UNIVERSITY OF PENNSYLVANIA NEURAL AND BEHAVIORAL SCIENCES BUILDING

415 University Ave, Philadelphia, PA 19104

Reinhardt Swart | Lighting + Electrical
Advisor | Shawn Good + Leslie Beahm

Building Statistics Part I
8.30.13

THE BUILDING

The project is a higher education lab building with instructional labs, faculty offices, student spaces, and an auditorium. As an expansion of existing laboratory space, the new building will provide for the collaboration, exchange, and integration of knowledge that characterizes the study of Biology and Psychology at UPenn.

Name | University of Pennsylvania Neural and Behavioral Sciences Building
Location | 415 University Ave, Philadelphia, PA 19104
Occupant Name | University of Pennsylvania faculty, staff and students
Occupant Type | Business (B), Assembly (A-3), and Storage (S-1)
Size | 77,100 SF total
Number of Stories | Five stories and a basement below grade
Construction Dates | January 2014 – March 2016
Estimated Building Cost | $49,300,000
Project Delivery Method | Guaranteed Maximum Price (GMP)

THE PROJECT TEAM

Architecture & Engineering | SmithGroupJJR, Inc.

Project Manager: Mark Potter
Architect: Sven Shockey
Structural Engineer: ZY Liu + Liliana Blackson
Mechanical Engineer: Dan Mather + Liz Kaminsky
Electrical Engineer: Joe Trusk + Andrew Verilone
Lighting Designer: Matt Alleman + Leland Curtis
Interior Designer: Lori James
Sustainability: Chris Heine

Owner | University of Pennsylvania
Construction Manager | P. Anges
Landscape Architecture | Christopher Allen
Civil Engineering | Pennoni Associates, Inc.
Audio, Visual, Telecomm, Acoustics | Shen Milsom & Wilke, LLC
Signage | InkSpot DESIGN Inc.

ARCHITECTURE

Courtesy of SmithGroupJJR

Courtesy of SmithGroupJJR

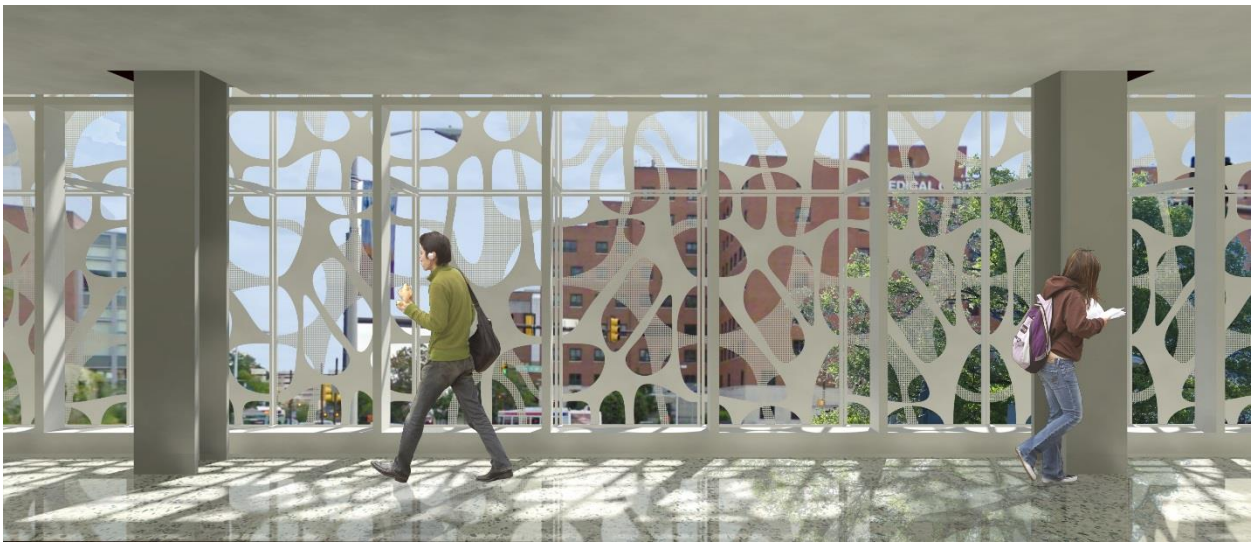
The new Neural and Behavioral Sciences (NBS) building creates a cohesive street front and inviting place for students and faculty. The NBS building, roughly 77,000 SF in size, will contain research and instructional laboratories, a 174-seat lecture hall, and office space. The building will adjoin the existing Leidy laboratories to the north at the lower through third floor levels. Likewise, the building will be connected to the existing Lynch Laboratories Building to the south via an underground tunnel at the lower level.

The placement and design of the building allows the structure to become a unifier and connector for other nearby buildings which are all part of the Neural and Behavioral Sciences neighborhood. This idea is conceptually apparent in the organic and connective architectural design. The massing of the NBS building is simple yet effective—the east end is a white metal and glass faculty office block, which cantilevers into the garden to help minimize excavation impact on roots and simultaneously provide a protected entry porch below. The west end is a copper clad lab block.

