



Continuing Education



Photos by Eli Goldstein

Masonry Meets Police Department Objectives

Safety and Security with Openness and Transparency

Eli Goldstein, AIA

Jersey City Police Department
Jersey City NJ

Client
JERSEY CITY New Jersey

Architect
THE GOLDSTEIN PARTNERSHIP
Maplewood NJ

Structural Engineer
SEVERUD ASSOCIATES New York NY

Construction Manager
EPIC MANAGEMENT Piscataway NJ

General Contractor
APS CONTRACTING Paterson NJ

Mason Contractor
HIGH MOUNTAIN CONSTRUCTION
North Haledon NJ

Glass Block Installer
GLASS BLOCK AMERICA Medina OH

Masonry Materials
BUZZI UNICEM USA |
THE BELDEN BRICK COMPANY |
EASTERN GLASS BLOCK |
EASTON BLOCK & SUPPLY |
GREEN GUARD |
HANOVER ARCHITECTURAL PRODUCTS |
HOHMANN & BARNARD |
NITTERHOUSE MASONRY PRODUCTS |
PITTSBURGH CORNING | **QUIKCRETE** |
ROCKCAST DIVISION OF READING ROCK |
SPEC MIX

Construction Cost **\$10.4 MILLION**

Masonry Budget **\$1,025,000**

Size **30,000 SF**

Completion **MAY 2015**

This glass block at the second story conveys a sense of openness, allows in natural light and is also blast resistant.





Upon reading the article you will be able to:

- 1 Explain ways in which masonry may contribute to LEED credits.
- 2 Identify qualities that make masonry materials particularly well-suited to the needs of a police building.
- 3 Discover ways that taking advantage of masonry's modularity can add efficiencies to building construction and design.

Masonry gives form and character to Jersey City's West District Precinct, complementing the rich architectural heritage of Jersey City's many public buildings. Its strength, fire-resistance, acoustic performance and economy made it a fitting choice for a building having the specific combination of requirements of an urban police building. By sourcing these materials regionally, installing them modularly to minimize waste and detailing to contribute to the building thermal mass, they significantly enhanced the building's sustainability.

During initial discussions with the client, concern for the safety and security of the officers in this challenging neighborhood was expressed. There was also a strong desire for the public spaces within the building to convey a sense of openness and transparency. To provide a tough building skin, masonry was an immediate candidate. Jersey City has a history of distinguished masonry buildings, many of which house the City's cultural institutions.

About 10 years ago, Jersey City initiated a capital program to gradually replace its four existing police precinct buildings, the most recent of which was built more than a century ago. Jersey City is New Jersey's second largest city. The western portion of the city is served by the West District Precinct of the Jersey City Police Department and was the first one designated for replacement. It is the busiest police precinct in the state.

Based on The Goldstein Partnership's extensive experience in police facility design, we were chosen to design the new West District Precinct. The site is a prominent corner, visible across a shallow pocket park from a primary vehicular artery.

Sense of Lightness Jersey City has committed to achieving a green certification of at least LEED Silver for each of its public buildings. To satisfy the project's requirements for energy conservation, security and transparency, the outside of the building is glazed with high-performance insulating glass units having bullet-resistant inner lites, while the lobby is glazed with 3" thick, bullet-resistant block.

Historically, brick facades were loadbearing elements in which windows were accommodated by punching openings through the masonry wythes. These openings are spanned with arches or lintels. In recent decades, masonry facades have consisted primarily of brick veneer anchored to stud or block backup walls. Although these veneers are not loadbearing, many contemporary masonry buildings continue to employ the architectural vocabulary of traditional masonry structures. On this project, the brickwork carries no load. Brick are laid in *panels* forming a checkerboard pattern in which the upper brick panels are clearly not supported by lower ones. The result is a tremendous sense of visual lightness.

The sense that each brick panel is independent of those around it is reinforced by using *lipped* brick at the first course of each brick panel. Lipped brick have a recess, just behind their faces, to accommodate the thickness of the horizontal leg of a steel lintel, plus mortar and flashing. As a result, the edges of the lintels are invisible from outside. To complete the illusion, upside-down lipped brick at the top of each panel are incorporated.

