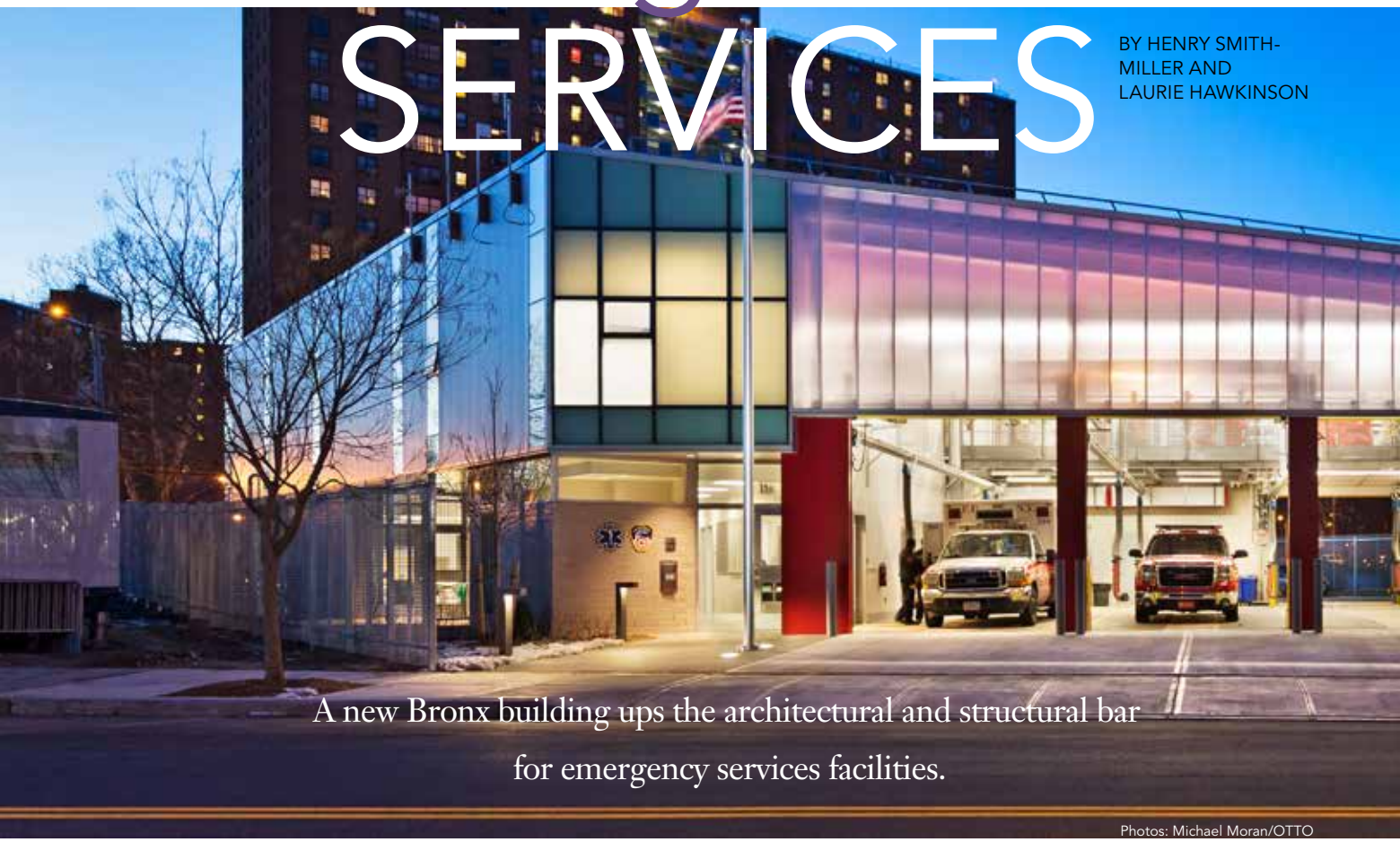
# Elevating Essential SERVICES

BY HENRY SMITH-MILLER AND LAURIE HAWKINSON



A new Bronx building ups the architectural and structural bar for emergency services facilities.

Photos: Michael Moran/OTTO

**RARELY DO SMALL** essential services structures fall into the category of architectural gems.

But the Zerega Avenue Emergency Medical Services (EMS) Station project in the Bronx sets a high standard for the future.

Smith-Miller + Hawkinson Architects (SMH), together with Robert Silman Associates (RSA), collaborated with SCAPE Landscape Architects and others to produce a visionary 21st century project. Parametric modeling techniques allowed for the development of a minimized building volume (the first floor is only 4,000 sq. ft) and exterior surface. The structure was crafted for material economy and performance and includes a landscape designed for the conservation of the environment.

The two-story building was commissioned by former New York City Mayor Michael Bloomberg as part of PlaNYC, an ititiative to address the city's predicted increase to 9.1 million residents by 2030, changing climate conditions, an evolving economy and aging infrastructure. The project site, located in an underserved neighborhood, is surrounded by low-rise industrial and manufacturing warehouses, high-rise residential towers, single-family homes and Westchester Creek. This project was the first to implement the Fire Department of New York's (FDNY) newly developed comprehensive EMS program, improving response capability by accommodating a larger number of vehicles, staff and support spaces.