Architecturally, the prepatinated copper enclosing the west lab block references the greens of biology, thus adding variety to the mix of buildings in the neighborhood which are all built in red and brown brick. The white metal and glass contrasts with the green copper and trees to improve readability of the massing.

Courtesy of SmithGroupJJR

Courtesy of SmithGroupJJR



Courtesy of SmithGroupJJR

The south side of the copper block is cut open to expose the main circulation corridors; this south facing glass is protected with a prominent and unique sunscreen that conceptually connects the adjacent garden with the behavioral disciplines who study inside the building through form and function.

MAJOR NATIONAL CODES

The applicable codes used when designing this building include the IBC 2009, IEC 2009, IECC 2009, IFC 2006, IMC 2009, and Philadelphia Plumbing Code 2007, as well as more specific compliances with NFPA 70 2008, ADA 2010, NFPA 72 2007, and ASME 2000.

ZONING REQUIREMENTS

Construction Type IB

A-3 Assembly - Lecture hall
B Business - Education for students above 12th grade, laboratories
S-1 Moderate-hazard storage

The NBS building will be fully sprinkled and will include non-separated mixed uses so that the allowable height and area are based on the most restrictive allowance, in this case, S-1.

As this is a lab building, the NBS building will include spaces with hazardous material use; the building will thus have one control area for each occupied floor level in accordance with IBC-414.2. At the interface of the NBS building and the existing Leidy Building, there will be a three-hour fire barrier. The tunnel connecting the lower level of the new NBS building to the existing Lynch Laboratories to the south will be fully sprinkled, of noncombustible construction, and separated from the interior of NBS and Lynch by two-hour fire barrier walls.

Allowable building height | 11 stories (per IBC Section 503)
*Note: No allowable area modification to be used.

HISTORICAL REQUIREMENTS

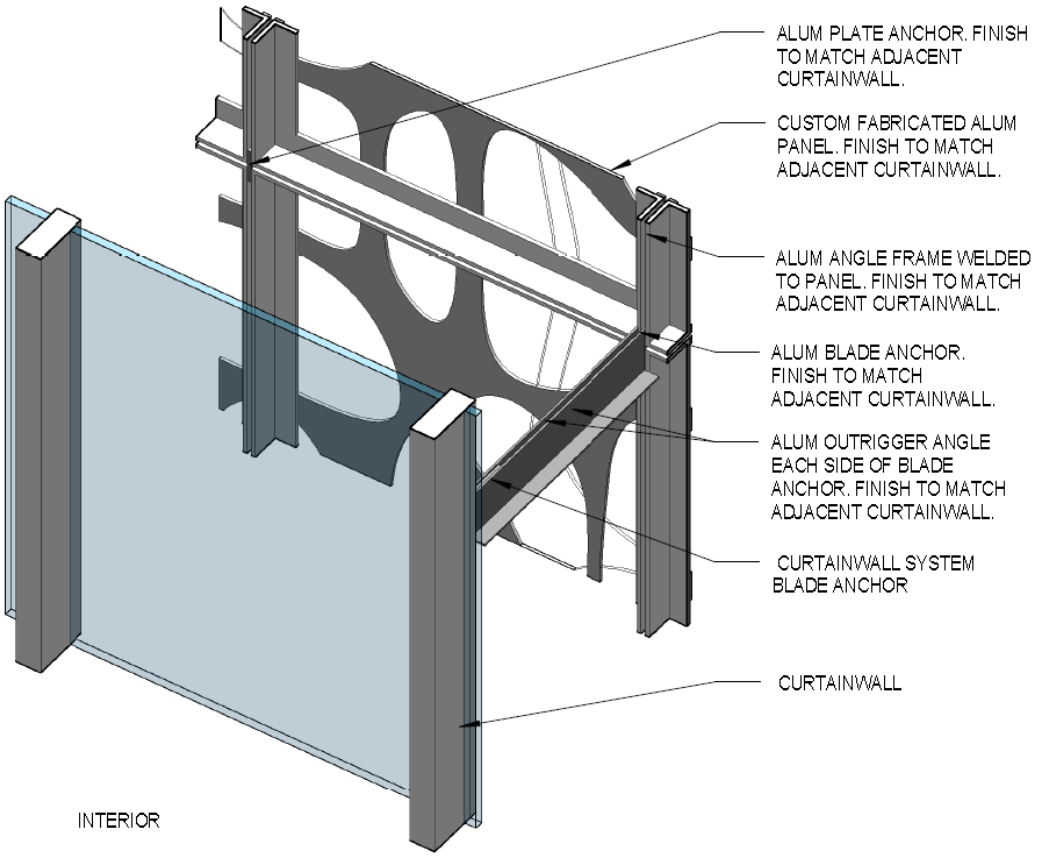
There are no historical requirements as this is a new building but the existing adjacent building—to which the NBS Building will connect—is historic and requires the historic elements are preserved and protected.

