



STRUCTURETONE Organization *Insights*

Structure Tone | LF Driscoll | Pavarini Construction | Pavarini McGovern

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A Message from Jim and Bob

It's hard not to notice when you fly in an airplane, use your cell phone to hail (and pay for) a ride or take an elevator to the top of a skyscraper: We human beings are capable of creating incredible things. Another amazing human achievement is underway in New York City as a new city rises over the rail yards along Manhattan's West Side. As we describe in this issue of *STO Insights*, this emerging neighborhood is the largest private development in the world and New York City's biggest effort since Rockefeller Plaza. This new city within the city is bringing people together like never before, through spaces to work, live, learn and shop.

And we're seeing that pattern emerge in other ways as well, whether people are literally coming together under one roof as is the case in Havas' new London "village" (page 8), or their approach to office design and development creates a sense of unity and cohesion across the globe, as with clients such as Willis Towers Watson (page 20).

As planners and builders, we're working with our partners to push the limits of our industry like never before. We're building data centers to be faster and smarter, enabling businesses and communities to have the data reliability, speed and breadth they need to thrive. We're incorporating new technologies into field operations, like mobile file-sharing and virtual reality, which are helping improve project coordination in real-time. We're building smarter and leaner, as Lean expert Sam Spata describes on page 12. And we're building greener, with the integration of more and more green technologies within buildings, as energy firm NRG's new offices in New Jersey demonstrate (page 14).

As we expand our ownership group toward an employee-owned company, we will also continue to invest in our own workforce and workplaces to ensure our clients benefit from the most energetic, innovative and collaborative professionals in the industry.

The built environment has a tremendous impact on our lives and our evolution. It's both the product and driver of change, and we take our role in that process seriously. We're honored to build the amazing spaces that allow the human mind to invent new technologies, cure diseases, develop new products and solve community problems. The future is always at our fingertips, whether with our new clients or long-tenured relationships. And that's exhilarating. We're proud to share that future with you. ◀

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Phase one of the 28-acre development, shown here in purple, is now under way



HUDSON YARDS: A New City Rising

“The new heart of New York.” That’s the bold expectation set out on the website of Hudson Yards, the massive mixed-use development under way along New York City’s far West Side. Now with more than half of the 28-acre site well into redevelopment, that vision is getting closer and closer to becoming reality.

“Hudson Yards is already starting to take shape as a city within a city. When it’s fully built out, it will roughly be the same square footage as the central business district in Dallas. It’s amazing,” says Tom O’Halloran, vice president of business development at Structure Tone.

Breaking new ground

Hudson Yards is, in fact, the largest private real estate development effort in the history of the United States. When completed, it will offer 27 million square feet of built real estate, from offices, hotels and retail stores to apartments, art centers and a school—plus 14 acres of gardens, art installations, parks and public spaces, including the end point of the city’s famed High Line.

The opportunity to revitalize such a prime piece of land in one of the world’s largest cities is actually the result of a serendipitous loss—New York’s failed bid to host the 2012 Summer Olympics, which went to London. Already earmarked for redevelopment, the site ultimately went to Related Companies and its partners, who envisioned a new neighborhood emerging above the active Long Island Rail Road, Amtrak and New Jersey Transit rail yards.

Only the beginning

Commercial spaces were the first take to shape, starting with 10 Hudson Yards. This building, now completed, is already home to such notable firms as Coach, L’Oreal USA, SAP, VaynerMedia and Boston Consulting Group. On deck for completion is 30 Hudson Yards, scheduled to open in 2019 as the city’s second-tallest office building and the new home of Time Warner, Wells Fargo and a number of other leading media, finance and commerce organizations. Six more buildings are in

various stages of planning and design to build out phase one, known as the Eastern Yard, including two more commercial towers (50 and 55 Hudson Yards), an Equinox hotel and fitness center (35 Hudson Yards), a retail podium featuring Manhattan’s first Neiman Marcus store, a residential tower (15 Hudson Yards) and The Shed, an art center, all surrounding a public square with additional retail and art installations.

Structure Tone is heavily involved in this first phase of development, building out tenant spaces in approximately 2 million square feet of the buildings so far. The firm built the stunning new offices of Boston Consulting Group in 10 Hudson Yards (see page 6 for more) and is now working on the offices of Time Warner and Wells Fargo in 30 Hudson Yards. “Class A tenants are certainly electing to move into these Class A buildings,” says Scott Corneby, Structure Tone executive vice president. “Time Warner alone makes up 26 floors of 30 Hudson Yards. While building out all of these spaces

simultaneously on such an active site is complex, it’s exciting to see it all taking shape.”

It’s a remarkable venture, and one that is certainly bringing Structure Tone into trailblazing territory—right in their own backyard.

“One of the reasons we relocated our office to Midtown was to be close to Hudson Yards—not only because this is an increasingly vital area of the city, but also because so many of our employees are working there. We can literally watch the progress right from our office windows,” says Eugene White, Structure Tone senior vice president of business development.

That proximity has certainly been beneficial given the unprecedented—and sometimes unexpected—challenges of such a massive effort. “There are so many atypical components to this project, from the fact that most of this work is being built on top of a newly constructed platform above one of the world’s largest transit hubs, to raising an entire city block, to the typical unknowns of an active construction site,” says O’Halloran. “It’s a new frontier for the whole industry and it’s setting the bar higher at every turn.”

The future is now

All of the work under way now is only one phase of this incredible effort. Phase two will build out the Western Yard to include several residential towers, an office complex and a new K-8 school. And, of course, the blocks surrounding the Hudson Yards site are actively redeveloping as well, including 3 Hudson Boulevard, a 66-floor office tower developed by Moinian; 441 9th Avenue, a 25-story commercial building by Cove Property Group; and 66 Hudson Yards, also known as The Spiral, a 65-story, tiered commercial tower designed by Bjarke Ingels Group and developed by Tishman Speyer. Development within the area between 10th Avenue and West 33rd Street is also in the works, including three office towers, a residential tower and public spaces, all led by Brookfield.

To say that this is an exciting time for development in New York is an understatement. To many in the real estate business, it’s downright inspirational. “As someone involved in this industry for 20 years and as a New Yorker myself, I take a lot of pride in what’s happening in my city,” says O’Halloran. “To see something as revolutionary as Hudson Yards taking shape in front of me, and with my company’s involvement, is inspiring on so many levels.”



Above ▲
30 Hudson Yards



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Amping Up the Collision Coefficient at BCG's New York Offices

“Unlock insight.” “Challenge established thinking.” “Drive transformation.” Reading through the mission of global firm Boston Consulting Group, it’s no secret that encouraging innovation is in their DNA. It’s only fitting then that when the company looked to relocate their New York City offices, they targeted a location like no other: the first tower built in Hudson Yards.



Workspaces range from casual seating to formal meeting rooms

The new office also marked a new chapter in the company’s evolution—one that reflects their drive to be bold. From the fluid, neighborhood-style working areas to the design intended to produce casual “collisions” between employees, BCG senior partner and New York managing director Ross Love has said, “We didn’t just change addresses; we changed the culture.”

No two spaces alike

Geared around a community concept, the workplace offers just about any type of working or meeting space one could ask for. Sit/stand work stations dot the neighborhood areas of the firm’s six floors, while open lounge areas, quiet nooks, large tables and various forms of seating fill the common areas. The office’s many meeting rooms, both formal and informal, can be booked by an individual for a few minutes of private time or by a team working on a project for weeks at a stretch.

With these unique spaces come unique designs, which, says Structure Tone project manager Derek Hamilton, did pose some challenges. “Every single room is different. No finishes are the same, and the rooms are different shapes and different colors,” he says. “We had to measure everything individually and we couldn’t really order many of the materials in bulk. The company did, however, try to work with the same vendors to get the desired design variety at a more competitive price.”

Staying connected

Because many of the company’s employees are mobile throughout the week, working areas are meant to easily shift from one user to the next, depending who needs them. To that end, dedicated offices are few and far between in favor of a hot-desking system, with available private areas to offer focus space when needed. To keep track of who is where, employees and visitors check in to a desk on a tablet, which they can also use to reserve conference rooms and other spaces. The whole idea of this fluid workforce is to increase the office’s “collision coefficient,” or how often employees casually interact throughout the day. And it’s not just an abstract theory—BCG actually tracked employee movements on a volunteer basis to see how it worked. “Volunteers wore devices that measured collisions through data on where they went, who they interacted with, how business units crossed. It’s unbelievable,” says Hamilton.

That connectivity also means the office’s technology systems are critical. Each floor has its own IT room to house equipment, and the 126 individual offices each have their own one-touch IT/AV systems. In addition, the “venture” and “immersion” meeting rooms are equipped with collaborative screens, including a 24-by-6-foot Prysm touch screen canvas, that teams can use to brainstorm and modify ideas on the spot. “Many of these systems hadn’t all worked together in one

place before, so we were testing things out as we went,” says Hamilton.

