Viridiant Lecture Series

highland park senior apartments: balancing energy efficiency, historic preservation and affordable housing

Community Preservation and Development Corporation's (CPDC) Highland Park Senior Apartments is a 77-unit rental project located in Richmond, VA. The project provides a case study opportunity to explore how Low Income Housing Tax Credits (LIHTCs) as well as state and federal Historic Tax Credits can be used to balance green building, affordable housing, and historic preservation goals when financing an affordable housing development.

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Low-Income Housing Tax Credit

Thanks to the Virginia Housing and Development Authority's (VHDA) leadership, Virginia is recognized as a national leader in the integration of green building with the LIHTC program.

- VHDA incentivizes developers to pursue 3rd party verified green building programs including the EarthCraft Multifamily (ECMF) program.
- In 2014, CPDC applied for and received funding through VHDA's 9% Competitive Pool, LIHTC Program.

Historic Tax Credits

The historic constraints that enabled the project to receive state and national historic tax credits included:

- Retain original windows
- Retain historic materials
- Maintain corridor ceiling heights
- No spray foam
- No new furring on exterior walls

the solution | balanced approach

CPDC partnered with Grimm + Parker Architects, KBS and Viridiant to find the balance between green building, affordable housing, and historic preservation goals. The result was a development that achieved ECMF Platinum Certification and is designed to operate at least 30% more efficiently than standard new housing. Key solutions included:

- Thoughtful enclosure improvements that improved thermal comfort for residents without jeopardizing the historic fabric of the building
- A glazing solution that met energy performance, historic review, and code requirements
- High performance Variable Refrigerant Flow (VRF) Heating and Cooling System
- Energy Recovery Ventilation for improved indoor air quality

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Historic Adaptive Reuse projects offer a unique challenge and opportunity. Often, stakeholders perceive green building and historic preservation goals to be in conflict with one another. Highland Park Senior Apartments demonstrates that there are opportunities for alignment between the goals of green building and historic preservation programs. The result of such alignment of goals and vision is the reuse of a community landmark.

Highland Park Public School, a Mediterranean Revival building built in 1909, is a two-story brick and stucco structure on a raised basement topped by hipped roofs clad with terracotta tiles. The unique Mediterranean Revival style stood out against the more common Virginia school styles of the time, Georgian and Gothic.

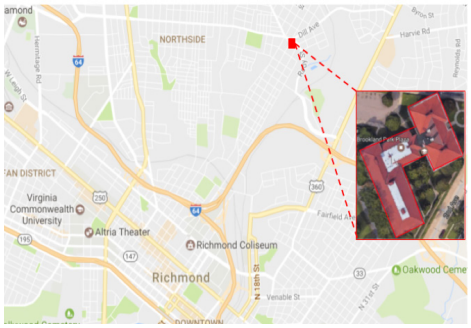

Figure 1: Highland Park Senior Apartments is located in northeast Richmond

Originally serving as the Highland Park Public School until the 1970s, the building was converted into apartments in the 1990s, but retains a high degree of integrity in terms of historic character. The exterior continues to feature Mediterranean Revival style including terracotta tiles, a symmetrical primary façade with light colored brick or stuccoed walls, a balcony above the round arched main entry doors opening, and rectangular windows. Although the interior classrooms had been converted into multiple apartment units during the 1990s renovation, the building's grand entry stair, as well as the auditorium's stage and proscenium remain intact.

The building was vacant for two years and suffered from extensive deferred maintenance, including deficiencies in electrical, plumbing and heating, outdated systems, and vandalism. Additionally, the building was not insulated to modern energy efficient standards; the ground floor (basement) had experienced significant mold growth; water had damaged moderate portions of the roof and interior framing.

Community Preservation and Development Corp., acquired the former school out of foreclosure in November 2013 for $600,000. This $11.4 million renovation will result in 77 apartments for low-income seniors. The architect on the project was Grimm + Parker Architects working from their Charlottesville. VA office. Locally-based KBS was the general contractor.

Figure 2: The new Highland Park Senior Apartments at 1221 E. Brookland Park Blvd. (Jonathan Spiers, Richmond BizSense)

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Rehabilitation included performing deferred maintenance, site improvements, water-proofing, replacement of kitchen cabinetry and appliances, bathroom vanities and toilets, flooring and finishes, as well as updating plumbing, electrical and HVAC systems to modern standards, while also providing proper envelope air sealing and insulation. To ensure compatibility with Section 504 for disabled access, several existing units will continue to provide accessible/barrier-free living on the ground and first floor.

