



U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

## Tradition Meets Innovation

### Warwick Grove Community in Warwick, New York

Warwick Grove features 215 units on a 130-acre wooded site in Warwick, New York, within an hour's drive of New York City. The developer is Warwick Grove Company, LLC, an affiliate of Leyland Alliance LLC and Tarragon Corporation. A Traditional Neighborhood Design (TND), the community includes condominium apartments, townhouses, live-work units, and a wide variety of single-family home styles. Leyland Alliance has implemented TND on projects in four states, but the company wanted to blend New Urbanist site design principles with high performance, energy-efficient building



practices.

PATH technical advisors consulted with Leyland Alliance, the project architect, and key construction partners on code issues, costs, and benefits of using advanced technologies. One strategy was the use of unvented insulated crawlspaces to enclose mechanical equipment in semi-conditioned space and to replace floor insulation. To implement the new technology, PATH consultants first demonstrated the associated benefits through modeling and real-life examples. They then analyzed the builder's standard practice, trained crews on the new technique, resolved code issues, and examined costs. Through

#### TECHNOLOGY HIGHLIGHTS

Insulated Unvented Crawlspace

Tight Building Envelope

High-Efficiency Gas Furnace

Tankless Gas Water Heater

Superior Indoor Air Quality

Durable Design and Materials

Traditional Neighborhood Design



this process, the project team was able to apply a number of PATH technologies to homes throughout the community.

## Advanced Technologies

It is the goal of the U.S. Department of Housing and Urban Development's Partnership for Advancing Technology in Housing (PATH) to accelerate the development and use of technologies that radically improve the quality, durability, energy efficiency, environmental performance, and affordability of America's housing market. Warwick Grove features several of these technologies, carefully planned and implemented to yield performance and cost benefits to both the builder and the homeowner. Highlighted in this case study are the PATH technologies used in this project.



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### Tight Building Envelope

All of the homes in Warwick Grove will meet ENERGY STAR® Home standards. Homeowners will benefit from long-term energy savings offered by a tight building envelope. Home performance tests were conducted to verify that the design goals for efficiency were met.

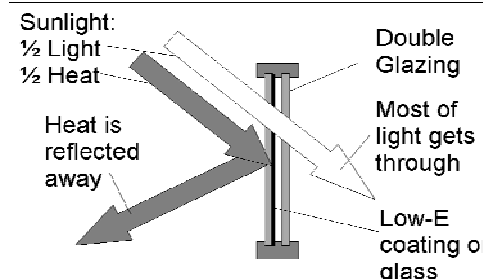
**Energy Modeling**—Modeling performed by PATH engineers was used to optimize the building envelope and insulation. Modeling helped to identify which energy saving technologies would have the greatest impact at Warwick Grove.

**Building Insulation**—Performance of the building envelope was improved through use of R-38 roof insulation and R-19 wall insulation. Kraft paper-faced batts were used in the first home, but the builder encountered problems with the quality of installation. For future homes, technical advisors recommended the use of unfaced batts with a vapor retarding paint.

**Conditioned Unvented Crawlspace**—Leyland's standard practice for homes built over crawlspaces is to insulate the floor and leave the crawlspace uninsulated. PATH consultants recommended insulating the crawlspace with foil-faced polyisocyanurate insulation (1) called Thermax on the crawl walls to keep mechanical equipment located there within semi-conditioned space. Mechanical equipment located within conditioned space (2) performs much more efficiently, resulting in energy savings for the homeowner at no additional cost to the builder. While insulating crawlspace walls adds cost, the builder eliminates the need for floor insulation. Although the project architect was concerned that the New York State code would require sheetrock covering the insulation, technical advisors received confirmation from the product manufacturer that the specific code approvals for the intended application are in place.

**Air Sealing** (3)—Applying urethane foam around windows, doors, and other breaks in framing helps prevent air infiltration and loss of conditioned air.

**Low-e Insulated Windows**—High performance glazing provides daylight (4) without sacrificing energy efficiency. Thermal modeling showed that the use of low-e windows will allow the builder to downsize cooling equipment for the homes, offsetting the total cost of the



low-e coating.