Construction within construction

But perhaps the biggest challenge in building out the space was doing so in a building—and on a site—that was still under construction itself. 10 Hudson Yards was the first to begin construction, and with leases quickly being signed, tenant fit-outs began as soon as physically possible. BCG’s space was one of four being built out at the same time, all while the base building was still finishing up. Issues facing the base building construction team often trickled down to the tenant space contractors, meaning coordination and communication were key. “With so many contractors on site, we sometimes lost elevator access for days,” Hamilton says. “We just had to plan our work out the best we could and stay in constant communication with the base building owner to make sure we were always up to speed.”

The results of that challenging work, however, are well worth the complexity. The new space is simply stunning and is certainly turning heads throughout the commercial real estate industry. In fact, BCG has had over 90 firms tour through the space for inspiration. “We knew we were doing something special while we were building it,” says Hamilton. “But to see how happy they are with the space in the end is such rewarding proof. Everyone is just thrilled.”

Project Details

Size:
193,295sf

Client:
Boston Consulting Group

Architect:
Gensler

Engineer:
Lilker Associates

Owner’s Rep:
Gardiner & Theobald

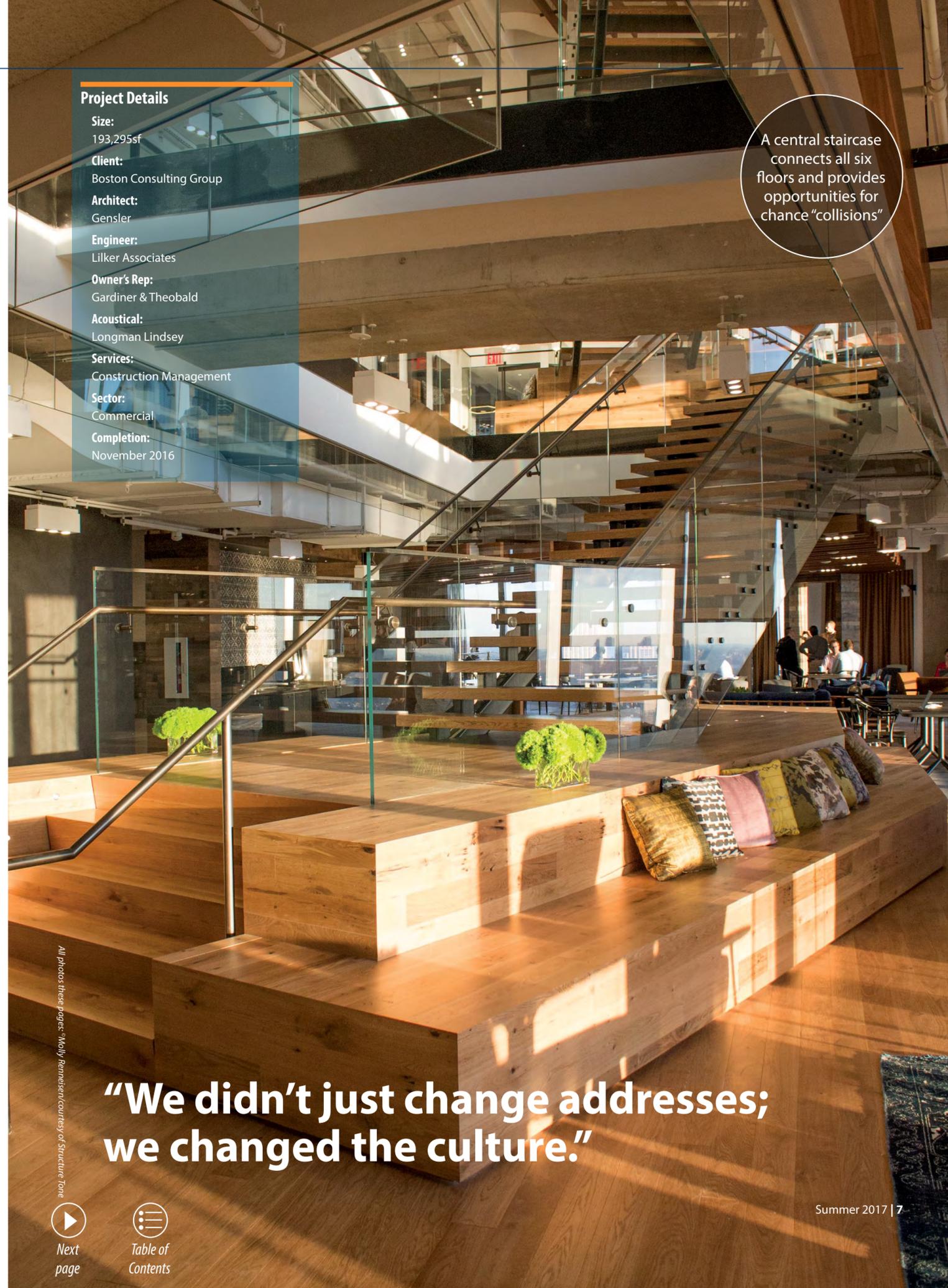
Acoustical:
Longman Lindsey

Services:
Construction Management

Sector:
Commercial

Completion:
November 2016

A central staircase connects all six floors and provides opportunities for chance “collisions”



“We didn’t just change addresses; we changed the culture.”

All photos these pages: Molly Renssen/courtesy of Structure Tone



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Havas' "village" concept brings 1,700 colleagues under one roof

IT TAKES A VILLAGE: Creating Connections at Havas Kings Cross

Visit the London Twitter feed of global communications group Havas and the company description is just one word: "Reimagine."

Project Details

Size:
167,000sf/10 floors
Client:
Havas UK
Architect:
MCM Architecture
Engineer:
Troup Bywaters + Anders
Owner's Rep:
JLL
Services:
Construction Management
Sector:
Commercial
Completion:
January 2017

That simple but powerful message was certainly a driving force behind the UK group's relocation to a new London headquarters, a "village" that brings together 25 different agencies and 1,700 colleagues under one roof in a diverse, reimagined community.

"As part of my role, I was shuttling between agencies, literally going across town from agency to agency," says Mark Whelan, Havas UK group chief creative officer. "While that was inconvenient personally, the bigger problem was that to try to encourage interaction between these agencies was logistically just very difficult."

So the firm set out to develop a new headquarters that brings those agencies together and, quite literally, reimagines what an inspiring and functional workplace can be. Within a palette of warm timbers, concrete and patinated steel, general floors are made up of open-plan work spaces with break-out meeting areas, quiet rooms, civic corners and collaboration spaces. Other floors feature client and presentation spaces as well as a commercial kitchen and communal café. From the open hot-desking to the feature linking staircases, making connections was at the core of the design.

"We talked a lot about adjacencies. You have a media business next to a creative business, a data business next to a content business," says Whelan. "What's happened as a result is you're literally bumping into people. That deliberate planning of bricks and mortar leads to human interaction."



Above ▲
The Forum accommodates large, high-tech meetings and work sessions

The story of stairs

The new office's ten staircases help drive that interaction, both with their statement aesthetics and physical locations. Organized so that no staircase connects more than two floors at one spot, the layout literally forces people to walk through shared common areas to continue going up or down. With 50 tonnes of steel to be considered, building these staircases was no simple task. The structural connections, welds and physical and logistical installation were crucial to the design, performance and finish. The project team worked together to create samples, mock-ups and bench-

marks throughout the entire project so that the quality was of the highest level. The team also held multi-trade design coordination workshops to ensure everyone understood the expected results.

"The staircases were particularly complicated," says Su Millar, Havas' building services director. "Each panel weighed several tonnes and they all had to be manually winched up to the 10 floors in staggered groups. It was punishing work but the engineering was superb, and the end result is brilliant."

Complicated is right, says Structure Tone senior project manager Mark Kermack. "The stairs had

to be manufactured and delivered in sequence as there was only one way into and up the building," he says. "We had to take special care to ensure that loading out did not impede subsequent deliveries and that everything was loaded into position to suit other programmed works without preventing progress."

Into the great wide open

Maintaining the open, industrial feel of the design while ensuring the office was equipped with the latest technology was also a challenge. Approximately 60% of the floor plate is open-plan office area with exposed high-level services. To ensure these services were aligned, the team held coordination workshops floor by floor with all services and architectural trades, ensuring interfaces with services, feature bulkheads and ceilings were reviewed and addressed early on. The use of 3D cloud surveys interpreted with REVIT CAD drawings ensured that clashes were addressed before they were encountered.

The team faced the same challenge in the Forum. This double-height, 200-person auditorium allows Havas to host large, technologically impressive meetings, events and

presentations that live up to their clients' and employees' expectations. But maintaining the exposed ceiling design without sacrificing acoustics was tricky. The solution was to apply architectural foam sheeting to the concrete soffit and hang the MEP services from a unistrut subframe to maintain a uniform finish.