Cavity Wall System For most of the exterior, insulated masonry cavity walls are used. They are composed of a 4" brick veneer, 4" cavity (the inner half of which is insulated with a continuous layer of 2" extruded polystyrene), and an 8" block backup. The interior of many perimeter walls are finished with 5/8" drywall applied to steel furring strips anchored to the block backup.

Continuous insulation helps minimize thermal bridging and assures that the bulk of the exterior wall's mass is within the thermal envelope, helping to stabilize the building's interior radiant temperature. The average R-value of the masonry cavity walls is greater than R14, more than 67% above the prescriptive requirement of New Jersey's current energy code, ASHRAE 90.1-2007. Having masonry backup walls enables this building to use about 4% less energy for heating and cooling than a similar building without the thermal mass.

Code requires that these different use buildings] be separated from one another with fire rated construction.

Block backup is constructed as infill between tubular steel columns. Horizontal steel tabs are shop-welded to the sides of these columns at 2' on center vertically so that they project into the hollow cores of the adjacent block. The cores of those

block are reinforced with vertical bars threaded through holes in those tabs. Grouting the cores *locks* everything together, as required to accommodate seismic forces.

Creating Identity As we walked the streets around the site to become familiar with the context for this important civic building, I found a profusion of century-old masonry townhouses, and was inspired by their spectacular and unusual brick coursing and bonding, often using long shallow brick. At a design meeting

soon thereafter, I learned that the Police Department's shorthand name for this district is *The West*. The next time I looked at design sketches, I realized that each of the two street facades had eight square brick panels along its second floor. I added the seven letters and one space of THE WEST to our sketches and realized that custom coursing could be used to incorporate THE WEST into the facade.

Visual Effects Ever since working as a mason intern for several summers while in architecture school, I have been fascinated by the virtually infinite potential for patterning associated with the incremental nature of brick construction. A brick wall is like a digital photograph with large pixels. By varying the color and arrangement of the pixels, one can achieve a wide range of visual effects.

To incorporate each of the large letters into the street frontages, masons recessed a specific group of bricks just $\frac{3}{4}$ " within the context of an unvarying running bond with modular Roman brick (4" deep x 2" high x 12" long). This modest amount of relief provides both functional and aesthetic advantages. It leaves an air space greater than 1", enabling moisture to flow freely within the cavity behind the veneer, even where recessed. The visual result is subtle enough for the letters to virtually disappear under certain lighting conditions. Happily, the visibility of the letters varies with the time of day, time of year and weather. The letterforms were achieved by recessing full brick in the appropriate pattern within the 9' wide x 10' high brick panels. Waste was minimized because the overall panel was modular, meaning that the infill consisted solely of full and half brick.

Partition Walls Under Chapter 16 of the International Building Code (IBC), police stations are classified as Essential Public Facilities, along with fire and rescue facilities. As such, they are in Occupancy Category IV (the highest category) in the determination of structural requirements, including earthquake-resistance. Whereas police stations used to be classified in the IBC as Business Uses, they are now considered Mixed Uses, with all of the complexities that accompany this designation. The architect has the option to design the entire building to satisfy the requirements of the most restrictive use or to separate uses with fire-rated assemblies. For *The West*, a combination of these approaches was used.

Mixed-use buildings usually conjure images of urban structures having retail uses on the ground floor with offices and/or apartments above. Unbeknownst to many is the fact that police buildings contain an even more elaborate mix of uses. Offices are supplemented by detention areas (cellblocks), garages (sally portes) and places of assembly (conference and/or meeting rooms). Building codes require that these different uses be separated from one another with fire-resistance rated construction.

At the West District, rated walls are constructed of reinforced concrete block. Where additional strength is required (for seismic-resistance or security), cores are reinforced with vertical bars grouted solid. Where block is visible in public areas, ground-face (burnished) units are used. Block partitions are doveled into floor slabs at their bases and sandwiched between

pairs of steel clip angles at their tops. Block is also used for partitions where acoustic isolation and privacy is required between adjacent spaces.

