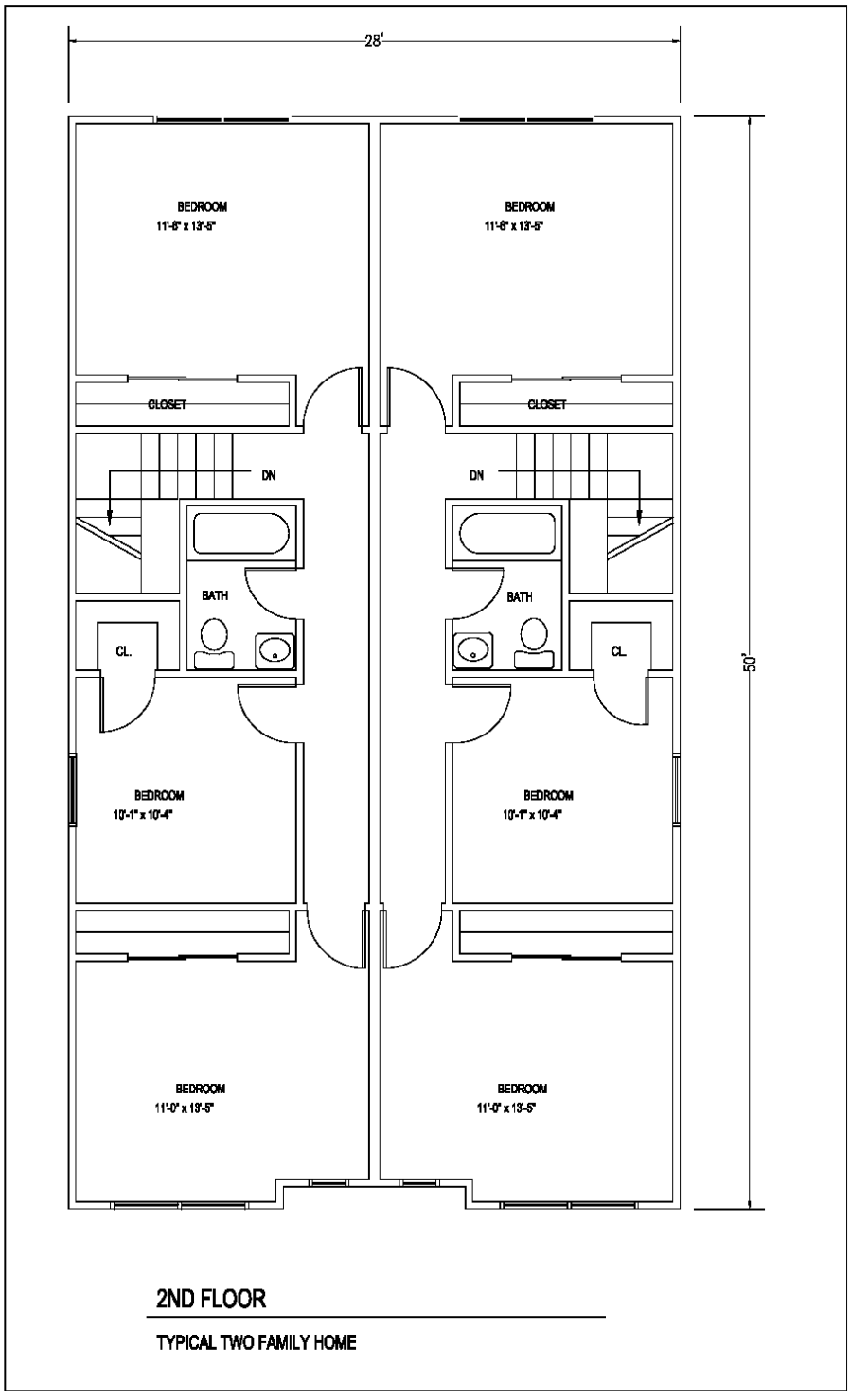
	TOTAL ADDITIONAL COST FOR BOTH BUILDINGS	TOTAL ADDITIONAL COST PER UNIT
HAR DWOOD FLOORI G IN KITCHENS AND BEDROOMS	$ 117,380.64	$ 917.04
QUA URY TILE / WOOD FLOORING IN COMMON AREAS	$ 144,920.50	$ 1,132.19
6" E TERIOR WALL S UDS	$ 25,394.50	$ 198.39
CEL ULOSE INSULAT ON	$ 56,753.76	$ 443.39
FIBE GLASS WINDOW S	$ 226,000.00	$ 1,765.63
SHEI F METAL DUCTW ORK	$ 17,799.87	$ 139.06
UP-G ADED LANDSC/.PING	$ 98,000.00	$ 765.63
CON ULTING AND EN GINEERING COSTS	$ 40,000.00	$ 312.50
ALTE NATIVE SOURCES OF IRRIGATION	$ 10,000.00	$ 78.13
POLY OSCYANURATE INSULATION ON ROOF	$ 113,000.00	$ 882.81
FING R JOINTED WOOD BASE THROUGHOUT THE BUILDING	$ 32,131.00	$ 251.02
COMI ARTMENTALIZA TION: OUTSIDE FRESH AIR TO APT UNITS	$ 78,028.80	$ 609.60
COMI ARTMENTALIZA TION: OUTSIDE FRESH AIR TO CORRIDORS	$ 22,514.56	$ 175.90
CRED T FOR MODIFIC/.TION OF APARTMENT AND C ORRIDOR MAKE UP AIR	$ (96,016.00)	$ (750.13)
5 STA COMPLIANCE-/ DDITIONAL COSTS FOR BASIC 5 STAR	$ 387,720.00	$ 3,029.06
TOTAL	$ 1,273,627.62	$ 9,950.22
CRED T FOR 5 STAR REBATE($2,000 PER UNIT +100000 FOR SUPPI EMNTALS)	$ 310,160.00	$ (2,423.13)
NET A DDITIONAL COSTS	$ 963,467.62	$ 7,527.09