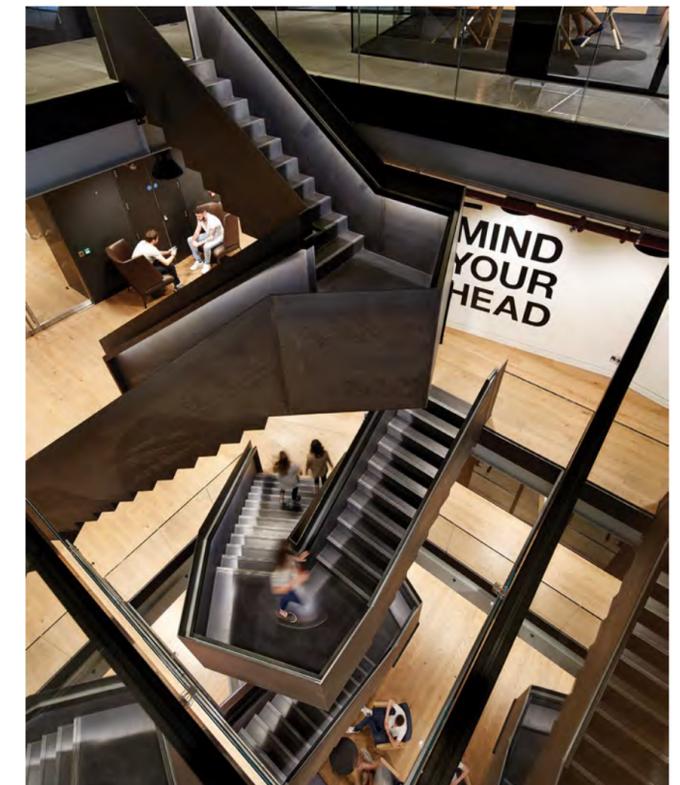
Function follows form

With all of these design and construction challenges solved, perhaps the most successful result of the new workplace is the effect it's having on employees.

"As people started using the space, moving up and down the staircases, having spontaneous breakout meetings, the quality of the work has risen. People have literally upped their game to meet the standard of the building, and I didn't anticipate that. It's a fantastic outcome," says Mark Whelan.

Havas' UK chairman and Europe CEO, Chris Hirst, agrees. "Making such a significant move has enabled us to both individually and collec-

tively rethink our businesses, to reshape how we work and to reshape how we think about ourselves. And that's what we needed to do." ◀



Above ▲
The office's ten staircases have become statement pieces, both aesthetically and functionally

All photos these pages: "Havas UK London" - MCM Architecture Ltd.



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A DOSE OF “VITAMIN N” AT TAUCK TOURS’ NEW HQ

The year was 1925, when entrepreneur Arthur Tauck took a group of friends on a tour of the back roads of New England. More than 90 years later and his commitment to helping people experience the outdoors continues, both through Tauck Tours’ business and now its new corporate headquarters.



The “Lodge” offers views of the surrounding woody campus

All images these pages: Connie Zhou



Even the conference rooms offer a glimpse of the outdoors

A natural connection

Nestled within 60 wooded acres in Wilton, Connecticut, the 55,000sf office centers on what Tauck considers the most nourishing ingredient to a healthy workplace: “Vitamin N” (aka, nature). With its lodge-like setting—complete with large stone fireplaces and wood features at every turn—the building gives employees the feeling that they are actually in a vacation property, conveying the sense of calm and comfort they bring to their customers.

Designed by Perkins Eastman, the space draws from the values Tauck has embraced since the company’s founding: wellness, collaboration, heritage and nature. The glass exterior and office walls allow light to fill the working spaces, and the interior design elements focus on the colors of autumn leaves and earthy textures. With eight different terraces and access to nature trails, employees are encouraged to take in all the “Vitamin N” they can. In fact, to celebrate the new space, the company bought each employee a new pair of trail running shoes and built a special cubby into each desk to store them.

Leaving no trace

While the new office certainly radiates the history and legacy of the Tauck brand, modern comfort and functionality was still central to the office design. As such, integrating the needs of a modern office into this serene, natural setting—without disrupting it—did come with some challenges.

“There were a lot of systems to fit into very limited space,” says Robert Jaus, Pavarini Northeast’s superintendent for the project. “The space above the ceiling is packed with MEP equipment, so we needed to have some very detailed coordination drawings to ensure everything would fit together.”

Jaus and his team started with the HVAC contractor. The existing steel beams had slotted holes that drove the locations for where the ductwork had to be installed. They sent those drawings to the sprinkler fitter, who fit that system in around the HVAC. Then came the electrician, and finally the plumber. “The penetrations in the structural steel really drove where everything could go. So it was important that we took a very organized approach to both locating and phasing the addition of each service.”

Dealing with data

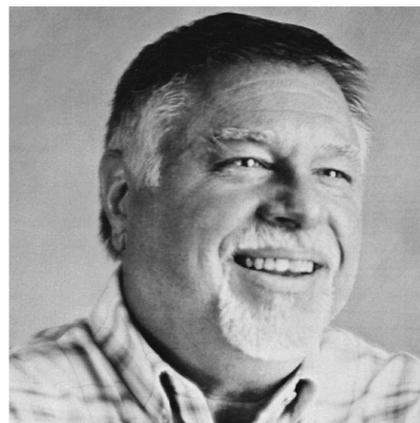
Building out the office’s data center and UPS room posed a similar space crunch. Given the specialized use of that space, the data center’s design included both a pre-action sprinkler system and a gaseous fire suppression system, meaning twice the amount of fire suppression equipment occupied utility corridor spaces. What’s more, as construction began, the team realized the electrical panels were much larger than anticipated and wouldn’t fit into the UPS room and data center as designed. “We had to work hand-in-hand with our electrician and the engineer in almost a design/build situation to redesign the UPS room so that all the gear would fit,” says Jaus.

The limited space options for data center services also affected the role of the central double-sided fireplace in the office’s “living room” area. The fireplace is just above the data center, making it an ideal chase for the data conduit that feeds the entire office. However, the fireplace’s free-floating design left little room on either side, making adding the conduit a tight fit. “There really wasn’t any other space we could sacrifice for the conduit, so we worked with Tauck’s IT team to drill some pilot holes within the fireplace and test this solution—and it worked,” says Jaus.

Now with all systems go, Tauck employees are getting their daily dose of “Vitamin N” in a modern work environment that reflects exactly what a travel company strives for. “It really does make you feel like you are in a different place,” says Jaus. ◀

Project Details	
Size: 55,000sf	Services: Construction Management
Client: Tauck Tours	Sector: Commercial
Architect: Perkins Eastman	Completion: January 2016
Engineer: Southport Engineering	

LEAN MACHINE: Q&A with Sam Spata



Above ▲
Sam Spata



An architect by trade, Sam Spata has spent the last 20 years of his career focused on helping the design and construction industry learn how to be “Lean”—officially. As a proponent of the Lean project delivery approach, he helps guide project teams in how to actually apply Lean theories to reduce waste, improve workflow and enhance value. Here Sam explains how Lean has evolved and what it means for modern design and construction.

How is the Lean approach different from other building design approaches?

Culturally, Lean respects the distinct contributions of each individual involved in development, design and construction. Everyone is entrusted to use their specific expertise in discovering and eliminating wasteful processes while delivering value to their customers in a collaborative way. Those who build bring that knowledge upstream, and those who design bring that knowledge downstream. Lean is a new way toward the old “master builder” concept but in this iteration, the “master” isn’t a single person, but rather a team working to make best-for-project decisions.

Lean is both a system and a culture. As a system, it’s been adapted from manufacturing to make project delivery of buildings and infrastructure more efficient. But as a culture, Lean is focused on respect and relentlessly identifying and eliminating waste from the process so that the customer gets value.

How did this approach come into shape?

A number of people can legitimately claim to have been “present” at the creation. The one I got to know best is Greg Howell, co-founder of the Lean Construction Institute (LCI). In the early 1990s, Greg was among a few who saw the success of manufacturing approaches like the Toyota Production System as having potential in the design and construction of buildings and infrastructure. In the Toyota system, small, incremental improvements on every process build up over time into a competitive advantage. They tell their workers, if you see something wrong, pull the cord, stop the line and fix it. Then after a root cause analysis and changes to the system, the problem never arises again. Greg and others adapted this approach to develop a “Theory of Lean” for our industry. About a decade after founding LCI, that theory led to the invention of Integrated Project Delivery which, in turn, accelerated the development of the Lean tools, habits and processes we use today.

How did you become such a strong supporter of Lean?

My Lean journey began two decades ago when I was introduced to Total Quality Management. I was most impressed with TQM’s bedrock respect for the individual. But TQM never really caught on in our industry. My “aha” moment came in 2008 as part of a multi-billion-dollar project team in Sacramento. Lean processes were introduced, and I learned that a project is properly considered a “network of commitments,” and that the key to success is reliability. That resonated with me. I’d had some successful projects by that time, and the one aspect they had in common was the reliability of my project teams. So, I became a strong supporter of Lean because I see in it the best prospect for reliable project delivery, every project, every team, every time.

How is Lean different from integrated project delivery?

The short answer is that you can do Lean without IPD; you can’t do IPD without Lean. Integrated Project Delivery was a direct outgrowth of Lean, invented by Lean practitioners in response to skyrocketing healthcare construction costs in central California. IPD is a multi-party contract that mandates a project delivery culture of respect, trust and transparency. Lean, on the other hand, is the project delivery system. In other words, IPD is a contractual obligation; Lean is the method to meet it.

Where are you seeing Lean catching on most?

Without question, Lean has been adopted most successfully in the life sciences sector, primarily healthcare and higher education research facilities, since hospitals and labs were already using what are essentially Lean principles in their operations (efficiency, patient value, etc.). The West Coast had the most necessity early on with construction cost escalations, so Lean caught on there first. Now we’re seeing that geographic concentration of Lean in the west gradually make its way east. It’s taken a while, but it’s coming.

What challenges are there to adopting a Lean approach?

Adopting Lean means adopting change, which is always difficult and often overwhelming. That’s why I developed The Lean Progression®. It outlines the culture and system of Lean in five inter-dependent levels: Theory, Vision, Process, Tool and Habit. Practicing Lean requires new learning, and people need to understand why. That’s where hard numbers can help. Research by the Lean Construction Institute and Dodge Analytics demonstrates that Lean projects are twice as likely to be on budget and three times as likely to be on schedule. Those are powerful reasons for embracing Lean.

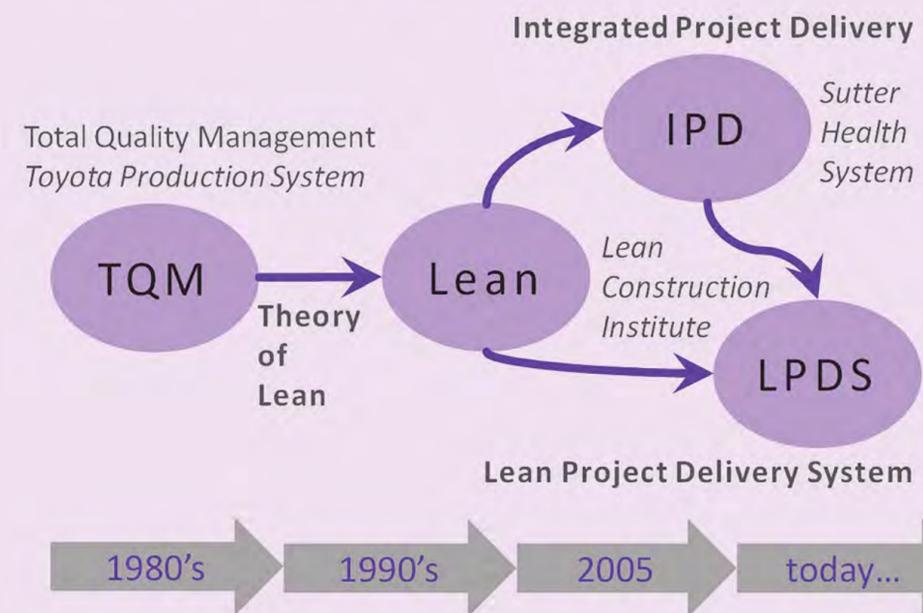
What is the role of construction in the Lean approach?

First, let’s remember that Lean is holistic and integrates design and construction. That said, each individual primarily contributes their specific expertise, albeit in a collaborative way. For construction, this expertise includes logistical knowledge regarding means and methods, constructability and site safety that the designers need to understand from the earliest stages.

What advice would you give a client or project team considering using a Lean approach?

First, understand that you are buying into both a culture and a system. Lean project delivery is a process, wrapped in a system, inside a culture. Second, consider how you will implement this change—through a single pilot project, through a subset of your organization as a test “studio” of sorts or all-in throughout the entire organization. Each has its advantages, depending on your goals. Third, you’re not alone. There is a Lean community of practice out there, ready to help. Contact the Lean Construction Institute to get started. Finally, pick the right consultant to facilitate your Lean journey with training and hands-on coaching. ◀

Roots of Lean Project Delivery System



The Lean approach was inspired by the manufacturing principles embraced by Toyota in the 1980s



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A solar array on NRG's green roof helps power the building

Project Details
Size: 130,000sf
Client: Boston Properties/NRG
Architect: HLW International
Engineer: AMA Consulting Engineers
Owner's Rep: Cushman & Wakefield
Services: Construction Management
Sector: Commercial

Big Data Making a Big Difference to Sustainability

Businesses are doing more and more to make their work environment as healthy, productive and sustainable as possible. Yet meeting an increasingly higher bar can be a challenge, especially for organizations with expansive buildings and campuses. One company in New Jersey is helping to show how combinations of sustainable approaches and modern data management technologies can make a big difference.

Power company NRG is using its new Princeton headquarters to showcase and test how integrated power systems, comprised of the traditional and alternative forms of energy that it recommends to its own customers, can work to create a more efficient office environment. Through a master control system,

the building syncs power supplied from traditional utility power with power generated onsite by the rooftop and parking solar arrays, the combined heat and power unit, battery storage and traditional fuel and gas turbine generators, activating each depending on the conditions of the day.

"It's all tied to the weather forecast," says Structure Tone account executive Michael Farrell. "The control system has the ability to analyze the weather and pull from whichever power system will be most efficient and cost effective during peak hours."

While comprised of standard technologies available today, a power system and microgrid like NRG's isn't very common in the workplace, making it a unique project for the team. "The microgrid's control system is cutting-edge technology that continued to develop during the project," says Farrell. "We worked very closely with NRG's engineers, HLW, AMA and others to finalize the microgrid's control infrastructure while maintaining the schedule. It was a big team effort."

The project also had to contend with construction happening concurrent-

ly in many areas, in many different phases. The building itself is new, so coordination between the base building contractor and the Structure Tone team was critical—particularly with the diverse power systems. "Managing site logistics was tricky at times," says Farrell. "While they were installing the solar array on the parking lot, for example, we had to find other places for our materials and crews. There was lots of coordination."

NRG's new building—recently certified at the LEED Platinum level—was completed last year. So far, the new building is proving to be the productive, efficient showcase space the company was hoping for. "NRG's lobby has a huge display system of real-time data indicating how much power the building is using and where it comes from. It's both educational and fascinating," says Farrell. ◀

All images this page: © Jeffrey Totano, Photographer



Above ▲ NRG's new office has become their showcase space for alternative energy



Amazing Spaces

Houghton Mifflin Harcourt's new Boston offices celebrate the company's history and culture



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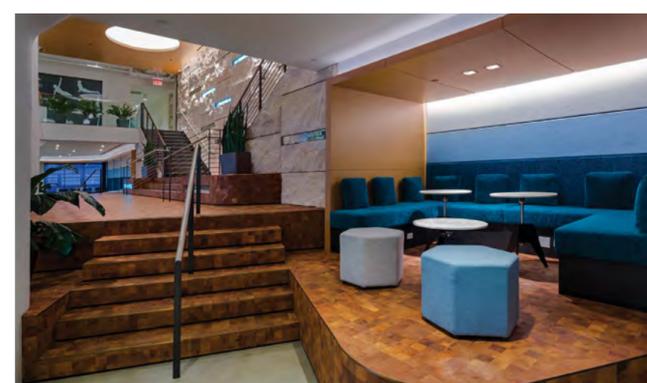
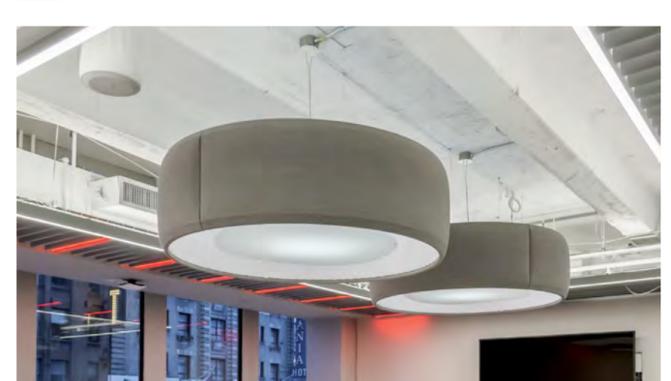


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Take a look at some of the notable—and inspiring—projects we recently completed. #STOamazingspaces



Above ▲ Houghton Mifflin Harcourt, Boston, MA

Above ▲ Carpenter Technology, Philadelphia, PA

Above ▲ WebMD, New York, NY

Above ▲ Gensler New York, New York, NY

Left and previous page: Houghton Mifflin Harcourt, 2017 Neil Alexander; Right: Carpenter Technology, Jeffrey Tatro, Photographer

Left: WebMD, John Beer/Building Images Photography; Right and following page: Gensler New York, Mike Vezalid/courtesy of Structure Tone



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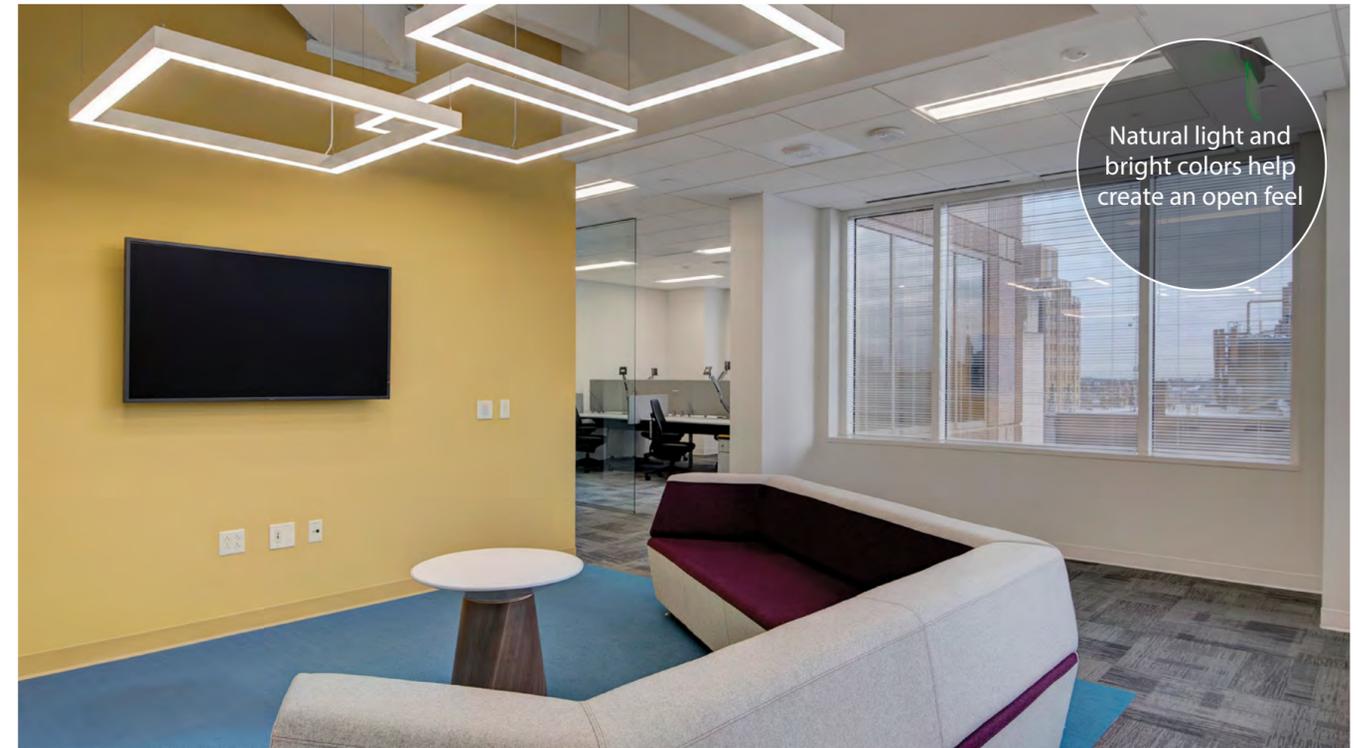


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Gensler's new NYC space is inspired by its Theater District location



Natural light and bright colors help create an open feel



FROM DARKNESS TO LIGHT

Today's open-plan, light and bright workplace trends can be a challenge for companies who deal in highly confidential projects. With its new San Antonio offices, however, a large management consulting and technology firm faced that challenge head on, embracing a modern, open office without sacrificing discretion.

With the help of Carson Design and Structure Tone Southwest, the firm now has over 22,500sf of bright, modern, open working space in San Antonio's Weston Center, complete with state-of-the-art technology systems. The rebuilt space includes both open and private offices, collaboration areas, conference rooms and privacy booths, as well as extensive MEP renovations and upgrades to accommodate the firm's sophisticated IT needs.

The highlight feature of the space is the clear-finish, cypress wood veneer surrounding the conference room windows, which help infuse light throughout the space.

"This was a total shift from their former dark, corporate environment. It's very bright with lots of natural light and pops of color, and there are many more places to sit and share ideas than they had before," says Mark Jones, Structure Tone Southwest regional vice president.

All photos this page: Heinigh Photography



The biggest challenge, however, was in making that transformation happen in just a short 16 weeks. Relationships made all the difference, says Jones. "We expedited the flooring, the LED light fixtures and the 22 new air system boxes thanks to our relationships and purchasing power. By communicating with the design team and the owner early on, we could find reasonable solutions that made that tight schedule work." ◀

Project Details

Size:
22,500sf

Client:
Large management consulting and technology firm

Architect:
Carson Design

Engineer:
TTG Goetting

Owner's Rep:
CBRE

Services:
Construction Management

Sector:
Commercial

Completion:
February 2017



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GLOBAL STANDARDS, LOCAL COLOR:

Q&A with Willis Towers Watson's Al Ronci

Managing a global company's real estate portfolio is a complicated job. How can you ensure an efficient and consistent approach without sacrificing local needs and character? It's a matter of interpretation, says Al Ronci, head of global real estate and workplace solutions for Willis Towers Watson. Here he shares some of the strategies that help his firm keep advancing workplace design to new levels.



Above ▲
Al Ronci

How many offices does Willis Towers Watson have worldwide?

Willis Towers Watson is a leading global advisory, broking and solutions company that helps clients around the world turn risk into a path for growth. We have 40,000 employees serving more than 140 countries from around greater than 550 offices—some of them large, some small and all with their own unique situation, make-up and personality.

Does Willis Towers Watson have a prevailing philosophy or approach to office development?

As a relatively new company created from a merger of equals, one of our priorities is to combine our strengths by bringing our people together. For my team, Real Estate & Workplace Solutions, this means driving the consolidation of our offices. Our philosophy is to create modern and efficient offices that work as hard as our colleagues do, though our approach is about more than just saving dollars and optimizing space. We recognize that this is our unique opportunity to provide a great work experience for our people through inspiring design, workplace technology and introducing spaces that support activity-based working. Right now, we are just over a year into a multi-year program to consolidate and refresh. We are learning lessons, but each successful consolidation tells us we are headed in the right direction.

What is consistent about that approach across all offices, and what is more subject to the needs or preferences of the particular location?

We often use the phrase "global standards, local color" when we talk about our approach to workplace transformation. At the top we have that global mission to create a great experience for our colleagues and our clients, and to help us realize that vision in a consistent way we have created a Workplace Transformation Toolkit. The toolkit not only sets out how our offices should look, feel and work, but also how we go about making the change happen; it describes the whole end-to-end process, start to finish, and even into the day-to-day management of the new space. When the toolkit is passed to local offices, it is their interpretation that brings that local color to our global workplace standards and guidelines.

What are the benefits of managing real estate corporately vs locally?

Aside from the cost benefits reporting and governance advantages that centralized management can bring—which are significant—I would also highlight that a more corporate approach allows us to better align and coordinate our resources. We've found success comes easier when everyone is marching in the same direction and to the same tune. The trick is to make sure that local needs are listened to and accommodated where we can, but balance them against our focus to



A Workplace Transformation Toolkit helps the company blend corporate standards with local character

provide a globally consistent experience for our colleagues and clients.

What are the challenges?

Considering every one of our 550+ unique offices that together serve markets all over the world is an enormous task. We are meeting the challenge with a strong global vision, a defined project transformation process and a mixture of the best in-house and external expertise. Our Workplace Transformation Toolkit helps us deliver consistency in both approach and outcome, and our centralized organization structure helps us efficiently manage our resources. One of our biggest challenges is actually around managing expectations because we can't change our offices fast enough for our colleagues. Our people seem to really like their new workplaces and word spreads.

How does your design and construction team help work through those challenges?

When we select our design and construction teams, we look for partners who are willing to invest time getting to know us and what we are trying to achieve. We want them to understand our global vision and how we are bringing it to life in a way that works for each of our unique office locations. That's not to say we don't want to be challenged by our designers. If there is a better way to achieve the desired result, new technology that could help us or even a funky idea inspired by the city we are working in, we expect to hear about it.

Do you often use the same project teams in many locations or do you use different teams for each project?

We realized that in order to successfully progress our vision to bring our people together and refresh our spaces, we needed to find a way to combine specialist expertise with local office knowledge. Within the approach set out in our Workplace Transformation Toolkit, there is clear guidance on establishing an organization for change for each project. We allocate names and responsibilities to specific roles, and each individual understands exactly what they need to deliver to the project. Some are experts from central teams (typically real estate, external advisors and IT project managers), and some are from the local office (e.g., HR, communications and change management and local business leadership). It is an efficient way to deploy our experts across a number of concurrent projects and also access invaluable local knowledge and secure local ownership and buy-in.

What are your favorite components of Willis Towers Watson offices?

Actually, the users. After we have transformed a workplace, there is tremendous uplift in occupier energy. It's a great buzz to know that excitement is the end result of the team's hard work, and also that by creating a great experience for our people we make a significant contribution to Willis Towers Watson's success.

What are the next challenges facing workplace design, in your opinion?

On the other side of every challenge there is opportunity. When we talk about how our workplaces might change in the future, we hear many opinions—which are often contradictory. Will there be more agile working, or less? Will more employees be working from home, or heading back into more traditional-style offices? What about business hubs? Although each of these questions could potentially have a huge impact on the general direction of workplace design, I don't see us ever second-guessing the future—only continuing to anticipate the needs of our business occupiers as they emerge. For me, there are, however, two particular trends that pose challenges to design. The first is to accommodate possibilities from technological change as an enabler to workplace design from the business side, but also as an expectation from our occupiers who want to enjoy the same functionality at work that they do at home. This is happening right now. The second challenge for me is making sure we create workspaces that attract and help us retain the best talent for our businesses; I think we are on the cusp of seeing this become a key priority for us all.

What does the office of the future look like to you?

My experience tells me our offices are ever-evolving. We expect that there will always be another tomorrow—and that's what makes for an interesting journey, don't you think? ◀



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Project Details

Size:
58,000sf

Client:
Interxion

Architect:
Gilligan Architects

Engineer:
Ethos Engineering

Civil and Structural Engineer:
Downes Associates

Owner's Rep:
Linesight

Planning Consultant & EIS Manager:
Anthony Marton

Services:
Preconstruction,
Construction Management

Sector:
Mission Critical

Completion:
December 2016

“The project was granted permission on the first pass, which I think is a first for this part of Dublin.”



INTERXION: Raising the Bar for Data Centre Construction

When you've worked with a client for nearly 20 years, you get to know what they are looking for. Our Mission Critical team has developed just that kind of relationship with European data centre leader Interxion, making it a fairly seamless process to build the company's data centres across Ireland and the UK.

Not that it's an easy, one-size-fits-all approach. Although Interxion has developed an engineering “bible” of sorts that establishes specific criteria for building their facilities, each project has unique circumstances, limitations or surroundings that require some creative thinking and institutional knowledge to find the best path forward.

Case in point is Interxion's newest Dublin, Ireland facility. The 58,000sf, Tier 3 data centre is located in a blue chip industrial park on the outskirts of the city. Interxion returned to Structure Tone's Dublin team to lead the project, from planning and feasibility, to construction, through to commissioning, including all civil, structural and architectural construction elements. The work includes not only the data halls—and their associated UPS units, generators, chillers, coolers, fire suppression systems, etc.—but also a three-story front-of-

house area for administrative offices and the civil infrastructure required to accommodate the new building on its greenfield site.

As the design took its final form, Structure Tone led the effort to submit the project to the local council for its environmental permitting, including a detailed environmental impact statement proving the facility would not negatively impact its surroundings. “The project was granted permission on the first pass, which I think is a first for this part of Dublin,” says Jason Monks, Structure Tone senior project manager. “Most projects fail the first time since they submit the bare minimum in the hopes nothing will raise a red flag. But we engaged with the local authority during preconstruction to find out what criteria we needed to meet to get the project approved on the first try.”

Structure Tone also took on the role of BIM manager for the project, working with an outside vendor to coordinate all the individual models into one federated model on a weekly basis. With that understanding of the full picture, the team was able to prefabricate significant portions of the work. “We actually had 99% of the chilled water piping prefabricated off site, thanks to BIM,” says Monks. “That definitely helped us complete the project well ahead of schedule.”

Between the thorough understanding of Interxion's “engineering bible” and comprehensive involvement in every step of the project, the team was able to successfully tackle another potential challenge: building the data centre to Level 5 commissioning standards. Because Interxion required a Level 5 commissioning, the whole facility

In addition to building construction, the greenfield site involved extensive civil and site work

had to undergo an independent commissioning process, led by DLB Associates. “DLB's agents said this data centre was one of the best they had ever commissioned due to the persistence and can-do attitude of the Structure Tone team and our partners. That was quite a compliment!” says Monks.

“The data centre industry in Ireland continues to thrive, and Dublin has become a strategic location for businesses looking to interconnect mission critical services in Ireland and across Europe,” says Tanya Duncan, managing director of Interxion Ireland. “After working with Structure Tone on our first two data centres in Dublin, they played a crucial role in ensuring that this state-of-the-art facility would meet the many technical requirements which are essential in the mission critical sector.” ◀



REALPAGE: A One-Stop Shop for Clients and Staff

The Dallas area has seen a wave of office relocations and expansions in recent years. Topping the list as one of the largest is web-based property management company RealPage, who moved into a new headquarters in the Lakeside Campus in Richardson, Texas.



“Floating” meeting rooms are cantilevered over the main lobby

Project Details

Size:
400,000sf/4 floors

Client:
RealPage

Architect:
HGA Architects

Engineer:
HGA

Owner’s Rep:
Cushman & Wakefield

Services:
Construction Management

Sector:
Commercial

Completion:
September 2016

With four floors and 400,000sf renovated by Structure Tone Southwest, the new office aims to help the company meet the same goal for its employees that it does for its customers: to be a one-stop shop for their needs. In other words, while their clients can come to them for anything related to managing rental properties, their employees can come to the office not only to work, but also to eat in the full-service dining areas, exercise in the fitness center or take a break in the game room.

“We centered the office on the concept of ‘work, live and play.’ It’s almost like a planned community, connected through neighborhoods and a very open and collaborative environment,” says Sandy Seaton, vice president of real estate and workplace solutions for RealPage.

That neighborhood environment includes over 2,000 work stations of varying shapes and sizes, 155 private offices, conference rooms, break-out

spaces and break rooms, with a central community area that houses the work café, fitness center and other amenities. “We needed to figure out how to make a 420,000-square-foot floor plate more intimate,” Seaton says.

Men of steel

And they needed to do it fast: The project team had only a quick six months to fit out the extensive complex to meet RealPage’s move-in date. “It kind of turned into a design/build project,” says Structure Tone Southwest project manager, Ryan Davis. “We had to coordinate as often as possible with the owner, the design team and our subs to work through design changes quickly, work through RFIs in real time and look ahead at the next phases to head off any challenges.”

One of those challenges was installing all the steel the design required within an existing building. The steel was particularly crucial for two signature features: the unique monumental staircase and the 16 floating conference rooms.

The double-helix staircase that winds three floors together is one of a kind. “We thought if this stair-

case is going to be a centerpiece, let’s make it an iconic conversation starter since it’s the first thing you see when you walk in,” Seaton says. Designed by HGA Architects, the resulting intertwined sets of stairs was special ordered, which meant added lead times and communication from all sides.

“There was only one vendor in the country who could bend the tube steel, which bends on two different axes and totals over 120,000 pounds,” Davis says. Supporting that weight involved driving a 27-foot pier—which is no easy task in an existing building. To solve the space challenge, the team used a spider crane, which essentially folds up to fit through a 3-foot doorway and then unfolds to full size to lift the massive pieces of steel.

Steel was also central to the so-called “floating” meeting rooms, which appear suspended in mid-air thanks to large steel beams anchored into the existing floor plate and cantilevered over the lobby space. Again, the spider crane was critical. “We don’t often have to install large amounts of steel in existing buildings,” says Structure Tone Southwest superintendent Bobby Moore. “The spider crane certainly came in handy, and I think we’ll be seeing more of this use of interior steel in downtown remodeling.”

Eyes on everything

With so many moving parts happening at once—and the move-in deadline fast approaching—the Structure Tone team decided to boost their manpower by dedicating more experts to each component of the job, from the steel installation, to the kitchen and fitness center renovations, to bringing in mission critical team experts for MEP consultation. “As we got each design revision, we made sure someone was dedicated to each area to expedite the changes and make sure everything stayed safe and on schedule,” says Davis. “We had over 450,000 man hours with no safety incidents. We had eyes on everything.”



