

Parking Garages

Sheridan Hollow Parking Facility Building on an "Unbuildable" Hill

Background

Lack of adequate parking has long been a divisive issue in the City of Albany, pitting the needs of local residents against those of thousands of commuting State employees.

The NYS Public Employees Federation had estimated that nearly 50,000 people work in downtown Albany, including roughly 17,500 State employees, most of whom commute in and out of the city daily. As late as 1998, waiting lists for assigned downtown parking spaces were in excess of ten years for many State employees. Efforts to revitalize Downtown Albany, as a place to work and live, were jeopardized by a continued lack of adequate parking.

With the opening of the \$24.4 million Sheridan Hollow Parking Facility and its 1,380 spaces, the New York State Office of General Services (OGS) now administers over 13,000 spaces for State employees in downtown Albany. Sheridan Hollow will meet the needs (in whole or in part) of a lengthy list of State entities, reducing the strain on local on-street parking and easing relations between residents and commuting State employees.

Sheridan Hollow Quick Facts:



Albany's newest parking attraction.

Photo by Clough Harbour.



Stepped site preparation.

Photo by Clough Harbour.

- Structure stepped into existing slope (three steps varying from 15' to 30')
- Eight levels, seven parking decks
- 200' x 230' building footprint
- 450,000 square feet total
- 1,380 parking spaces
- Stairways at three locations
- Vehicle accessible on first and seventh decks
- Elevators serve all decks
- Twin ramps provide vehicle access between all decks
- Foundation included 115 drilled shafts, each 3' to 5' in diameter

(cont. on page 2)

Sheridan Hollow Parking Facility *(cont. from page 1)*

- 12 foot wide pretopped double tees
- Columns, at 36 foot spacing, made in two pieces, varying from 32' to 45' in length

Community Outreach

To engage the community in the decision-making process, representatives from OGS and the engineer conducted seven meetings with interested groups from August through December 2002. The purpose of the meetings was to present the project, identify areas of concern, answer questions, and to obtain feedback on the project. Meetings were conducted with the Sheridan Hollow and Ten Broeck Neighborhood Associations, the Historic Albany Foundation (HAF), the City of Albany, and an ad-hoc stakeholder group that included representatives from the Albany Public Library, Albany Institute of History and Art, and the University Club.

Construction on a Unstable Slope

The central portion of the project is located on steep slope with a total change in elevation of 80 feet across the length of the site. Historically, the area was occupied by an active roadway lined with residential buildings until the early twentieth century. Sometime between 1913 and 1915, a slope immediately to the west of the site gave way, damaging or destroying several homes in the process.

Given the slope's history of instability, extensive subsurface investigations were conducted, including two cone penetration tests and five soil borings. Penetration tests were advanced through 100+ feet of Lake Albany varved silt and clay soils down to the underlying glacial till or shale bedrock. After taking the preliminary facility layout into account, tests indicated that excavation at the base of the slope would render the slope unstable. Precise sequencing of construction and the use of lightweight structural fill at the upper portion of the slope helped ensure stability. Four inclinometers were installed to monitor the condition of the slope throughout construction.

Two Foundation Designs

The soft varved silt and clay soils underlying the site offered poor support for the foundation of the proposed facility. Based on the geotechnical analysis, a deep foundation extending down to the underlying bedrock or glacial till was recommended to provide adequate support. Given the extreme volatility of steel prices in 2004 when the project was bid, the engineer took the unusual step of advancing two independent deep foundation designs. Both H-pile and drilled shaft foundations were designed as bid options.

Foundation Design & Construction

Foundation construction included the installation of temporary and permanent lateral earth support systems, drilled shorts, concrete footings and two concrete retaining walls. Temporary earth support (required for the installa-

tion of the foundation system) consisted of driven H-piles with lagging boards and tiebacks. Permanent earth support includes coal tar epoxy coated sheet piles with over 80 tiebacks extended to approximately 80' and holding loads as high as 215 kips. The deep foundation consists of 115 reinforced concrete drilled shafts ranging in length from 40 feet to 100 feet, and 3 feet to 5 feet in diameter. The drilled shafts are designed to support loads as high as 1,700 tons and are tied together with grade beams between the footing and the concrete retaining wall. Retaining walls spanning between the east and west wall of the garage ranged in height from 24' to 30'.

An Existing Steam Tunnel Ran the Length of the Site

The structure spans an active 12' x 12' steam and utility tunnel serving the nearby Empire State Plaza and New York State Capitol Building. Maximum load requirements on the tunnel prevented heavy equipment from crossing over it. Moreover, the high elevation of the tunnel exposed it during most of the construction work, effectively splitting the worksite into two separate areas. Because of this, complex site phasing was required to accommodate the tunnel. Loading restrictions on the tunnel required special protective measures be installed to allow the crane to pass over it.