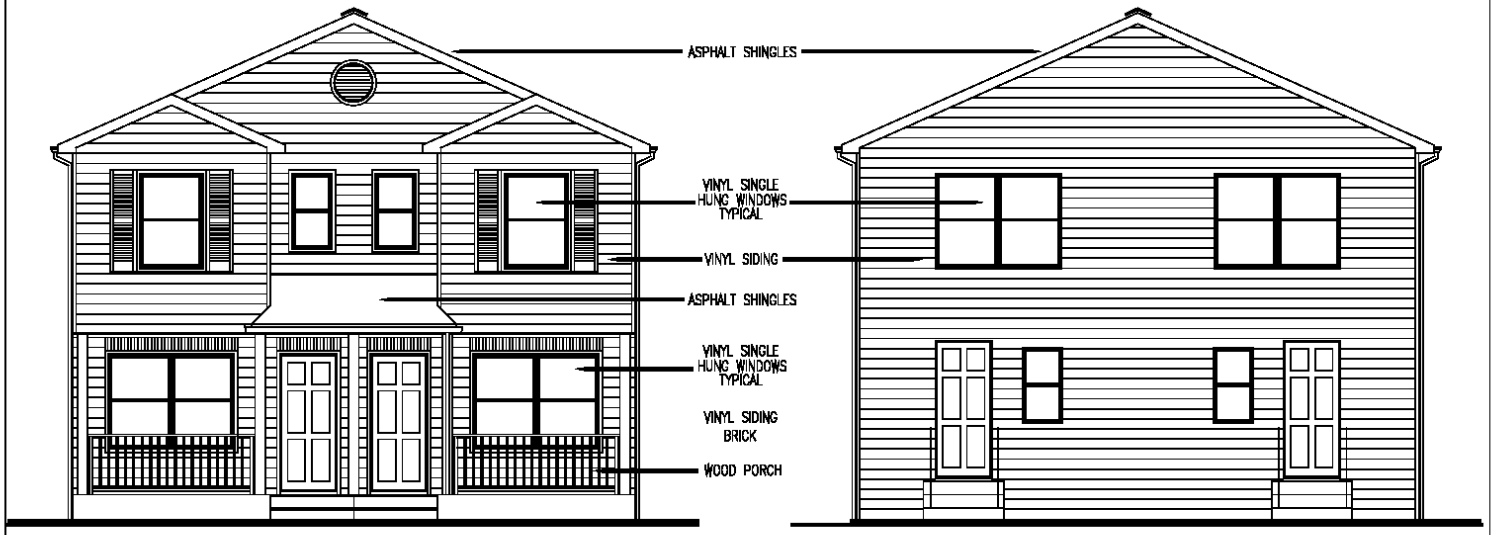

SPRINGFIELD AVENUE
BERGEN STREET
HUNTERDON STREET
SEVENTEENTH AVENUE
Preliminary Site Plan
Springfield Village - Block 2545, Newark, New Jersey
JP Affordable Housing


19'-11"
KITCHEN
9'-0" X 11'-8"
A= 105 SQ. FT.
DINING ROOM
9'-11" X 15'-0"
A= 149 SQ. FT.
W/H
W
D
BATH
A= 28 SQ. FT.
LIVING ROOM
9'-11" X 16'-10"
A= 167 SQ. FT.
CL
PORCH
36'-2"
1
FIRST FLOOR PLAN SINGLE FAMILY
SCALE : 1/4" = 1'-0"
19'-11"
BEDROOM #1
15'-11" X 11'-8"
A= 197 SQ. FT.
CL
CL
BATH
A= 47 SQ. FT.
CL
CL
CL
BEDROOM #2
9'-0" X 13'-6"
A= 126 SQ. FT.
BEDROOM #3
9'-11" X 13'-2"
A= 131 SQ. FT.
36'-2"
1
FIRST FLOOR PLAN SINGLE FAMILY
SCALE : 1/4" = 1'-0"