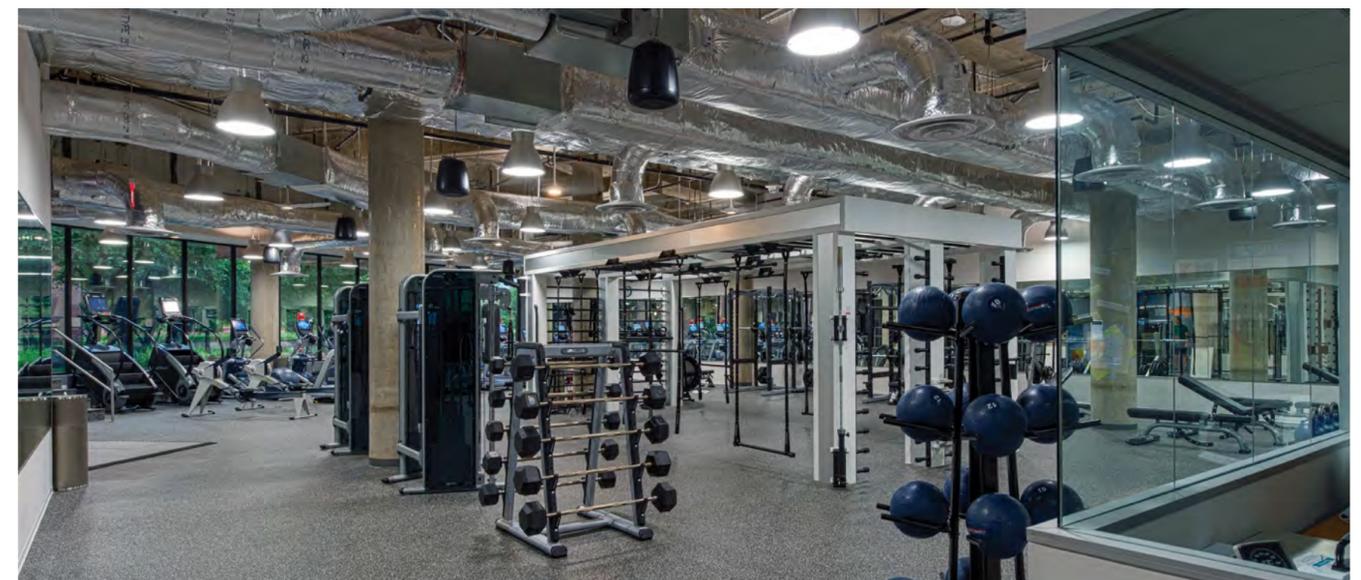
The custom double-helix staircase includes over 120,000 pounds of steel

That all-hands-on-deck approach paid off. RealPage was able to move in on time and settle into their striking new space, which was even featured in local business media. And for the construction team, the experience cemented a bond that the team still draws on today, says Moore.

“This was a complex job, but the teamwork and camaraderie that we built to get it done was awesome, and it made it even more fun.”

The RealPage team agrees. “We’re seeing the proof of how much people like the space in how they are using the work café, the fitness center, the conference rooms, and how people are starting to feel comfortable to leave their desks and work elsewhere,” says Seaton. “We didn’t have that flexibility before.”

Below ▼
The campus fitness center has become one of its most popular amenities



All images these pages: Kevin Bowers, Photographer



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Project Details

Size:
450ft

Client:
Brooklyn Bridge Park Corporation

Engineer:
Arup

Services:
Construction Management

Sector:
Infrastructure

Completion:
April 2017

The Squibb Park Bridge connects Brooklyn Heights to Brooklyn Bridge Park

BOUNCING BACK IN BROOKLYN BRIDGE PARK

It's not often that a company known for building high rises gets to work on a piece of public infrastructure. But that was exactly the case when Pavarini McGovern joined the team working to modify Brooklyn's Squibb Park Bridge.

Squibb Park Bridge first opened in March 2013 and was an instant hit with the surrounding neighborhood. An efficient pedestrian overpass from Brooklyn Heights to Brooklyn Bridge Park, the bridge gives residents and visitors a scenic connection to the park over its 450ft timber and steel zigzag with a playful underfoot bounce. But after some structural instability concerns arose in 2014, the bridge was closed until retrofits could be made to safely reopen it to the public without sacrificing its whimsical aesthetic.

In 2016, Brooklyn Bridge Park Corporation (BBPC) hired top engineering firm Arup to design and oversee modifications to the bridge, and Pavarini McGovern as the construction manager to execute the plan. Pat Kirshner, VP of capital projects for BBPC, was excited to see Pavarini McGovern win the assignment since the two had successfully teamed on the Sea Glass Carousel when she worked for the Battery Park Conservancy. "I appreciated Pavarini McGovern's enthusiastic and attentive approach," she said of the carousel project—another undertaking which was intricate, peculiar and dear to the community. Kirshner was confident that Pavarini McGovern would supply a team with both the skill and sensitivity to bring the Squibb Park Bridge back into use and make it the neighborhood jewel it was meant to be.

After thorough performance testing and review, Arup developed a solution to address the bridge's stability issues: Pavarini McGovern would have to make several modifications to the existing structure. First, PMG installed special scaffolding below the two main spans to support the bridge above Furman Street and allow realignment of the bridge structure. With the scaffold in place, the bridge's own support cables were de-tensioned. Next, the team carefully repositioned the bridge into its ideal geometry using adjustable supports attached to the scaffolding. They stiffened crucial timber-to-steel connections, reconnected lateral bracing and installed tuned mass dampers to reduce the vibration of the bridge as pedestrians walk across it. Once these modifications were complete, the cables were pulled back into tension and clamped into place at each truss connection to keep the bridge in the right shape.

With the bridge once again carrying its own weight, the PMG team removed the scaffolding and put the tuned mass dampers to the test. The dampers reduce vibration by absorbing energy as the bridge moves. To confirm they were working, the team placed accelerometers on the bridge while test walkers marched across it to the beat of a met-



Above ▲ Adjustable scaffolding was used to support and reposition the bridge before connections were strengthened

ronome. "We had nine people bouncing together at fundamental frequency," said David Farnsworth PE, principal at Arup. The team took measurements first while the dampers were disengaged, and then again while engaged. Once final adjustments were made, the bridge retained approximately 10% of its former bounce—just enough to put a spring in your step.

The bridge is open once again, and public response has been very positive. The long-awaited reopening coincided with the first warm weather of the year, helping people access Brooklyn Bridge Park at just the perfect time. In a morning visit to the bridge, Kirshner stood at its center with a contented smile, watching the people walk by. "The best thing is just seeing people use it," she said.

The bridge has undergone regular monitoring to test the efficacy of the improvements and is fitted with vibration sensors which will signal an alert if it vibrates too much. But the outlook is clear: Arup and Pavarini McGovern have made this bouncy bridge safe. As development continues in the area surrounding Brooklyn Bridge Park, the bridge will continue to enhance residents' quality of life as a vital pedestrian shortcut with quirky Brooklyn charm. ◀



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All photos these pages: Jennifer Sheen photography.com © 2017 Brooklyn Bridge Park



This year's race honored Chris Gallo of KPMG (third from right)



GIVING BACK: The National Multiple Sclerosis Society

There's nothing like a shared cause to bring people together in ways they might not have expected. That's certainly Structure Tone's experience when it comes to supporting the National Multiple Sclerosis Society.

For decades the Society's New York City-Southern New York Chapter has worked to improve the quality of life for people affected by MS in the five boroughs of New York City and surrounding counties. Through a number of fundraising events and drives, the organization works with the community to raise funds for critical MS research. Structure Tone helps organize the chapter's annual Race Against MS at Belmont Park, which brings the greater New York real estate community together for an afternoon of thoroughbred racing, food, drink, auctions and more.

could help make the Race Against MS even more successful, so a decade ago they started reaching out to clients, partners and industry leaders. Today, the event routinely sells out and raises over \$500,000 each year for the chapter.



"I remember going to the Race Against MS as an attendee more than 25 years ago. It was always a nice way to give back and spend time with others in our industry," says Ray Donaghy, senior vice president of client relations.

Because Ray's mother is living with MS, the event and the organization haven taken on new meaning. The Donaghy family knew Structure Tone

As the Structure Tone team became more involved with the organization, they also began to realize their own network was more connected to MS than they had ever known.

"We've seen many donors from the real estate and AEC community attend the race and disclose to one of our committee members that they supported the event because a sister, mother, father or spouse had been living with MS. It touches so many more people than we know," says Structure Tone executive chairman Jim Donaghy.

"My favorite part of supporting the MS Society is that it touches my family and the families of our friends and colleagues," says Ray. "There is still no cure. The race event and others like it work toward a world without MS, and that's so much bigger than any of us."

Plus, he adds, the race is a really good time. "In my opinion, it's the most fun of any of the Society's events," he says. "And all for a great cause."

GAME-CHANGER: Technology in the Field

By Terrence Robbins, vice president, information technology, Structure Tone

In the modern age of building construction, the process has always been fairly linear. The client expresses their requirements. The architect designs the building. The engineer designs the infrastructure. The construction manager leads construction with the assistance of specialized subcontractors.

But today, with new technologies and innovations emerging what seems like daily, the construction process is becoming more collaborative than ever, reducing design change iterations, identifying construction conflicts earlier in the building process, avoiding risk and saving clients time and money.

The advent of mobile devices has revolutionized the way we work. Thanks to mobile devices, construction managers and their teams can review plans, document progress, complete paperwork and answer calls and emails, among dozens of other responsibilities, right on a job site. And while the laptop provided some of those abilities, laptops were never conducive to field work—they're bulky and require a surface to rest on while you use them. With the development of mobile applications, anyone can take their work into the field, literally working on the

job with less need for time-consuming trips to the office or trailer to review plans or check on RFI responses and the status of submittals.

This mobility and flexibility has certainly changed the process and behavior of a project team. Project staff can spend more time actually observing the project work and communicating with subcontractors, the owner and the design team. Their days are less administrative and more focused on their area of expertise. We've even found that seasoned professionals who were reluctant to rely on the computer have fully embraced the mobile environment. The intuitiveness of the apps in our industry has made it easy for all levels of a crew to learn and use them to do their jobs more efficiently and effectively.

