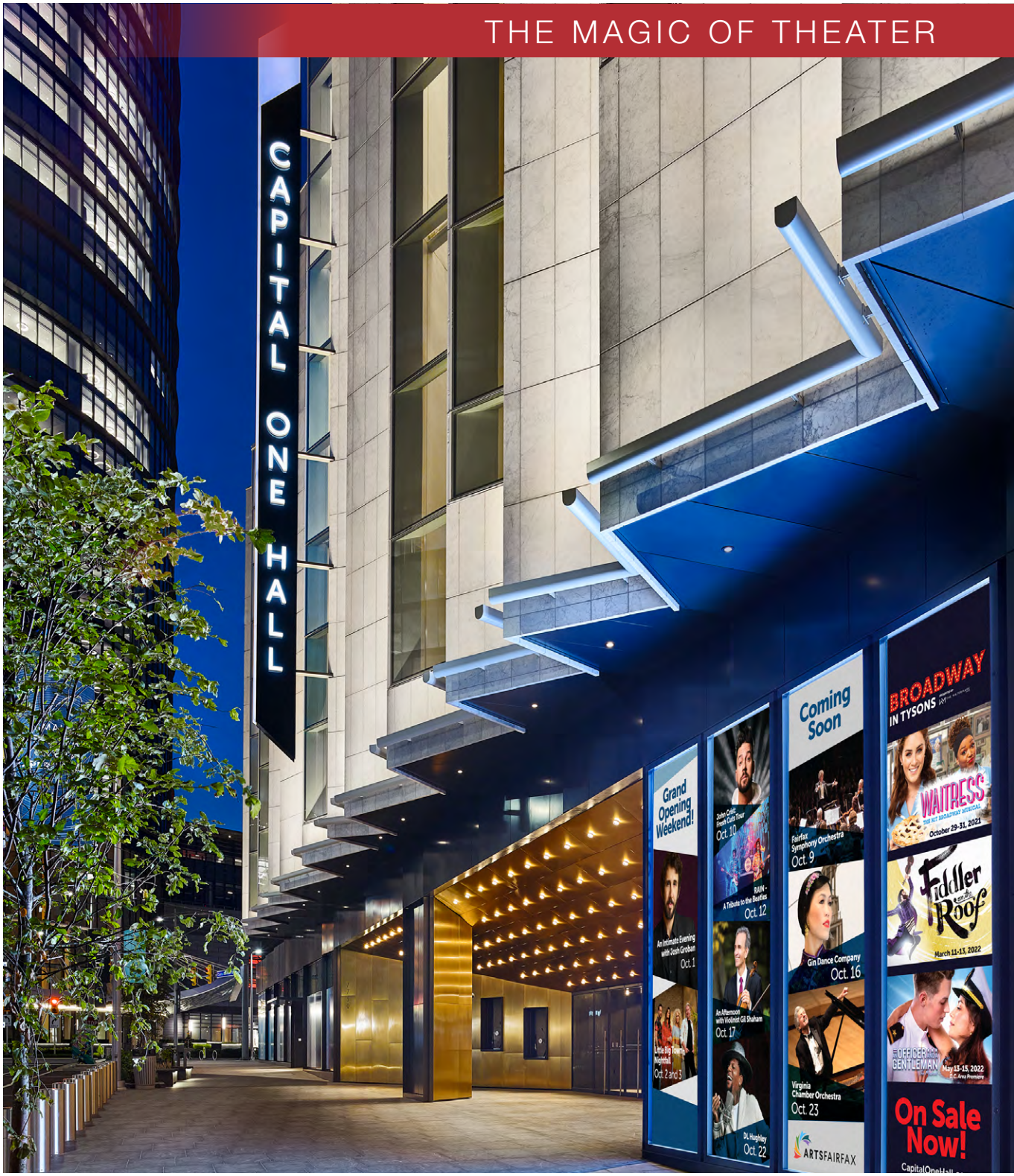
MOMENTUM

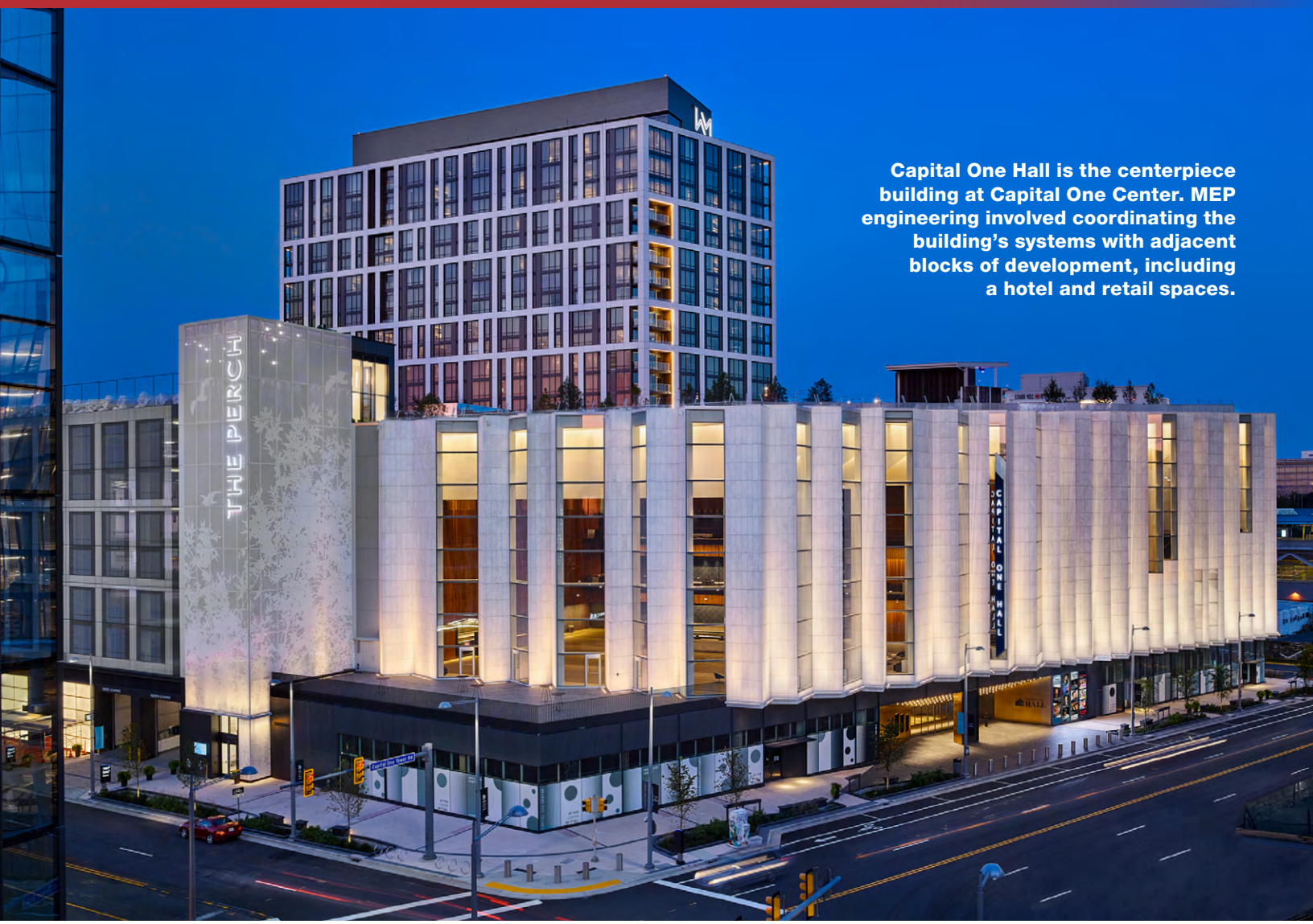
SUMMER 2022

THE MAGIC OF THEATER



Mueller

The New Cultural Heart of an Urban Campus



Capital One Hall is the centerpiece building at Capital One Center. MEP engineering involved coordinating the building's systems with adjacent blocks of development, including a hotel and retail spaces.

The fall 2021 opening of Capital One Hall in northern Virginia represents the most significant contribution to the Washington, D.C., metropolitan performing arts scene since the John F. Kennedy Center for the Performing Arts opened in 1971. From Broadway productions to concert tours, the hall serves as a new epicenter of the arts in the region.

A striking white marble building set in the heart of Capital One Center, the financial company's Tysons headquarters campus, Capital One Hall has quickly become a popular venue for the performing arts—praised by artists and audiences alike. The hall offers The Main Theater, a 1,600-seat venue designed for major productions and concerts; The Vault, a 225-seat black box theater; and The Atrium, a 1,300-person flexible event space. In addition to hosting corporate meetings, the hall welcomes community arts programs, Broadway productions, concert tours, weddings, and other events.