ASPHALT SHINGLES
VINYL SINGLE HUNG WINDOWS TYPICAL
VINYL SIDING
ASPHALT SHINGLES
VINYL SINGLE HUNG WINDOWS TYPICAL
VINYL SIDING
BRICK
WOOD PORCH
STUCCO
3
FRONT ELEVATION SINGLE FAMILY
SCALE: 1/4" = 1'-0"
4
REAR ELEVATION SINGLE FAMILY
SCALE: 1/4" = 1'-0"


KITCHEN
11'-6" x 13'-5"
KITCHEN
11'-6" x 13'-5"
D
W
HWH
1/2 B
CL
UP
D
W
HWH
1/2 B
CL
UP
47'-8"
LIVING/DINING
13'-5" X 20'-3"
LIVING/DINING
13'-5" X 20'-3"
PORCH
PORCH
1ST FLOOR
TYPICAL TWO FAMILY HOME


28'
BEDROOM
11'-6" x 13'-5"
BEDROOM
11'-6" x 13'-5"
CLOSET
CLOSET
DN
DN
BATH
BATH
CL.
CL.
50'
BEDROOM
10'-1" x 10'-4"
BEDROOM
10'-1" x 10'-4"
BEDROOM
11'-0" x 13'-5"
BEDROOM
11'-0" x 13'-5"
2ND FLOOR
TYPICAL TWO FAMILY HOME



FRONT ELEVATION
SCALE: 1/4"= 1'-0"

REAR ELEVATION
SCALE: 1/4"= 1'-0"

ENERGY COST AND FEATURE REPORT

Date: March 07, 2002

Owner's Name:
Property
Address:

Builder's Name: JP Affordable Housing
Weather Site: Newark, NJ
Builder's File: BASSFAM.BLG

ANNUAL ENERGY COSTS		bassfam
Heating	$	212
Cooling	$	151
Water Heating	$	147
Lights & Appliances	$	529
Service Charges	$	126
Total	$	1165
Average Monthly	$	97

ENERGY FEATURES

Ceiling w/Attic	R-30, Attic U=0.032
Vaulted Ceiling	None
Above Grade Walls	R-13 Batt U=0.078
Foundation Walls	None
Doors	R-2.6
Windows	Double - Vinyl U=0.460
Window Shading	H: None C: None
Frame Floors	R-19 Batt U=0.048
Slab Floors	R-5 PerimeterR-5.0 Per
Infiltration	H: 0.35 C: 0.35 ACHnat
Infilt. Measure	Blower door test
Interior Mass	None
Heating System	Fuel-fired air distribution
Heating Efficiency	80.0 AFUE
Cooling System	Air conditioner
Cooling Efficiency	10.0 SEER
Water Heating System	Conventional, Gas
Water Heating Efficiency	0.56 EF
Ducts	R-4.2
Active Solar	None
Sunspace	No

Notes: Where feature level varies in home, the dominant value is shown.

REM/Design - EEBA: Residential Energy Analysis Software v8.43

PERFORMANCE SUMMARY

Date: March 07, 2002

Owner's Name:
Property
Address:

Builder's Name: JP Affordable Housing
Weather Site: Newark, NJ
Builder's File: BASSFAM.BLG

		bassfam
Annual Load (MMBtu/yr)		
Heating		28.8
Cooling		13.8
Water Heating		18.9
Annual Consumption (MMBtu/yr)		
Heating		36.1
Cooling		4.7
Water Heating		24.9
Lights & Appliances		23.7
Annual Energy Cost ($/yr)		
Heating	$	212
Cooling	$	151
Water Heating	$	147
Lights & Appliances	$	529
Service Charges	$	126
Total	$	1165
Design Loads (kBtu/hr)		
Space Heating		22.3
Space Cooling		17.7

Utility Rates:

Electricity: NJ Electric
Gas: NJ GAS

REM/Design - EEBA: Residential Energy Analysis Software v8.43

PERFORMANCE FACTORS

Date: March 07, 2002

Owner's Name:
Property
Address:

Builder's Name: JP Affordable Housing
Weather Site: Newark, NJ
Builder's File: BASSFAM.BLG

		bassfam
Normalized Loads		
(Btu/sf shell area/DD)		
Heating:		1.84
Cooling:		11.53
Normalized Consumption		
(kBtu/sf floor area/yr)		
Heating:		27.5
Cooling:		3.6
Lighting:		1.7
Appliances:		16.3
(Btu/sf floor area/DD)		
Heating:		5.5
Cooling:		9.5
Normalized Costs		
($/sf floor area/yr)		
Heating:	$	0.162
Cooling:	$	0.115
Water Heating:	$	0.112
Lighting:	$	0.056
Appliances	$	0.347
Total:	$	0.681
Normalized Design Loads		
(Btuh/sf shell area/DD)		
Heating:		0.0014
Cooling:		0.0148
Normalization Factors		
Floor Area:		1311
Shell Area:		3149
Heating Degree Days (B65):		4977
Cooling Degree Days (B74):		379

REM/Design - EEBA: Residential Energy Analysis Software v8.43

ENERGY COST AND FEATURE REPORT

Date: March 07, 2002

Owner's Name:
Property
Address:

Builder's Name: JP Affordable Housing
Weather Site: Newark, NJ
Builder's File: ASBUILT.BLG

ANNUAL ENERGY COSTS		asbuilt
Heating	$	160
Cooling	$	102
Water Heating	$	133
Lights & Appliances	$	529
Service Charges	$	126
Total	$	1049
Average Monthly	$	87

ENERGY FEATURES

Ceiling w/Attic	R-30, Attic U=0.032
Vaulted Ceiling	None
Above Grade Walls	R-13 Batt U=0.078
Foundation Walls	None
Doors	R-2.6
Windows	Double/LoE - Vinyl U=0.360
Window Shading	H: None C: None
Frame Floors	R-19 Batt U=0.048
Slab Floors	R-5 PerimeterR-5.0 Per
Infiltration	H: 0.35 C: 0.35 ACHnat
Infilt. Measure	Blower door test
Interior Mass	None
Heating System	Fuel-fired air distribution
Heating Efficiency	90.0 AFUE
Cooling System	Air conditioner
Cooling Efficiency	12.0 SEER
Water Heating System	Conventional, Gas
Water Heating Efficiency	0.62 EF
Ducts	R-4.2
Active Solar	None
Sunspace	No

Notes: Where feature level varies in home, the dominant value is shown.

REM/Design - EEBA: Residential Energy Analysis Software v8.43

PERFORMANCE SUMMARY

Date: March 07, 2002

Owner's Name:
Property
Address:

Builder's Name: JP Affordable Housing
Weather Site: Newark, NJ
Builder's File: ASBUILT.BLG

		asbuilt
Annual Load (MMBtu/yr)		
Heating		24.4
Cooling		11.1
Water Heating		17.2
Annual Consumption (MMBtu/yr)		
Heating		27.1
Cooling		3.2
Water Heating		22.6
Lights & Appliances		23.7
Annual Energy Cost ($/yr)		
Heating	$	160
Cooling	$	102
Water Heating	$	133
Lights & Appliances	$	529
Service Charges	$	126
Total	$	1049
Design Loads (kBtu/hr)		
Space Heating		17.4
Space Cooling		13.5

Utility Rates:

Electricity: NJ Electric
Gas: NJ GAS

REM/Design - EEBA: Residential Energy Analysis Software v8.43

PERFORMANCE FACTORS

Date: March 07, 2002

Owner's Name:
Property
Address:

Builder's Name: JP Affordable Housing
Weather Site: Newark, NJ
Builder's File: ASBUILT.BLG

		asbuilt
Normalized Loads		
(Btu/sf shell area/DD)		
Heating:		1.56
Cooling:		9.29
Normalized Consumption		
(kBtu/sf floor area/yr)		
Heating:		20.7
Cooling:		2.4
Lighting:		1.7
Appliances:		16.3
(Btu/sf floor area/DD)		
Heating:		4.2
Cooling:		6.3
Normalized Costs		
($/sf floor area/yr)		
Heating:	$	0.122
Cooling:	$	0.078
Water Heating:	$	0.102
Lighting:	$	0.056
Appliances	$	0.347
Total:	$	0.602
Normalized Design Loads		
(Btuh/sf shell area/DD)		
Heating:		0.0011
Cooling:		0.0113
Normalization Factors		
Floor Area:		1311
Shell Area:		3149
Heating Degree Days (B65):		4977
Cooling Degree Days (B74):		379

REM/Design - EEBA: Residential Energy Analysis Software v8.43

Sustainability Blooms in the Garden State

New Jersey enables builders to improve on resource efficiency.

By Jeff A. Goldberg

STEVEN WINTER ASSOCIATES, INC.

Sustainability and affordability don't occupy the same house often enough—but in New Jersey passion, innovation, and public funding have come together to do the job. New Jersey is one of the first states to legislate resource efficiency into affordable housing with its Sustainable Development/ Affordable Housing Pilot Program, initiated in 1999. The state invested $17 million for developers to incorporate resource efficiency into housing for those families earning 50%–80% of the area's median income.

Springfield Village, in Newark, is one of the first of eight projects completed in the pilot program. JP Affordable Housing of Jersey City developed the 25-unit Springfield Village with John C. Inglese of Rutherford as architect and engineer. Steven Winter Associates (SWA) provided energy and green materials consultation, specification and sourcing assistance, and follow-up documentation for Springfield through HUD's Partnership for Advancing Technology in Housing (PATH).

The New Jersey program requires that the units qualify as Energy Star homes. Using REM/Design software, SWA modeled JP's two-story affordable homes to establish a baseline for performance and gauged various incremental energy measures. (JP's base case, at 25% better than a house meeting the Model Energy Code, was already close to Energy Star.) Concurrently, SWA and JP set up a material cost matrix (see Table 1).