The next frontier is the rapid development of augmented and virtual

reality programs, which have the potential to bring project collaboration to even greater levels. From the earliest stages of design, the entire project team can see the design intent and details take shape and work together to solve any design issues before construction even begins. The client and project team can immerse themselves in the design, experiencing the new space as it will exist after the construction is complete. This enables the client to better understand the functional use of the space and make educated decisions around potential construction options.

While builders and designers will always rely on the fundamentals of their respective crafts, technology has undoubtedly opened the door to a much more efficient and effective culture of collaboration in construction. We're seeing fewer change orders, faster solutions



Above ▲ Terry Robbins

to challenging design issues and more alignment from the very beginning across the entire design team. And with the entrepreneurial spirit of both technology developers and construction professionals, we know the bar will only continue to raise higher. We're excited to be part of it. ◀



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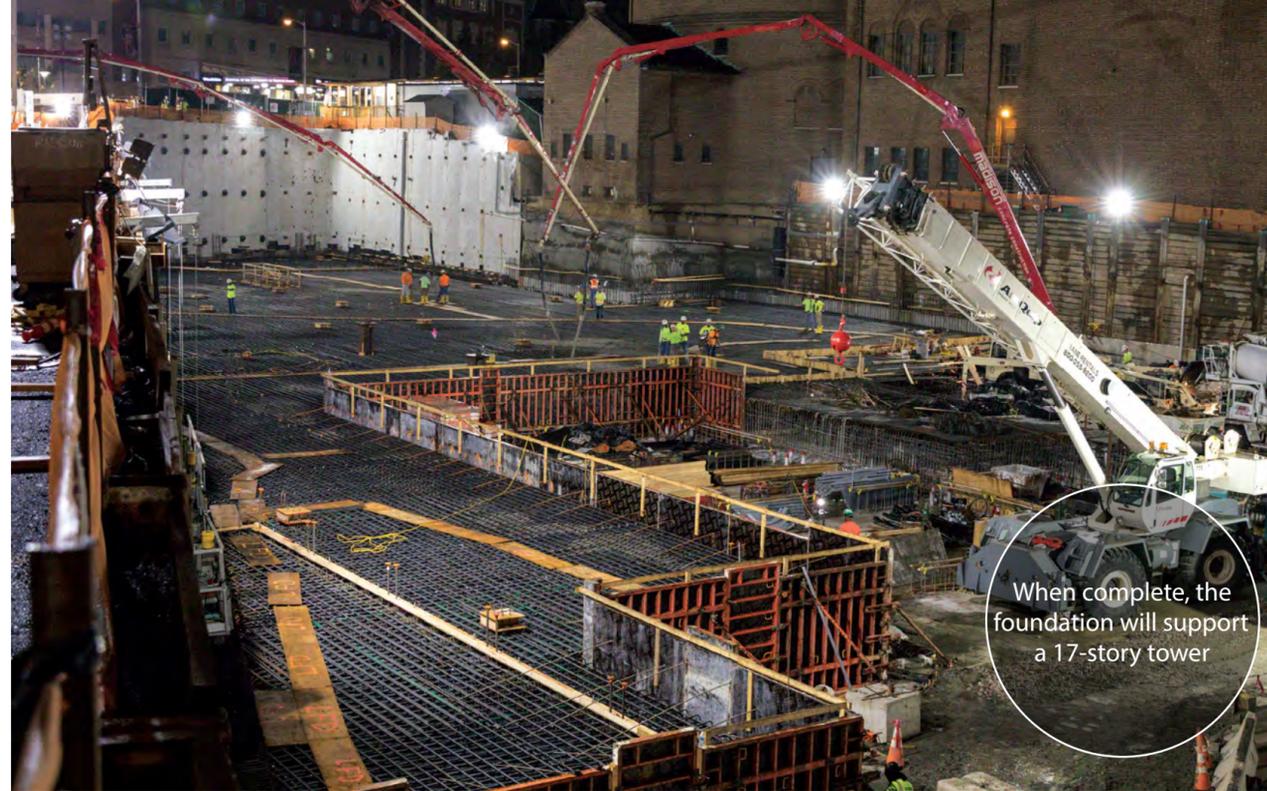
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MAKING HISTORY

Penn Medicine's newest hospital sets Philadelphia record



When complete, the foundation will support a 17-story tower

Record Setting Numbers

- 14 straight hours of placement
- 6,540 cubic yards of concrete
- 650 concrete trucks
- 4 pump stations
- 120+ personnel
- 950 tons of reinforcing steel

Concrete Placement Key Team

Owner:

Penn Medicine

Construction Management:

LF Driscoll
Balfour Beatty

Concrete Construction:

Madison Concrete Construction

Site Support:

JPC Group, Inc.

PennFirst IPD Team:

Penn Medicine
Foster+Partners
HDR
BR+A
LF Driscoll
Balfour Beatty
Southland Industries

It isn't even completed yet and the Penn Medicine Pavilion is already breaking records. From Friday, July 7 to Saturday, July 8, 2017, construction crews poured the building's concrete foundation, making it the largest single concrete placement in city history.

Over the course of 14 straight hours, crews continuously placed approximately 6,540 cubic yards of concrete onto the site, requiring more than 650 concrete trucks, 4 pump stations and over 120 crew members, site managers and safety support personnel. The concrete covers the more than 950 tons of reinforcing steel that forms the building's foundation.

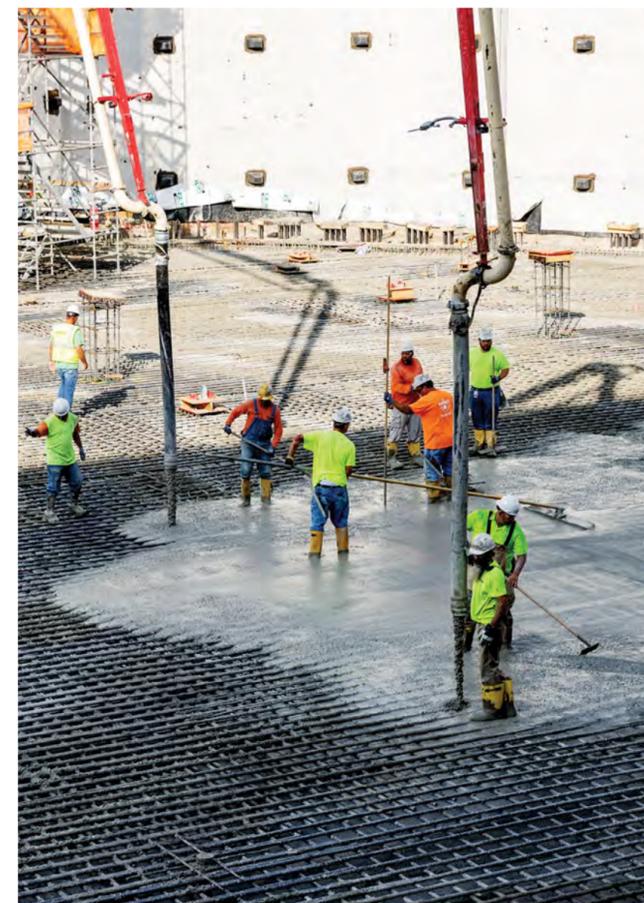
To supply this volume of concrete, the concrete subcontractor, Madison Concrete Construction, engaged three different suppliers, who each prepared a special high-strength design mix at 6,000 psi that included fly ash to meet the building's LEED certification requirements. The logistics of the site also posed a challenge—its tight urban location made staging difficult and required the closure of several streets to accommodate hundreds of concrete trucks.

In the end, the placement was not only successful, but also made concrete-placement history, surpassing the record set last summer by the W/Element Hotel project in Center City Philadelphia, which required 5,850 cubic yards of concrete.

The epic effort was managed by a joint venture between LF Driscoll and Balfour Beatty, who are partnering together as part of the PennFirst integrated project delivery (IPD) team designing and building the Penn Medicine Pavilion. The PennFirst IPD team combines the celebrated architectural and engineering design expertise of HDR, Foster+Partners, BR+A and Southland Industries with the construction management expertise of LF Driscoll and Balfour Beatty. Team members from each firm are working together and with Penn Medicine's clinical, facilities and patient experience experts to ensure the entire process is a collaborative effort that brings each firm's talents and knowledge to the table to maximize efficiency, reduce waste and, ultimately, provide the best results.

The Penn Medicine Pavilion will house inpatient care for the Abramson Cancer Center, heart and vascular medicine and surgery, neurology and neurosurgery and a new emergency department, including 500 private patient rooms and 47 operating rooms. According to Penn Medicine, the new facility is the largest capital project in Penn's history and "Philadelphia's most sophisticated and ambitious healthcare building project."

The new facility is expected to be completed in 2021. To check out a time lapse of the concrete pour, visit <https://vimeo.com/224887776>



All photos these pages: PennFirst

Above ▲
The 6,540 cubic yards of concrete are enough to fill a Goodyear blimp



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