Project Complete

In early August 2006, Sheridan Hollow opened for use, on time and within budget. OGS Acting Commissioner John J. Spano publicly announced the Office's satisfaction with the engineer's performance, mirroring sentiments personally expressed to the engineer by the OGS Project Manager:

"The addition of this new garage is fundamental to the State's efforts to assist in the revitalization of downtown Albany. I commend everyone who worked on designing and building this parking facility for a job well done." OGS Acting Commissioner John J. Spano, August 9, 2006.

Project Credits

Architect: Desman Associates; Engineer: Clough Harbour & Associates; Contractor: Turner Construction Company; Precaster: William E. Dailey. Article submitted by Chris Johnson, Clough Harbour & Associates.

PCANY Website

All PCANY members now have access to the Members Only Page, where varied reports, communications, meeting notes, etc. will be posted. There is also a new category listing, Complimentary One Year Membership, which will be given to every attendee at a PCANY seminar or workshop; or it may be requested simply by visiting...

www.pcanyc.org

Brick faced structural members featured on parking garage for luxury condos in Hoboken



Erection of precast elements on Hoboken Cove garage in Hoboken, NJ was completed in September. Spandrels and columns feature thin set brick, highlighted by buff colored details to match adjacent condominiums. Photo by Unistress.

tible to deterioration from airborne contaminants, freeze-thaw, and efflorescence. Face dimensions are typically 3/8" to 1/2" less than nominal dimensions, and they are available in corner units as shown in the photo below. Precast member sizes are normally adjusted to meet standard brick or unit dimensions.

Typically, thin brick are set in a form liner or template before the member is cast. The brick are usually manufactured with a dovetail back face to provide a mechanical bond to the concrete. Physical properties of the brick will vary considerably, depending on the source and grade. Darker colors and higher strengths can be achieved in the burning process of the brick. The coefficient for thermal expansion will also vary and should be considered in their selection and detailing of the precast members. This includes location and type of reinforcement, use of prestressing, and detailing of connections.

The Hoboken garage, using a total precast system and structural members with architectural fin-

Architectural brick faced structural spandrels and columns are featured on a new eight story parking garage for Hoboken Cove luxury condos in Hoboken, New Jersey. Thin-set brick, highlighted with buff colored and lightly sand blasted sills, frames, bands and other details are used on all four elevations of the garage.

The three bay garage is 258' long and 182' wide. A typical interior bay is 61' x 36'. Two bays including one of the exterior bays are sloped for access between floors. A typical load bearing spandrel beam is inset and connected to the back face of columns. Rebar in non load bearing spandrel beams are connected with splice sleeves to the foundation to provide lateral shear walls for seismic and wind loads.

Time and Cost Savings

The use of thin-set brick, cast in a precast member, offers several time and cost saving benefits over conventional laid up brick on the job site. High priced and time consuming building skills are transferred from the job site to controlled conditions in the precast plant. Stored materials, mortar batching and protection as well as scaffolding are also eliminated. Erection on the Hoboken garage required 72 days including several lost days for rain. A comparable steel frame structure with cast-in-place decks, fireproofing and site laid masonry would have doubled the time required.

Thin brick actually clay tile

Thin brick, which are actually clay tile, are harder and denser than conventional brick. They are also less suscep-



Hoboken garage showing base of column, spandrel beam inset, and bottom of window. Photo by Unistress.

ishes, is "state of the art" for today's garages. Brick faced spandrels and columns are expected to compliment and enhance the neighborhood.

Toll Brothers Inc. from Hoboken is the Developer and General Contractor for the project. Desman Associates from New York City is the Architect and Engineer. Hoch Associates, from Ft Wayne, IN, provided the specialty precast engineering. Unistress Corp., whose plant and main offices are located in Pittsfield, MA, furnished and installed all of the precast products.

Article submitted by Harold Nelson.

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November 2006

MONTHLY NEWSLETTER

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Seminar on Parking Structures

PCANY will co-sponsor a full day seminar with ACI and PCI, "Design and Construction of Concrete Parking Structures", in Albany on April 16, 2007. Seminar attendees will learn about:

- Design and Material Considerations
- Good Design Practices for All Types of Construction
- And Much More
- Selecting the Structural System
- Requirements for Durability

All attendees will receive the ACI 362.1R-97 publication, "Guide for the Design of Durable Parking Structures", the PCI publication "Precast Prestressed Concrete Parking Structures: Recommended Practice for Design and Construction", a 260 page workbook of all the seminar slides with a supplementary appendix of data, and Professional Development Hour credits. All members of ACI, PCI, and PCANY can receive a fee reduction of \$140. Registration is through ACI Headquarters.

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