This process proved a useful way to track comparisons that needed frequent updating and provided a reference from which return-on-investment could be calculated, simplifying the choice of which technologies to exclude. A few examples: The use of recycled concrete backfill (from a nearby demolished housing project) actually cost considerably less than crushed stone. Installing the HVAC within the conditioned space, at a $200 upcharge per unit, will yield a quick payback through energy savings. Although the compact fluorescent lighting costs four times that of incandescent, at a $310 upcharge per house, costs could be recouped in approximately two years of electrical and replacement bulb savings. The cost of high efficiency refrigerators, at a 30% upcharge, could be recouped within two years. Low-flow showerheads cost twice that of a standard unit; however, at $12 per head, water savings exceed that in one year.

Relative Cost-Effectiveness

Some of the technologies were less cost-effective than others. Two examples of "high cost" environmental measures implemented at Springfield were fiber cement siding and fiberglass framed windows. Both of these materials are substitutes for vinyl products, which are substantially less expensive but which have reputed environmental impacts that JP chose to avoid in this project.

Initially, there is little or no energy penalty for vinyl windows compared to their fiberglass counterparts. Fiberglass windows reportedly cut infiltration (saving energy dollars) longer into their service life, which itself is longer than vinyl due to the thermal stability of fiberglass. According to JP, the fiberglass windows cost three times that of the vinyl windows they would have installed.

Fiber cement siding cost two times that of the vinyl siding that would have been installed. There is no real energy benefit, and while it is durable and rot-resistant, it does need to be painted. Its primary benefits are the reduced environmental impact mentioned above, and the fact that, in the long run, fiber cement will maintain greater visual integrity than vinyl. Fiber cement also does not require painting as often as wood siding.

Table 1. Summary of Sustainable Technologies

Proposed Product or System	Product or System Replaced	Total Cost of Item(s) Replaced	Total Cost of Item(s) Proposed	Cost Differential (Total)
Site Work				
Recycled concrete backfill	Clean stone	$400	$250	($150)
Architecture/Planning				
HVAC equipment, ductwork located in conditioned space	In unconditioned space		$200	$200
Structure and Framing				
Optional deck using wood/ polymer decking (5/4 in x 6 in)	Wood rails	$100	$200	$100
Building Envelope				
10 fiberglass framed windows	10 vinyl windows	$1,100	$3,300	$2,200
1.5-in blue board between edge of slab and foundation wall	No insulation		$50	$50
1-in insulation under entire slab (650 ft²)	No insulation		$325	$325
Recycled-content fiberglass insulation (4,000 ft²)	Standard fiberglass	$1,200	$1,200	$0
Fiber-cement siding (15 yr. factory prime/paint, 1,896 ft²)	Vinyl siding	$2,085	$4,171	$2,086
Extended warranty roof shingles (900 ft²)	Recycled-content shingles replace standard asphalt	$540	$675	$135
Interior Finishes				
Recycled Component (PET) Carpet (111 yd²)	Standard polyester carpet	$1,165	$1,609	$444
HVAC System				
Duct insulation (against condensation)	Uninsulated ducts		$50	$50
Ventilating fan (Panasonic w/Airetrak)	No outside air		$150	$150
Lighting				
10 CFL fixtures (foyers, kitchens, baths)	Incandescent lighting	$100	$410	$310
Appliances				
High-efficiency refrigerator	Standard refrigerator	$420	$550	$130
Plumbing/DHW				
Pipe insulation	Uninsulated pipe	$0	$25	$25
Low-flow shower head	Standard shower head	$6	$12	$6
3 low-flow faucets (aerators)	Standard faucet	$6	$12	$6
Landscaping				
Turf grass (2 bags)	Standard seed	$30	$50	$20
Shade tree (one additional)	Standard tree count	–	$300	$300

STEVEN WINTER ASSOCIATES, INC.

Both evaluations, energy measures and material costs, ran side by side until a reasonable set of specifications was worked out for bid. These specs indicated that the homes would surpass Energy Star while incorporating many sustainable strategies.

As built, both the attached and the detached infill homes include many cost-effective technologies. Small 12-SEER A/Cs, condensing furnaces, programmable thermostats, efficient gas water heaters (with a minimum energy factor of .62), and ductwork insulated against condensation are all within the conditioned envelope. Infiltration is reduced through airtight outlets and tight construction. High-performance low-e windows were installed. CFL fixtures, high-efficiency exterior lighting with photosensors, and Energy Star refrigerators further reduce electric consumption.

Although JP agreed to install 2 x 6 stud framing at 24-inch on center with R-19 insulation, conventional 2 x 4 framing at 16-inch with R-13 was implemented. JP believes the framing subcontractor resisted straying from standard practice in this regard.

Durable exterior finishes include the fiber-cement siding and 30-year roof shingles. Low-volatile organic compound paint and controlled ventilation were implemented to improve indoor air quality. Recycled-content materials include carpet, concrete backfill, insulation, and storage sheds. Low-flow plumbing fixtures and low-maintenance turf save water. Deciduous trees, when mature, will reduce summer heat gain.

