REGO PARK II

Rego à Go-Go

Can you build big-box retail on a borough-sized footprint? That's what the development and design teams for the new Rego Park II in Queens were determined to do when they began work on the $550 million retail and residential venture owned by Vornado Realty Trust. "The development is one of the first attempts to rearrange big-box retail into a vertical format, appropriate to an urban infill location with ground-level orientation and a mix of uses," says Giovanni Valle of the project's design architects Ehrenkrantz Eckstut & Kuhn Architects (EEK), who worked with architects of record SLCE Architects and Greenberg Farrow and structural engineers Severud Associates on the project.

At 440 feet by 600 feet—equivalent to three to four Manhattan blocks—the development's footprint is one of the largest in New York City, but for retail giants used to occupying more than 200,000 square feet with a single store the space could feel small and inflexible if it weren't for structural steel framing. "It allows for increased open floor area and, therefore, greater flexibility for location of interior partitions," says Valle. The 30-by-30-foot column grid creates easily modifiable space for tenants who could require mezzanines, and escalator and elevator openings. The structural design also allows unique architectural elements, including a curved metal roof, pedestrian platforms, bridges, and a tensile fabric structure, to achieve their intended form.

The development's three floors of retail space, which totals 694,000 square feet and connects to a five-level car garage, will supplement existing malls in the immediate area, with the goal of forming a cohesive shopping destination in Rego Park. The project also includes a 300,000-square-foot residential tower, which along with the retail complex aims to revitalize its portion of Junction Boulevard by transforming the neighborhood from one of numerous empty lots into a "mixed-use Main Street," says Valle. The new complex defines a block-long open-air galleria protected from the elements with a structural steel canopy covered with fabric cladding. The galleria links the retail complex and Junction Boulevard with the adjacent residential neighborhood. The fabric membrane of the galleria canopy is supported by twelve tied arches that span from the north building to the southwest building and parking garage. The arches are two-chord trusses with 12-, 10-, 8- and 6-inch diameter pipe; their web members are pipes that range in diameter from 1½ inches to 6 inches. The cables that tie the bases of the arches are ¾ inches in diameter.

The relatively small site plan necessitated the vertical stacking of big-box retail tenants in order to accommodate the required program. Parking was also stacked in order to remove cars from street level and create an inviting pedestrian-oriented shopping environment at grade. Two levels of parking and one level of retail are also located below grade to maximize area within the given footprint.

Typical floor construction for the retail buildings consists of concrete fill on composite metal deck. The structural steel beams and girders are composite with the concrete floors and use headed studs for shear transfer. Decking is primarily 3 inches deep, 18- or 20-gauge composite floor deck. Decking on the roof of the north retail building, where there is no concrete, is 3-inch-deep, 20-gauge roof deck.

A typical retail bay is framed with W18 x 35 filler beams spaced

Previous spread A block-long open-air galleria will be protected from weather by a structural steel canopy covered with fabric cladding.
Page 23 A rendering of the completed mixed-use development.

Top Erection of the five-level parking garage at the east side of the site.
Above The column grid of the future residential tower is oriented at a 45-degree angle to the retail building supporting it.

Previous spread, left: © Severud Associates; top: © Ehrenkrantz Eckstut & Kuhn Architects

Above Steel erection for the retail building on the northwest side of the site.
Right A 30-by-30-foot column grid enables tenant flexibility.
Below Typical retail bay framing.

Facing and top: © Bernstein Associates Photographers; right: Severud Associates

at 10 feet and W24 x 76 girders. Columns are W14 in varying sizes. Rolled shapes are ASTM A992, while most other material is A572 Grade 50. Round, rectangular and square HSS is ASTM A500 Grade B. Miscellaneous connection material is ASTM A36. The majority of connections are shop-welded and field-bolted with ASTM A325 or A490 bolts.

Designing a large complex for such a small site was one challenge. Sequencing the erection of steel for the 30-by-30-foot column grid project was another. Structural steel erection began on the southwest corner of the site, proceeding upward and northward, in sequences, finishing with the galleria. A Liebherr LR1400 crawler crane positioned in the subcellar erected the steel for this portion of the project. Next, steel erection began in the northwest corner of the site where a Liebherr LR1250, positioned on a platform (a small portion of the ground floor and supplemental framing erected from the street), erected upward and westward, in sequences, until reaching Junction Boulevard. The crawler crane then backed off the platform and erected the last sequences of steel.

In the meantime, the LR1400 used to erect the southwest building moved to the center of the north retail building and erected 90-foot transfer plate girders over the building's loading dock. This design allowed enough column-free space for trucks to maneuver when unloading deliveries. After erecting the plate girders, the crawler crane was moved to 97th Street on the east side of the site where, positioned

Top row: © Bernstein Associates Photographers; Severud Associates; bottom row: © Severud Associates; Bernstein Associates Photographers

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Facing Retail tenants are connected by a series of catwalks in the Galleria.

Above A vehicular and pedestrian bridge across 62nd Drive connects an old parking garage with the new structure.

"Structural steel framing allows for increased open floor area and, therefore, greater flexibility for location of interior partitions."

Giovanni Valle, Ehrenkrantz Eckstut & Kuhn Architects

on another ground-floor platform, it erected the steel for the site's northeast corner. Finally, the steel truss bridge connecting the five-level parking garage to an existing garage across 62nd Drive (at the site's south side) was preassembled in a staging area at street level, and then lifted into place with a street crane. The project's approximately 7,300 tons of structural steel took eight months to erect.

"The 30-foot by 30-foot column grid readily accommodates the floor layouts for the retail tenants. With this column spacing, the transfer system at the roof of the southwest building (under the residential tower) worked well with an 8-foot depth restriction on the girders," says Chris Schneider of construction manager Bovis Lend Lease. This transfer system represented one of the bigger challenges for both the designers and the erectors of the project.

Although the project's retail and parking portions align with the city streets, the residential tower column grid is oriented at a 45-degree angle to the retail building that supports it. This orientation complicated the roof-level system of transfer girders. "The framing of the 8-foot-deep transfer girders was carefully studied to make it as efficient as possible," says Schneider. To anchor the reinforced concrete residential tower to the transfer system at the roof of the southwest retail building, bearing plates were installed under the columns and shear walls, and threaded couplers for the vertical reinforcement were welded to the bearing plates. At the shear walls, tie-down anchorages were provided at the ends by means of threaded rods which pass through the transfer girder top flanges and connect to the girder webs.

The hybrid structure presented other construction challenges, resolved through unique erection methods. The southwest retail building's stair and elevator cores were scheduled in concrete, but because the building supports the residential tower, the structural steel had to be erected before the concrete contractor was on site to frame the core walls. To resolve the issue, temporary 8x8 HSS columns were placed at the corners of the concrete walls. Then, a ring of channels framing from temporary column to temporary column created an opening for the walls. The floor framing connected directly to the temporary columns or ring beams, which allowed steel erection to proceed independently of the concrete.

The steel truss bridge that connects the new parking garage to the existing garage across 62nd Drive required additional problem solving with steel. On the new parking garage, steel brackets were field-welded to plates embedded in the precast concrete columns. However, since the existing precast concrete parking garage lacked sufficient capacity to support the vehicular/pedestrian bridge, the building team took advantage of an existing narrow space between the face of the garage and the property line to construct a steel frame able to support the bridge. The frame sits on a continuous grade beam that spans between grade beams cantilevered from new mini-caissons drilled between the existing garage's pile caps. Slide bearings allow the two garages to move independently without inducing any forces in the bridge.

Taking advantage of the benefits afforded by using steel for rapid erection of the frame was important. The project's curtain wall assembly was coordinated to allow tenants to move into the building as soon as possible—enabling the building owners to begin collecting rent and generating revenue. The assembly is comprised of a metal panel system, both flat sheets and corrugated, mounted over rigid insulation (Dens-Glass sheathing with a waterproof coating) and cold-formed metal framing hung off the slab edge. With the exception of the storefronts, all of the building's exterior walls are curtain walls (totaling 170,000 square feet). The prefabricated wall panels were lifted into place with a Link-Belt RTC-8040 II crawler crane and field-welded to angles embedded in the edge of slab. With the envelope enclosed quickly, the development's anchor tenants were able to begin fit-outs of their respective spaces. The end result of the project teams' close collaboration was a streamlined erection process that allowed both owner and tenant to begin using the property as soon as possible. With cars removed from the street level, Rego Park II is immediately recognizable as a pedestrian-friendly place where shoppers, among rows of trees and shaded outdoor areas, just might forget they're at the mall. **M**

REGO PARK II

Location: **Junction Blvd. and Queens Blvd., Queens, NY**
Owner/Developer: **Alexander's of Rego Park II, Inc.**, *Saddle Brook, New Jersey*
Design Architect: **Ehrenkrantz Eckstut & Kuhn Architects**, *New York, NY*
Architects of Record: **Greenberg Farrow**, *New York, NY*
SLCE Architects, *New York, NY*
Structural Engineer: **Severud Associates Consulting Engineers, P.C.**, *New York, NY*
Mechanical Engineer: **AKF Engineers**, *New York, NY*
Construction Manager: **Bovis Lend Lease**, *New York, NY*
Structural Steel Fabricator: **Owen Steel Company**, *Columbia, SC*
Structural Steel Erector: **A.J. McNulty & Company**, *Maspeth, NY*
Miscellaneous Iron Fabricator and Erector: **Post Road Iron Works**, *Greenwich, CT*
Metal Deck Erector: **A.C. Associates**, *Lyndhurst, NJ*