Capital One selected **HGA** and **Mueller Associates** to lead the 149,000-square-foot building's design because of the team's collective expertise in creating major performing arts centers. Throughout the Mid-Atlantic, Mueller has engineered the modernization of several theaters at the Kennedy Center and new performing arts halls for communities and leading academic institutions. Capital One and HGA recognized that Mueller's skilled engineering team would minimize mechanical noise in Capital One Hall's venues while ensuring the comfort of its patrons and performers.

"Our work in designing systems for performing arts centers dates back more than 45 years," says **Todd Garing, PE, LEED AP**, president of Mueller. "In the mid-1970s, we helped modernize the historic Lyric Opera House in Baltimore. Since then, we've completed dozens of complex projects, including at the Strathmore, UVA, Duke, George Mason University, and the University of Maryland, Baltimore County. Capital One Hall was challenging from several perspectives, but the goal remained the same: we needed to design systems that would support superior performance acoustics, sustainability, and comfort."

Life on the Edge

Known as one of the nation's most prominent "edge cities," Tysons is a four-square-mile commercial center set at the busy intersection of the Capital Beltway and the Dulles Toll Road in Fairfax County. For decades, county planners envisioned transforming the Tysons community from a dense office and retail maze of development into a more vibrant live-work-play setting with public amenities and multi-modal options for visiting and commuting.

Planning for Capital One's headquarters began in 1999 when the company purchased 26 acres just inside the Beltway. The company initially proposed a traditional office park with four towers on a relatively closed campus. Other dynamics soon came into play, however. The Washington Metropolitan Area Transit Authority moved forward with plans to build the Silver Line and create a new Metrorail stop steps away from the planned Capital One campus. At the same time, the county continued to promote a friendlier, more walkable urban environment with ample public amenities.

Capital One recognized the unique opportunity to create a dynamic mixed-use hub for the community in addition to its corporate headquarters space. The resulting master plan for Capital One Center presented a lively mix of destination spaces that would support connections with the surrounding neighborhood, with a walkable street grid and various uses, including residences, restaurants, retail, and other amenities. Today, Capital One Center's mix of uses also includes a Wegmans supermarket and a 300-room hotel.

The visionary plan set the stage for a world-class cultural destination. Capital One Hall emerged as the signature, public-facing project on the campus, with a clear opportunity to create an iconic cultural venue. The Perch, a rooftop park with a biergarten, amphitheater, and sculpture garden, was also included in the plan. With the hall's development, Capital One Center is today a premier location to host corporate events, while the community benefits from an easily accessible, multi-purpose facility.

A Box Within a Box

The design of Capital One Hall's event spaces presented a clear challenge: creating performance venues with excellent acoustics while sandwiched between highly active spaces. The lowest levels include a subsurface parking garage and a busy loading dock that brings 18-wheelers to the street-level grocery store. The rooftop park sits atop the building. Nearby, trains roll in and out of the Metro station.

The solution was to create a "box within a box" to absorb shocks and minimize the heavy vibrations coming from all directions. While much of the collaboration for this unique structural solution took place between HGA and **Thornton Tomasetti**, the structural engineer, Mueller played a crucial role in minimizing penetration points for the HVAC system routing.

"We needed to coordinate closely on the penetration points and keep those to as few as possible," says **Scott Cryer, AIA**, a principal with HGA who oversees the firm's arts, community, and education practice. "We didn't want the box to become swiss cheese. Mueller's engineering team did an exceptional job of reducing the number of penetrations to help preserve the structure's integrity, which supported the overall acoustical quality in the theaters."

Clark Davenport, PE, Mueller's lead mechanical engineer, points to another significant challenge. "We focused on the intricacies of detailing the systems to work within the box structure," he says, "but we also needed to think beyond the hall itself. We had to coordinate our systems with those in other blocks of development on the headquarters campus. A major focus from start to finish was carefully integrating the systems both within the building and beyond."

Adam Fry, PE, Mueller vice president and project manager for the MEP/FP design, agrees that integration of the systems that serve the entire block was key. "Capital One Hall has its own electrical service, but we needed to tie in with other central systems serving the hotel, parking garage, and retail. We tied into the central bank of generators for emergency power and the central fire alarm system serving the entire block."

Quiet and Comfortable

The Main Theater is served by multiple air handling systems that feature displacement ventilation with low-discharge air velocities. "Mueller created low-velocity systems that bring air through the plenum spaces below the seating at the orchestra level and in the balconies," states Cryer. "The air percolates up with little risk of mechanical noise as it flows in. The air is delivered directly and efficiently."