Table 2. Modeling Results — Cooling Season

Load	Base case costs*	Enhanced specifications costs*	Projected savings
Cooling (setpoint 78°F)	$151	$102	32%
Water heating	$37	$33	11%
Lights and appliances	$127	$118	7%
Service charges	$23	$23	N/A
Total	$339	$276	29%
Noncooling total	$188	$174	7%

*Results based on PSE&G rates $0.11/kWh electric and $0.59/Therm gas

STEVEN WINTER ASSOCIATES, INC.

Table 3. Energy Costs — Cooling Season

House (#)	Cost electricity and gas*		Savings total	Approx. cost cooling only*		Savings cooling
	Actual	Base case, REM		Actual (est.)	Base case, REM	
House #1	$254	$339	25%	$90	$151	40%
House #2	$342	$339	-0.01%	$135	$151	11%
House #3	$421	$339	-24%	$170	$151	-13%
House #4	$138	$339	59%	$15	$151	99%
House #5	$196	$339	42%	$50	$151	67%
House #6	$179	$339	48%	$25	$151	83%
Average	$255	$339	25%	$80	$151	47%

STEVEN WINTER ASSOCIATES, INC.

Analyzing Energy Use

SWA's preliminary analysis of energy use records indicates that the homes used less energy than was predicted by software modeling. Though simulations predicted that the single-family houses would save 32% in cooling costs (see Table 2), utility bills from the Public Service Electric and Gas Company (PSE&G) for six homes indicate that those costs averaged approximately 47% lower than those of the REM-modeled identical home—JP's standard product—without the above-mentioned energy features (see Table 3). However, this preliminary analysis does not account for a tendency among many homeowners to ration their A/C use, particularly in the first months of occupancy when they do not know how much it might cost to use the central A/C.

Noncooling savings correspond to REM estimates. Records indicate noncooling loads (including lighting, appliances, plug loads, and gas water heating and cooking) for the summer months averaged approximately $175, compared to $188 for the base case, yielding the predicted 7% savings (see Table 2). Fluorescent lighting accounts for a significant portion of the savings; JP installed ten fixtures per home, the maximum amount PSE&G credits, in high-use areas recommended by SWA.

The bottom line is that the homes' performance apparently meets modeling expectations, and the homeowners SWA visited reported satisfaction. If the remaining seven projects show similar results, New Jersey will have a well-documented account of these pioneering efforts available to like-minded builders. With continued levels of funding, New Jersey hopes to attain its goal of enabling future builders to achieve similar success with greater independence.

Jeff Goldberg is an architect with Steven Winter Associates, Incorporated, in Norwalk, Connecticut.

For more information:

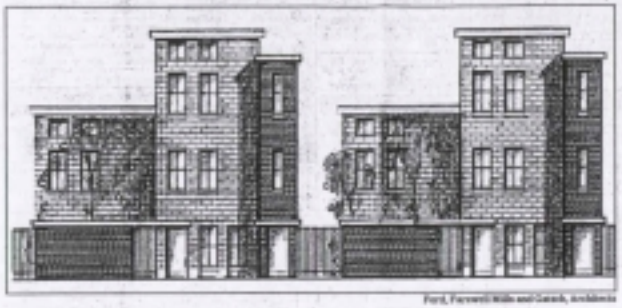
More information on the New Jersey program is available at http://www.state.nj.us/dca/dhcr/sdhome.htm.

For information on PATH, go to www.pathnet.org

Energy-Efficient, Ecology-Sensitive Housing

State program offers subsidies to modest-income projects.

By RACHELLE GARBARINE



Ford, Farewell Mills and Gatsch, Architects

Rendering of Clinton Park Townhouses in Trenton, left; Eastampton Apartments rentals will have clusters of four buildings.

Kitchen & Associates Architectural Service

THE 128-apartment development in Newark — involving both the conversion of a 19th century factory into 62 units and the construction of a 66-unit apartment building on the nearby site of a factory that is to be demolished — appears to be much like other low- and moderate-income rental housing projects in New Jersey.

But the two buildings are being designed to be environmentally sensitive, energy efficient and more affordable for residents to maintain, thanks to a $17 million state pilot program.

The two-building project is one of eight that the state's Department of Community Affairs is financing under its Sustainable Development/Affordable Housing Program, which was initiated last year. Among the others are projects involving the construction and restoration of one- and two-family houses in a historic area of Trenton and the development of 180 rentals on a patch of farmland in Eastampton, in Burlington County. The eight projects will produce 424 new and renovated rental and for-sale units for people earning 50 to 80 percent of their area's median income.

Under the program, which state officials say is the first of its kind in the nation, $12 million in low-interest loans of up to $55,500 a unit is available to developers to offset the cost of designing housing with higher energy efficiency and lower impact on the environment. In addition, $5 million in below-market-rate mortgages will be offered to income-qualified buyers by the New Jersey Housing Mortgage Finance Agency.

The aim is to encourage developers to build housing "that will be low-cost to people and low-cost to the environment," said Jane M. Kenny, commissioner of the Department of Community Affairs, which oversees housing issues. It is, she said, "a radical approach and the first step in what will raise the bar for and be a trend in affordable housing production."