Additionally, the existing auditorium (with previous renovations) was rehabilitated to serve as the community room with historic stage, as well as provide communal library/ lounge, kitchen, fitness room, salon and restrooms. The project obtained EarthCraft Multifamily (ECMF) Platinum certification ensuring sustainable design and construction.

Enclosure

A challenge that many teams face when approaching the renovation of historic, adaptive reuse property is improving the enclosure performance. The team was not able to improve the levels of insulation in the thermal enclosure due to the exterior walls contributing to the historic fabric of the project. Instead, air sealing and compartmentalization were the primary goals of the enclosure improvements. With a minimum enclosure tightness requirement of 7ACH50, the project achieved an enclosure tightness improvement of over 50% from baseline conditions.

Highland Park Enclosure Performance Summary	
Unit-level Airtightness	7 ACH50
Above Grade Walls	R-15
Roof/Attic	R-38
Glazing	U-value: 0.38 SHGC: 0.30
Crawlspace*	R-19

*Improving the existing crawlspace was not required for the building's permit since it represented an existing condition. Early design feedback from project team stakeholders led to the inclusion of a vapor retarder and R-19 insulation in the shallow crawlspace; resulting in improved building durability, indoor air quality and improved thermal performance.

Figure 2: Diligent ceiling unit airsealing by KBS improved the compartmentalization and overall airtightness of each apartment, reducing energy consumption, and improving indoor environmental quality.

Figure 3: Grimm + Parker Architects developed a holistic glazing solution by 1) rehabilitating the existing windows to maintain the historic fabric of the property to Department of Historic Resources and the National Park Service guidelines 2) specifying custom interior storm windows that improved the assembly's performance to u-value 0.38, SHGC 0.40. (Photo credit: Grimm + Parker)

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Heating, Ventilation and Air Conditioning

Rehabilitating a historic building provides an opportunity to preserve the design and construction means and methods of the past, while integrating new technologies into the design that will improve the occupants' quality of life and the building's durability. For example, the project team's aggressive air sealing scope and improved indoor environmental quality goals necessitated the inclusion of two energy recovery ventilation (ERV) systems. The ERVs not only provide fresh air to residents but also incorporate an enhanced dehumidification feature to control interior relative humidity.

With the project's enclosure improvement opportunities limited, a Variable Refrigerant Flow (VRF) heating and cooling system was specified to meet ECMF Platinum energy performance benchmarks. These systems can operate 1-40 indoor air handling units, thus reducing the number of outside units that are hidden on roofs and making them ideal solutions in historic preservation projects. These systems are popular for historic, adaptive reuse applications since they offer designers with multiple indoor unit options including: slim-duct static air handlers (figure 4), ductless heads, flush mounted ceiling cassettes, and floor/wall mounted "radiator look-a-likes." Note, Highland Park Apartments utilized both slim-duct static air handlers and floor/wall mounted "radiator look-a-likes" to maintain the thermal comfort of residents and visitors to the property.

Figure 4: VRF outdoor unit is set on a pad on the perimeter of the building.

Fixtures and Finishes

While the team was limited in their ability to make substantial changes to the enclosure design, the fixtures and finish schedules afforded broader design choices. All lights and appliances (refrigerator and dishwasher) were Energy Star rated and met the requirements of Universal Design. Interior finishes utilized Low-VOC (volatile organic compound) paints and sealants. Original flooring was refurbished where possible, while apartment-level flooring was Marmoleum Composition Tile (MCT) which is a more sustainable option that Vinyl Composition Tile (VCT) or laminate tile flooring.

Next Steps

Highland Park Senior Apartments, now open and fully leased, is the first of three buildings that will house approximately 200 residents. The other two projects are Jackson Place, planned along Second Street in Jackson Ward, and a redevelopment of the Baker School at 100 W. Baker St. into 48 apartments for seniors. CPDC closed on those properties in 2013 and is aiming to bring them to market in 2019 (Richmond BizSense, December 2016, http://richmondbizsense.com/2016/12/19/former-highland-park-school-reborn-as-apartments/).