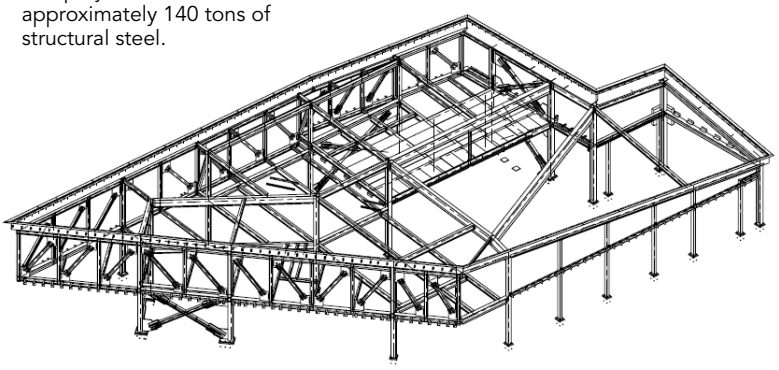
SMH's design brought sorely needed emergency services to the community and, by design, broadcasts an optimistic message: Its 7,000-sq.-ft green roof is visible from the street and the nearby high-rise residential housing, its translucent luminous polycarbonate skin is transparent by day and beacon-like at night and its welcoming cantilevered portico all portend a bright future for the neighborhood. It is also adjacent to a community garden, which is irrigated by a cistern that collects rainwater from the station's green roof.

## Fluid Circulation

The design provides for clear, coherent and efficient vehicular circulation on an irregular, trapezoidal site. SMH planned a building shaped by vehicle access, allowing for ease of ambulance arrival and departure. The upper floor is an occupied trussed bridge, essentially a translucent canopy designed to take advantage of daylight, neighborhood views and natural ventilation. The bridge incorprates two 13-ft-tall trusses; one is110 ft long and the other is 120 ft long. The green roof—the "fifth façade" of the building—folds over the structured canopy and shelters the spaces below. The arrangement results in a double-height, multi-level, column-free apparatus bay.

The Zerega Avenue Emergency Medical Services (EMS) Station came about as part of the city's PlaNYC initiative.

The project uses approximately 140 tons of structural steel.



The project site is surrounded by low-rise industrial and manufacturing warehouses, high-rise residential towers, single-family homes and Westchester Creek.

Based on the building's geometry and an architectural layout that included a 30-ft-long cantilever, extensive clear spans and a sloped roof, structural steel was considered to be an ideal choice for the building. The second floor was constructed of lightweight concrete slabs on steel decking or steel grating, which was in turn supported by steel beams, and the roof was framed with exposed open-web steel joists. Common shapes used were W12×45 W16×50 and W8×24.

Erection and Welding Contractors (EWC), the project's fabricator, delegated steel connection design to Cuoco Structural Engineers, who paid special attention to the exposed areas of steel. While the design did not specify architecturally exposed structural steel (AESS), every effort was made to make exposed connections, which used massive bolts and gusset plates, visually appealing.

The facility is located in an area with poor soil conditions designated as Site Class E, resulting in a seismic design cat-

**Henry Smith-Miller** (**hsm@smharch.com**) and **Laurie Hawkinson** (**hawkinson@smharch.com**) are both principals with Smith-Miller + Hawkinson Architects.

▲ The 7,000-sq.-ft green roof.

➤ The site plan.

◀ The trusses join to form an angular cantilever (right of photo).

▼ Looking down into the vehicle bay.

▼ The framing includes trusses of 110 ft and 120 ft long, both 13 ft tall.

egory of D. As such, RSA opted to use ordinary steel concentric braced frames. While this resulted in designing the steel for a higher seismic force, the connections were simplified, which resulted in an overall efficient structure.

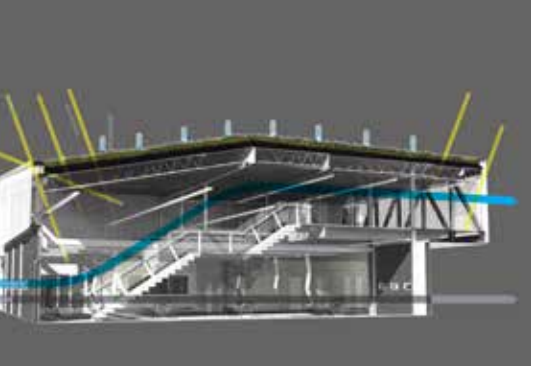
The connections that are part of the lateral force resisting system were designed to develop the expected strength of the members. However, at the trusses where the connections are exposed and where they did not participate in the lateral force resisting system, the size of the steel gusset plates was minimized by designing for the actual anticipated forces in the members rather than the expected capacity of the members. This resulted in balancing structural requirements, architectural aesthetics and economics.

Early in the design process, SMH expressed the desire to have the second floor cantilever at the west end of the building. RSA considered cantilevering beams at the second floor, but they were too large to be acceptable. We then investigated using a truss option in order to have smaller and lighter members. This solution was preferred and in the end, served the architectural expression of the design objectives. There was close coordination between SMH and RSA in order to develop the configuration of the trusses and to balance structural requirements with aesthetic finesse.

The building, which uses approximately 140 tons of steel, exists not only as an essential services facility that supports its community, but also as an example of how attractive architecture mixed with efficient structural engineering can define such facilities in the future. ■

**Owner**

New York City Department of Design and Construction



Circulation plan showing sun angle, evaporation, heat buffer, airflow and vehicular movement.

**General Contractor**
Kel-Mar Designs, Inc., New York

**Construction Manager**
Liro Group, New York

**Architect**
Smith-Miller + Hawkinson Architects (SMH), New York

**Structural Engineer**
Robert Silman Associates (RSA), New York

**Steel Fabricator and Erector**
Erection and Welding Contractors, LLC, Milford, Conn. (AISC Member/AISC Certified Fabricator)