While the idea of developing so-called "green" buildings, is not new, combining it with low- and moderate-cost housing, known as affordable housing, has been slow to take hold. A key reason, industry professionals say, is the cost to incorporate energy-efficient and environmentally sensitive features into housing that relies heavily on public financing. Another difficulty is that "developers are entrenched in doing business as usual and often need an incentive to try something different, which is what New Jersey's program provides," said Joseph W. Lstiburecк, a principal of Building Science Corporation, an engineering and architectural firm in Westford, Mass. His company works with developers to change their construction techniques to reduce costs and warranty claims.

The pilot program will show developers that "while they may spend more on the shell of the house, they will save on its mechanical system, making their investment a wash," Mr. Lstiburecк said. The new technologies will initially cost more, but as they become more widely used costs will drop, he added.

Commissioner Kenny said that affordable homes built with energy-saving features, such as added insulation or extra-efficient equipment, will cost less for residents to maintain. The homes built under the program are expected to reduce a residential utility bill by at least $378 a year for a typical three-bedroom home, she said.

To participate in the program, a developer's homes must meet or exceed standards established by Public Service Gas & Electric, the state's largest utility, which also reflect federal standards. The standards call for them to be at least 30 percent more energy efficient than a typical house constructed or renovated in the state. The utility, which is a partner in the program, will also pay the developer $1,500, plus 42 cents per square foot for each home that meets its standards. For example, for a 2,380-square-foot house a developer would get $2,414.

In addition, the state's Board of Public Utilities will provide additional financial incentives to developers who use solar heating techniques, such as solar panels and photovoltaic cells to convert sunlight into electricity, in their projects. Commissioner Kenny said there was a pool of $200,000 available to developers to design and implement such features.

The program encourages developers to try to limit a project's impact on the environment by, among other things, using building materials that contain recycled contents, are durable, have reduced toxicity and help improve indoor air quality. They are also encouraged to preserve trees and to develop the housing near shopping and mass transit links.

DEVELOPERS say they got involved in the program to stay abreast of new technologies and ahead of the competition. They add that they probably would not have incorporated the technologies into their projects without the state subsidies.

Commissioner Kenny said the program "will enable us to identify which strategies work and can be replicated." To ensure that the production of such housing continues, she said, her department will begin as early as this spring to require developers to incorporate the successful strategies into their projects as part of the competition for state funding.

The $15 million two-building development under way in Newark is being developed by RPM Development Corporation of Montclair, using mostly public funds, including $900,000 it received under the new state program. That money is being used to incorporate into both buildings — the renovated factory on North 13th Street, between Park and Sixth Avenues and the new structure on Park Avenue at North 11th Street, a couple of blocks away — such features as energy-efficient fluorescent lighting and fiberglass, instead of vinyl, window frames, which are considered better for the environment. In addition, the buildings will have cellulose insulation, which is made from recycled newspapers and blown into walls, filling air cavities more tightly and conserving energy more efficiently.

Bricks salvaged from the factory that is to be demolished will also be recycled and used for walkways as well as to repoint the facade of the building being renovated. And at each building, storm water will be collected and used to irrigate lawns and plants.

"Meeting the energy efficiency standards will make for better buildings, and in the long term will probably save us from going back to fix things 10 to 15 years from now," said Edward Martoglio, a principal at RPM. Mr. Martoglio said the program also "encourages more thoughtful ways to fit projects into the neighborhood."

The 128 units will have one to three bedrooms, with 650 to 1,100 square feet. Rents will range from $488 for a one-bedroom unit to $630 for a three-bedroom.

In Trenton, $1 million from the pilot program will be combined with $3 million in other, mostly public subsidies to develop Clinton Park Townhouses, comprising 23 new and renovated one- and two-family for-sale houses, with a rental apartment in each of the two-family houses. They will rise along Ewing and Southard Streets in the city's Ewing-Carroll historic district. Construction is to start this spring, with completion to follow a year later.

"The program forces you to use products and designs you would not normally use because affordable housing projects are built on such tight budgets you don't want to stray too far from what is known to work," said Christiana Foglia, a principal of Home Properties of New Brunswick, the developer.

The homes will have such features as energy efficient mechanical systems, additional insulation, and air handling systems that increase indoor air quality. The front and rear yards also will be landscaped with plantings that absorb storm water runoff and the homes will laid out to have a southern exposure to the sun, maximizing passive solar energy, Ms. Foglio said.

The one-family houses will have 1,011 square feet of space; the two-family homes will have an owner's unit, with 960 to 1,051 square feet plus a rental apartment with 960 to 637 square feet. The sale price is expected to be $83,900 and the apartments are to rent for $508 to $558 a month.

In Eastampton, Pennrose Properties of Philadelphia will use $1.3 million from the program to build a 108-unit low-rise rental development. It will be built on 25 acres of a 380-acre site just off the intersection of Woodlane and Monmouth Roads. The remaining 275 acres, which contain wetlands, will be left undeveloped.