In addition to addressing ventilation, Mueller's engineers designed systems to account for the center's various acoustical requirements. Mueller worked closely with HGA and **Stages Consultants**, the project's acoustician.

A Sustainable Showcase

Capital One Hall's design adheres to strict environmental and sustainability standards. There is an expanse of more than 30,000 square feet of green roof, a stormwater runoff reuse system, and 16 street-side bioretention basins to treat and retain stormwater onsite, exceeding the Virginia, Fairfax County, and Tysons re-development goals and requirements.

Capital One Hall Receives Rave Reviews

"Mueller is an excellent fit for projects that require sensitive MEP design. They understand the need to route and detail systems to reduce vibrations and noise that can be disruptive. They work within the architectural pathways and avoid long runs for the most cost-effective and efficient design."

Scott Cryer, AIA
HGA, Principal

Mueller's team zoned and engineered heating and cooling systems to optimize energy recovery and thermal comfort. Combined with a carefully designed building envelope, the MEP systems should achieve more than 27% energy savings compared to a typical code-compliant structure. The project has earned LEED® Gold Certification.

Enriching the Community

Cryer, who also serves as a board member of Arts Fairfax—the organization that oversees the use of the venues by community arts groups—appreciates the opportunity to design Capital One Hall and see its impact on the community. "I'm proud that the entire design team was able to contribute their specialized expertise and bring this project to life," he says. "We were able to figure out all of the 'technical gymnastics' and create an environment that people truly enjoy. When Josh Groban performed at the grand opening, he praised the acoustics in the hall. Then he ended the concert with a beautiful acapella piece."

"I attended a concert at Capital One Hall shortly after it opened," says Davenport. "It was amazing to see and experience the venue after years of design and construction. The acoustics were incredible—despite the hall being nearly full, the quiet moments during the performance were intimate, and the background of the audience nonexistent. The environment within the hall was extremely comfortable and though I strained to try to hear any HVAC system noise, there was none. The systems were working perfectly without any perception that they even existed."

"It's rewarding to see how much the community is using this building," says Cryer. "From top to bottom, Capital One Hall serves both corporate and public interests." Todd Garing adds, "Mueller teams have had an opportunity to work on many of the nation's landmark performing arts venues. This project really stands out, not only for the quality of the performance spaces but also for the overall impact on the community. I hope it will inspire other companies to think creatively about how their facilities can enrich communities and serve the public beyond their employees."

Capital One Hall: Serving the Community

Capital One Hall enlivens Tysons, Virginia, with new performance venues and a popular public park. More than a decade in the making, the venue required the expert skills of a multidisciplinary architecture and engineering team to achieve a pitch-perfect delivery.

1 *The dramatic atrium space supports a variety of corporate and community events and leads to an expansive terrace.*

2 *The Main Theater has received acclaim for the quality of its acoustics. A low-velocity air handling system provides comfort for patrons while minimizing disruptive noise and vibrations.*

3 *Capital One Hall's rooftop park, The Perch, includes a biergarten and amphitheater. The park is open to the community.*


1


2

3

Arts Projects Highlight Campus Growth

New Performance Venues Underway

Construction is underway on the Artis Center for Adaptive Innovation and Creativity, a transformative project on the Radford University campus in Virginia. The 178,000-square-foot building will support the university's vision for integrated educational programs in the arts, health sciences, and technology and is planned as a campus hub—drawing together students and faculty from multiple disciplines.

Designed by **Hord Coplan Macht** with **William Rawn Associates**, the Artis Center is the largest capital construction project in Radford University's history. Mueller has provided mechanical, electrical, and plumbing engineering for the building, which includes a theater, an instructional auditorium, maker spaces for the fine arts, music and dance studios, a metal-working shop, clinical simulation training suites, virtual and augmented reality labs, and numerous collaborative spaces.

At St. Mary's College in Maryland, construction is nearing completion on a new Performing Arts Center. The two-story, 50,233-square-foot building includes a 700-seat multipurpose auditorium, a 125-seat recital hall, rehearsal studios, and classrooms for the Music department. Designed by the team of **Graham Gund Architects** and **GWWO Architects**, the project will enable the university to significantly upgrade and expand its facilities for music education. Mueller has provided mechanical and electrical engineering services.

Renderings by GWWO Architects

Renderings by Hord Coplan Macht

Mueller Associates, Inc.
Consulting Engineers

ENGINEERING GREAT EXPERIENCES

1306 Concourse Drive, Suite 100, Linthicum, MD 21090
410 646 4500
www.muellerassoc.com