Beauty, a Welcome Addition To make the building entrance as visible as possible both from the streets in front, as well as from the boulevard that passes nearby, the main lobby is placed on the corner and housed in a two-story rotunda. Its outer half consists of an aluminum and glass curtain wall, while the inner half consists of decorative ground-face block at the first floor and curved glass block walls at the second floor. The faceted domed roof is framed with custom three-dimensional steel trusses with integral lighting. The oculus is topped with a hemispherical skylight.

To convey the sense of discipline and order so vital to the operation of a police department, the lengths and heights all of glass block and ground-face block walls in the lobby are set to match the dimensions of the respective units. For example, the radius of the rotunda is established so that the arc length between columns is just over 64", allowing eight 8"x8" glass blocks (and their joints) per course. This modular construction approach eliminates cutting of masonry units, which in turn maximizes productivity and minimizes waste, all with economic benefits. And, like the other masonry materials employed, glass block is fully recyclable, was regionally produced of abundant natural materials and added no volatile organic compounds (VOC) to the indoor environment.

A plan for recessing and protruding brick was created to spell out *THE WEST*, nickname of the police station. The difference is subtle, so visibility of letters varies with the time of day, time of year and weather.





Locating windows at regular intervals achieves a fresh panelized look while still taking advantage of the durability of masonry.

On the lobby floor, in the building being replaced, was the Police Department's shield, rendered in several colors of terrazzo. Originally, the intention was that the contractor cut it out of that building and reinstall in the new building. However, it was eventually concluded that recreating it would be more economical than relocating it.

Sense of Place In an effort to relate the building as much as possible to the main thoroughfare at some distance from the building's entrance, the radial terrazzo motif from the rotunda is extended into the entrance plaza across the street and into the pocket park located there. Like ripples radiating from a disturbance in a pond, curved bands of brick pavers radiate from the rotunda. Alternating with the bands of brick pavers are panels of concrete or panels of clay pavers in a contrasting color.

In the lobby, curved interior walls are built with scored ground-face block. Short walls lining wheelchair ramps and complementary planters outside are topped with cast stone.

To provide a solid visual grounding, the base of each facade consists of a cast stone watertable. Although the site appears flat, it rises about 1' as one travels in each direction from the corner. These modest undulations are de-emphasized by the 18" high watertable; much of it shows even at the highest points of the site.

The original intention was to use the same mortar color with both colors of Roman brick in the facade. However, the delivered brick had color ranges wider than anticipated, making contrasting panels less distinct. We ultimately chose to use two mortar colors, a lighter color for the lighter shade of brick and a darker one for the darker shade. This reinforced visual distinctions between adjacent panels.

In all of the buildings we design, we try to bring daylight as far into the building as possible. This not only enhances the working environment, but also yields energy savings. Occupancy sensors are used in many portions of this building so that the lights are on only when required. Daylighting further reduces the demand for artificial lighting.

The 3" solid bullet-resistant glass block transmit 90% of the available natural light.

Glazed interior walls, such as the curved glass block wall at the lobby, enable daylight to reach interior spaces which it would not otherwise, further extending its benefits. The glass block units transmit 90% of the available natural light.

Law enforcement facilities play many roles as symbols of public safety and community service.

We and our client felt that openness and transparency were the right messages for the building to send to the surrounding neighborhood. That led to our use of large expanses of glass, especially at the entrance and within the lobby. The building is manned round-the-clock (168 hours per week). This not only assures residents that someone is

always there to help, but also means that the City's investments in energy conservative materials and systems (yielding 5 Energy Optimization Credits under LEED 2009) will pay off much sooner than those in a conventional office building (conditioned less than 60 hours a week). ■



Eli Goldstein, AIA, is Managing Partner of The Goldstein Partnership, a 60+ year old Architecture

and Planning firm. He has designed many prominent masonry structures, including the Maplewood (NJ) Police & Court Building, the first LEED-certified municipal building in the State of New Jersey, recognized as the Top Green Building in NJ by IMI/New Jersey in its 2011 Golden Trowel Awards program. Goldstein holds a Bachelor of Science and Master of Architecture from the Massachusetts Institute of Technology. 973.761.4550
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