THE project will have a road system that encourages walking and the units will be grouped in clusters of four instead of eight as originally planned, providing additional open space. They also will be arranged on the site to take advantage of sun and shade, and will be built with better insulated foundations and stack framing, which requires less lumber, said Charles M. Lewis, a vice president at Pennrose.

Most of the two- and three-bedroom rentals will be town-house-style apartments with 980 to 1,156 square feet; some will be condominium flats with 910 to 1090 square feet. Rents are expected to be $517 to $598 a month. Construction of the $13 million project is scheduled to begin in the spring and take a year to complete.

Pennrose is also involved with a project in Camden, where it will receive $808,800 to rehabilitate an apartment building and an adjacent three-building garden-style rental complex, both abandoned historic landmarks, into 51 apartments for low-income elderly residents.

"When you talk about affordable, it is not only what it costs to build but what it costs residents to maintain, which could make an affordable house unaffordable," Mr. Lewis said. "If nothing else, the state program forces you to think about these issues."

Special Report: Sustainable Solutions to Affordable Housing

New Jersey unveils pilot program to create housing that is low-cost to people and low-cost to the environment.

PATH—the Partnership for Advancing Technology in Housing—has found a number of receptive and responsive allies in the Garden State, and is setting out to build some of the most innovative multi-family housing on the East Coast. The Sustainable Development/Affordable Housing Pilot Program is an initiative of New Jersey's Department of Community Affairs (DCA), which is working in collaboration with the state's largest utility, PSE&G. Steven Winter Associates is providing technical assistance in materials research and selection, energy analysis and logistical support during design and construction. SWA also will manage a volume-purchasing bidding process to assure optimum value at lowest cost.

"Governor Christie Whitman initiated the Pilot Program to create housing that is low-cost to people and low-cost to the environment. It was a bold, new concept and we knew there would be much to learn," says Jane M. Kenny, commissioner of the New Jersey DCA.

Eight projects, which will yield 422 units of affordable housing, are currently in the works under the DCA/PATH banner: together, they are shaping up as models for other states to follow in their efforts to produce sustainable, affordable multi-family housing. Selection criteria focused on the extent to which proposed projects embodies the principles of sustainability, affordability and replicability—central themes of both the PATH and DCA initiatives.

Together, the projects will help set the standard for future affordable housing developments in New Jersey. PATH technologies identified for integration include fiberglass frame windows, cellulose insulation, Homosote sound-barrier floor sheathing, sustainably harvested framing and hardwood flooring, high insulation levels, SEER 12 air conditioning, integrated heat and hot water systems, duct work located within conditioned spaces and low- or no-VOC paints, carpets, kitchen cabinets and finishes. Although not every project will include every feature, all must qualify for PSE&G's Energy Efficient Home 5-Star Program, which requires a 30 percent or better improvement in energy efficiency over a typical new home built in New Jersey.

Other participants in this effort include the New Jersey Housing and Mortgage Finance Agency, the New Jersey Department of Environmental Protection, U.S. EPA, the State Energy Office and the New Jersey Commerce and Economic Growth Commission. PATH and SWA will participate in all of the developments; several also are being considered as potential PATH case studies. This broad-based participation means that the "green" aspects of the pilot relate as much to the financial aspects of the project development as they do the environmentally responsible components of material selection, siting and design.

The Balanced Housing Program, which is administrated by DCA's Division of Housing and Community Resources, will provide project subsidies of up to $11 million, and up to $5 million in low-interest mortgages will be available through the Housing and Mortgage Finance Agency. The New Jersey State

Energy Office had pledged an additional $200,000 to fund the integration of passive and/or active solar technologies, and utility PSE&G's Energy Efficient 5-Star Program will help offset the incremental costs of energy efficient upgrades in amounts ranging from $1,200 to $2,500 per unit, depending on the size of the property and the configuration of innovative products and systems deployed.

Responding to a widely publicized RFP, developers seeking participation in the project were asked to submit preliminary design proposals during the initial phase of project selection, and more detailed project designs during Phase II of the competition. In addition to the selection criteria described previously, the eight developments were evaluated for their viability as urban infill, potential for effective site reuse/rehabilitation and their creative application of market-ready building technologies that support energy efficiency, durability, ease of maintenance and resource conservation.

Projects in the Works

• Operation Neighborhood '99,
East Orange, NJ
Developer: H.A.N.D.S.

• Springdale Village, East Orange, NJ
Developer: RPM Development Group

• Springfield Village, Newark, NJ
Developer: JP Affordable Housing and CURE

• Riverview Homes, Camden, NJ
Developer: Camden Lutheran Housing

• Clinton Park Townhouses, Trenton, NJ
Developer: Home Properties

• Faison Mews, Camden, NJ
Developer: Pennrose Properties

• Easthampton Apartments, Easthampton, NJ
Developer: Pennrose Properties

• West Side Village, Newark,NJ
Developer: RPM Development Group

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