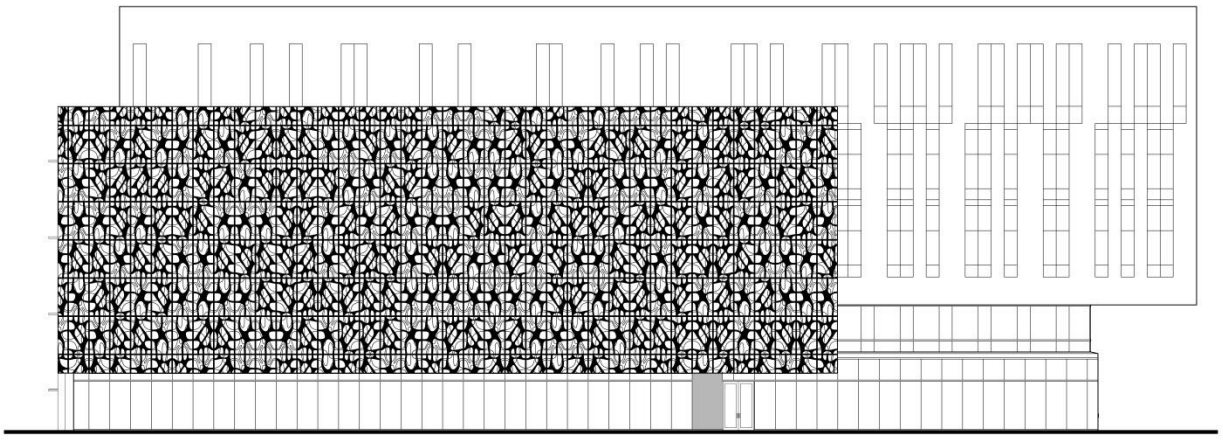
BUILDING ENCLOSURE

Generally, the building enclosure is a system of curtain walls and composite metal panels consisting of various elements of clear and low-E glazing, shading devices, and a unique scrim on the southern side of the building; behind the various metal panel is aluminum rainscreen drainback subframing, mineral wood insulation, airspace, a vapor barrier on the outside of the substrate inboard of the air space, 5/8" glassmat sheathing, 6" cold-form framing, and 5/8" gypsum board. The insulation will be extruded poly-styrene bonded to the sheathing by the vapor retarder.

Courtesy of SmithGroupJJR

A | The vertical scrim is a single sheet of painted aluminum panel with areas of solid metal, perforated metal with a 40% openness factor (3/8" diameter holes), and voids to create the appearance of multiple layers. The panel units are 3/8" thick. The curtain wall is a butt glazed system with painted aluminum mullions and 1" insulated clear and spandrel glass, adding frit where the scrim does not screen the glazing along the second floor.





Courtesy of SmithGroupJJR

Courtesy of SmithGroupJJR

B | The lab block on the west consists of prepatinated copper clad composite metal panels with the typical curtain wall construction. The west block has perforated composite panel horizontal sunscreens, which match the vertical sunscreen on the south, for protection from late afternoon sun. The curtain wall incorporates 1" low-e insulated glazing units.

C | Coil-coated aluminum face metal panels enclose the penthouse with a three-coat fluoropolymer finish and similar back-up system.

D | Light colored metal panels (white aluminum, not shown in image above) on the east block are largely shaded by surrounding buildings resulting in no shading devices. The curtain wall consists of 1" low-e, reflective low-e, and normal insulated glazing units (east block not seen in image above). The lower level curtain walls consist of clear and spandrel 1" low-e glazing set in a grey painted aluminum metal panel system with backing as described above.

ROOFING

Flat roof areas consist of a single-ply fully adhered 60 mils thermoset membrane (EPDM) on a cover board over 6" minimum polyisocyanurate board insulation and taper fastened to the roof deck with a vapor retarder. Where applicable, sections of the roof have green roof components—a 4" minimum growth medium, filter fabric, protection board/drainage mat, root barrier, and plantings. The green roof areas require a thermoplastic sheet (spec 07 13 54).

SUSTAINABILITY FEATURES

The NBS building is designed and will strive for LEED silver through integrated green strategies and design. The major elements of design visible from the outside are the green roof, the scrim along the south façade that acts as a sunshade, and the on-site bio-retention basin. The green roof will work with the bio-retention basin—directly south of the building—to capture and treat up to 90% of the annual rainfall on site and relieve some of the burden on the municipal storm sewer.

The scrim is a design element that will also shade the south façade from direct sunlight while filtering the light in to the space. The form of the skin and orientation of the building aims to optimize the amount of natural daylight delivered to the space while mitigating the solar heat gain in the warmer months. Generally, natural daylighting is a key strategy in this project, evident through the programming of spaces and ideal shape of the building.

Less visible, the HVAC system is sized to work in tandem with operable windows to optimize thermal comfort through natural ventilation. The building will be powered by 100% green power through Renewable Energy Certificates (RECs) purchased by the university.

Finally, the materials specified for the project will meet the LEED requirements for low-VOC content as well as local materials and recycled content.