Details in Contemporary Architecture

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Preface

Popular interest in architecture and the celebrity of architects has intensified in this media saturated age, but serious publications devoted to architecture are disappearing, while the quality of many that remain has declined. At a time when new knowledge and innovation are more important than ever, architects have fewer opportunities for intellectual exploration. *Details in Contemporary Architecture* is the first issue of *AsBuilt*, a new series from Princeton Architectural Press dedicated to formal and material innovation in architecture and the application of new technologies and materials. *AsBuilt* will present original solutions to problems of architectural detailing that demonstrate how complicated design problems have been handled by prominent architects, as well as those beginning their careers, to achieve beautiful, functional, and, where necessary, economical results. *AsBuilt* is dedicated to the proposition that architects learn best from other architects. Regularly calling attention to the details that go into works of contemporary architecture that are outstanding examples of art and technology will contribute to the creation of better buildings and strengthen the understanding and influence of architecture in society at large.

In each issue of *AsBuilt*, twenty-five projects will be selected from current architecture (in the United States and Canada), covering the whole range of building types, including works by architects from abroad collaborating with North American architectural and consultant teams. Since the Renaissance, when emphasis on the development of techniques for drawing propelled a shift away from construction toward representation and symbolic abstraction, critical theory has perpetuated a separation of building from architecture. The purpose of *AsBuilt* is to provide a continuing investigation into built architecture and the process of its realization, what they are now and what they are becoming; its larger objective is to revive the concept of building as the principal intellectual activity of architecture, to finally collapse the divide between theory and practice.

Whenever American architects gather in numbers, there are ritual lamentations about architecture's loss of respect, power, and influence, for which it is fair to say architects themselves have been largely responsible. The last fifty years have witnessed a systematic retreat at all levels of the profession as vast areas of the built landscape became architect-free zones, new materials, technologies, building types, and profound social change went unacknowledged, and market share was lost to cannier, more pragmatic players. To lessen legal exposure, architects became cautious and risk-averse, demoting themselves from supervisors to observers on the job site. Some prominent architects assumed responsibility for the preliminary design of their projects only, staying on as project consultants but leaving the onerous, exacting, labor-intensive disciplines of construction documents, contract administration, and project delivery to others. As they became more preoccupied with architecture's scenographic qualities and responsive to noisy popular media, architects learned to market their work based on its value as image or entertainment, even as the overall quality of American buildings declined. Many abandoned the mundane purposefulness of everyday life altogether for the postmodern theory swamps, or virtual worlds where passion for architecture can be severed from reality. On many dysfunctional building teams, architects focus mainly on design while engineers, consultants, and contractors have little interest in it, if any.

Architecture is complex and difficult, as much a state of mind as an assembly of parts, but it is mainly about materials and the way they are put together. Images with the illusion of great accuracy and completeness can be generated almost as soon as they are imagined, but architecture is developed slowly, laboriously, through a continuing process of working back and forth from concept to detail, with increasing specificity and precision. For architects committed to innovation, design is an extended process that demands close collaboration with engineers, consultants, contractors, subcontractors, and fabricators at every phase of a building project from inception to completion. The inevitable tension between concept and realization often generates fractious relationships among professionals with very different roles to play in putting a building together. Even when architectural intent survives the process intact, an architect is likely to reach completion feeling that he or she has borne a chalice safely through a throng of foes.

American building culture—traditionally risk averse, conservative, and confrontational—has lately shown signs of greater openness to material innovation and more collaborative relationships. As it has everywhere else, the digital revolution has forever changed American architectural design, practice, construction technology, buildings, and drawings. Whereas in the past architects translated an imagined three-dimensional conception of a building into two-dimensional drawings, they now create a computer model of the concept and generate the two-dimensional documents required to build it. Building information modeling (BIM)—based on the creation of intelligent three-dimensional models—and related information-sharing technology seem capable of realizing the earliest hopes for the role of computers in the making of architecture: a means of communicating and preserving architectural intent.

While many architects first turned to computers to realize new forms, they now recognize that by expanding their knowledge base and taking on additional risk, they can begin to regain control of the building process. As new technologies allow them to design in an ever more fluid fashion and to create forms not possible with less powerful tools, architects are also beginning to understand that they can minimize their own risk by becoming more familiar with the work of those who engineer and construct their buildings, and they are actively upgrading their skills.

Leading architecture firms such as Gehry Partners and Morphosis have used sophisticated modeling tools for years, not only to design and document their buildings but also to digitally fabricate building components. By directly engaging the building process, architects can offer faster construction times, higher quality, and a control of the fabrication process to preserve the integrity of their concepts not possible with the traditional methods. Like many architects who have started practices in the last ten years, SHoP PC incorporates a workshop as an integral element of their design practice, allowing them to do fullscale modeling and prototyping, another step toward redefining the way architecture is practiced.

In response to the increased interest in fabrication techniques and rising demand from architects, many American craftsmen and a growing number of small companies are now cultivating specialties or reviving techniques of craftsmanship on the verge of extinction. The expanded metal mesh manufactured by Spantek Expanded Metal, a homely component of the basic American industrial shed traditionally used for vent covers and stair treads, was seen with fresh eyes by Swiss architects Herzog & de Meuron, and fabricated by architectural sheet metal contractor M. G. McGrath into three-dimensional box-like forms for the shimmering facade of the Walker Art Center. Studio Gang Architects worked with Uni-Systems, a Minneapolis-based firm specializing in moving structures, to create a kinetic, faceted roof for the Starlight Theatre, consisting of triangular stainless steel-clad panels supported by steel columns and trusses; when the roof opens, six movable panels rise in succession to form a six-pointed star revealing the sky. The business and reputation of A. Zahner of Kansas City, which had previously focused on more mundane metal work such as siding, decking, and heating ducts, has grown partly because it is the company that Frank Gehry usually depends on to determine how to color metal and make it bend to his challenging designs. A. Zahner fabricated the insulated stainless steel panels for the exterior of Steven Holl's Lake Whitney Water Purification Facility for the Connecticut Water Authority.

Americans are, as George Santayana once observed, idealists working on matter; imaginative, but the imagination is practical, and the future it forecasts is immediate. In this first issue of *AsBuilt*, there is evidence of a peculiarly American mix of an idealistic materialism, or a materialistic idealism: Olson Sundberg Kundig Allen Architects's contemporary riff on basic machine-age components, steel shutters that open and close simultaneously using a series of devices including a hand wheel, drive shafts, u-joints, spur gears, and cables; Pugh + Scarpa's thin film technology solar panels, usually relegated to an inconspicuous and utilitarian role, which become the defining formal element on the main facade; RoTo Architects curvilinear brick layouts, creating undulating surfaces to make the walls at Prairie View come alive; or the exquisite concrete work at the Holy Rosary Catholic Church, material expression elevated to a poetic and symbolic level.

As increasing numbers of prominent clients look abroad for celebrated architects, teams of consultants and construction professionals—headed by local architecture firms with appropriate experience—are assembled to realize their concepts using often unfamiliar American materials, technology, and construction practices. