

OUR PEOPLE DRIVE PERFORM

PUSHING BOUNDARIES, EMBRACING THE UNIQUE

This is The Heights Project Story

WHY IT MATTERS

- **Unique aesthetic design.** The state-of-the-art, 775 seat, 180,000 square foot school is built vertically, with a variety of levels, sight lines, and visually-pleasing elements, along with a green roof.
- **Nuanced project management approach.** Due to a variety of complex systems and features, Shapiro & Duncan brought a team of sub-foreman onboard to manage details and ensure accuracy.
- **Commitment to creative thinking and going the extra mile.** From start to finish, The Heights project required out-of-the-box thinking, rigorous attention to detail, and a commitment to excellence to complete the unique structure and achieve its goals.



THE CHALLENGE

Shapiro & Duncan was selected as the Mechanical design-assist and construct partner on The Heights project. In this role, their team had the opportunity to be hands-on from the planning phases to lend their expert guidance and knowledge to guide the process of creating this one-of-a-kind structure.

The Heights is located directly across the Potomac River from the Nation's Capital, surrounded by high-rise offices, apartments, and condominiums. It was built to serve two distinct functions, housing the HB Woodlawn Program of 6-12 graders focused on the performing arts, with admission on a lottery system; and the Eunice Kennedy Shriver program for special education.

The challenge in this project was to design and construct a space to serve these dual purposes in the community, while in keeping with space and design considerations the urban location demanded.

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UNIQUE ELEMENTS

- **Environmental sustainability and innovation.** The Heights project is on track to achieve a LEED Gold certification. The building features a green roof with drains to collect water on terrace levels and recycle through the rainwater harvesting system, to be used for non-potable water for flush building toilets and irrigation. The Heights is the first school within Arlington Public Schools to install the water-cooled variable refrigerant systems providing each individual classroom with high-performance heating and cooling service.
- **Urban location, re-imagining of spaces.** The Heights brings a dual purpose and combination of performing arts and special education programs. The small footprint and vertical construction with a variety of levels, light, green space, and sight lines helps to facilitate its purpose and sets it up to advance its mission.
- **Creative leveraging of the team to best achieve project requirements.** By segmenting key functions of the work and assigning them to sub-foremen, Shapiro & Duncan was able to ensure accurate completion of intricate details to keep project functions on-time and on-budget.



THE SOLUTION

Shapiro & Duncan's team consisted of highly skilled tradespeople and subcontractors ranging from ductwork to plumbing and mechanical equipment and piping installations, to automatic temperature controls, air and water balance, mechanical installation, and chemical treatment, among others.

The school building itself is built on five bars, fanned out from a single axis point. To take advantage of the small footprint, The Heights is constructed in a vertical format, with 2 stories below grade and 5 above, with a variety of different elevations, facades, and areas for natural light to enter – creating a collaborative open space with lots of sight lines and green space.

To address the unique needs The Heights project, the Shapiro & Duncan team:

- ⇒ **Installed a complex HVAC structure, featuring water-cooled variable refrigerant systems (VRF), with each floor having a dedicated outdoor air unit to deliver fresh air at 70 degrees.** The VRF systems consists of 180 fan coil units, controlled by 44 branch selector boxes fed from 27 indoor water-cooled heat recovery condensing modules. Each classroom has a dedicated variable refrigerant fan coil unit, to deliver high-efficiency simultaneous heating or cooling, a design element which required complicated refrigerant piping and controls as well as advanced communication wiring for them to function correctly and at top efficiency. Shapiro & Duncan's team led the process of coordinating and installing these systems, along with the

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dedicated outside air units, air handling units, computer room AC units, cooling towers, heat exchanger, loop circulation pumps, and condensing boilers as key elements of the total system, which also played a role in ensuring the energy efficiency necessary to keep the project's LEED goals on track.

- ⇒ **Relied heavily on its internal VDC team to drive Building Information Modeling (BIM) technology** to ensure accuracy in materials and plans while navigating the space constraints and urban demographics. All plumbing, mechanical piping and ductwork systems were modeled, along with fire protection, electrical systems, ceilings, and structure. Once coordinated, the plumbing and mechanical piping systems were broken down into manageable pods for Shapiro & Duncan's prefabrication, delivery, and installation. Approximately 85% of systems were prefabricated in our shop including storm, sanitary waste and vent, domestic water, condenser water, and heating hot water.
- ⇒ **Facilitated 'just in time' material deliveries due to no lay down capabilities at the site due to the dense urban location.** Due to the tight urban location, there was no staging area available. All materials delivered to the site were required to be installed within a 2-week period of delivery, and Shapiro & Duncan's expertise was essential to ensuring this process flowed smoothly throughout the project. Their prefabrication facility located just 15 miles from the site was instrumental in making sure fabricated systems and equipment could be stored until needed on site for timely installation.

RESULTS-THE S&D DIFFERENCE

The Heights project was successfully completed from its November 2017 design/engineering start to its official opening in August 2019.

Throughout the project scope, the Shapiro & Duncan team's experience, track-record for tackling unique spaces and designs, as well as its network of relationships with a range of tradespeople was essential to the on-time completion of the project.

Due to the complexity of the various materials, particularly the variable refrigerant systems serving each of the classrooms, Shapiro & Duncan divided the individual scope activities by system and entrusted them to a team of sub-foremen who reported then to the overall project foreman. In addition to the refrigerant systems, sub-foremen were assigned to the storm, waste and vent pipe, and condenser water piping elements of the building to ensure prefab was ordered when needed, installations were checked, and quality control was performed. This team approach by system guaranteed accountability, attention to detail, and increased productivity.

THE BOTTOM LINE

The Shapiro & Duncan team is not constrained by the limits of the 'typical.' An expert team who brings knowledge and a creative approach is essential to completing unique construction projects that are re-defining the landscape and the ways we function in our spaces.