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## Efficient Mechanical Equipment

Consulting engineers designed the HVAC system and made recommendations regarding equipment and sizing to achieve maximum efficiency for project conditions. Home performance tests were conducted to verify that the design goals for efficiency were met.

**Manual J Sizing**—Engineers calculated room-by-room loads and air flow requirements for the first model home, providing comments on duct layout and zoning. Heating and cooling equipment was carefully sized using ACCA Manual J guidelines to maximize efficiency.

**Efficient Furnace (5)**—A direct-vent two-stage condensing furnace with variable speed blower with the new Carrier Infinity control system serves four zones. Annual fuel utilization efficiency (AFUE) of the furnace is an impressive 96%.

**Air Conditioner with Puron**—A high SEER air conditioner uses Puron, an environmentally preferable refrigerant (6). SEER 12 and above air conditioners frequently qualify for energy rebates.

**Programmable Thermostat**—When used properly, programmable thermostats save heating and cooling energy when the house is unoccupied.

**Tankless Water Heater**—Technical advisors recommended Rinnai tankless gas water heaters. A tankless gas unit heats water instantly, eliminating standby losses and conserving a third of the gas used by conventional tank heaters.

## Durable Design and Materials

Attention to detail during specification and construction can reduce future maintenance and repair needs. Durable materials used at Warwick Grove are designed to reduce solid waste, save money, and distribute the environmental impacts of product manufacturing over a longer time period.

**Water Protection Details (7)**—Properly detailed wall sections, quality flashing, drip edges, and generous overhangs can prevent water intrusion at the windows, roofs, walls, doors, porches, and overhangs.

**Ceramic Floor Tile (8)**—Ceramic lasts far longer than the vinyl flooring that it often replaces. Ceramic is inherently low toxic, low maintenance, and waterproof.

**Fiber-Cement Siding**—Hardiplank® lap siding has the look of wood and the easy maintenance of vinyl. The fiber-cement product has superior resistance to rotting, cracking, rain, or hail damage, and fire (backed by a 50-year warranty).

**PEX Plumbing**—Cross linked polyethylene (PEX) tubing used for piping is more resistant to chemical damage than copper. The flexible material requires fewer of the joints where leaks often start.

## Superior Indoor Air Quality

Most pollutants come from sources inside the home, including building materials. Warwick Grove homes use less toxic materials and finishes, including **low-VOC paints** and **ceramic tile** in place of vinyl (5). A **central vacuum system** removes household dirt

without adding contaminants to the indoor air. **Air sealing** techniques restrict air infiltration and limit the introduction of outside pollutants to the home environment. **Ultra quiet, ultra efficient bath fans** exhaust humid air to protect indoor air quality.

### Traditional Neighborhood Design

At Warwick Grove, Traditional Neighborhood Design (TND) is geared towards pedestrians rather than automobiles. Designed around Smart Growth principles, the community layout is compact and walkable to promote healthy living (7). Shops, parks, and public facilities offer recreation and services are all part of the development, close to home and easy to reach on foot. With an increase in pedestrian traffic, the designed front porches and recessed garages all encourage social interaction among neighbors.



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### Conclusion

Designed for residents age 55 and older, Warwick Grove features 215 units on a 130-acre wooded site in Warwick, New York, within an hour's drive of New York City. This active adult community emphasizes a compact layout, pedestrian-friendly neighborhoods, shared open space, nearby shops and services, and a variety of architectural styles. The developer, Leyland Alliance, wanted to add energy efficiency and sustainable building practices to its expertise with Traditional Neighborhood Developments. PATH support to this highly visible project includes energy efficiency, specification, and implementation training and media outreach. Technical advisors worked with Leyland Alliance to analyze their standard practices and identify areas for PATH innovations. Conditioned and unvented crawl-space, high efficiency mechanical equipment within conditioned space, tankless water heaters, and durable design and materials complement the site design by creating healthy,



comfortable, and high-performance homes.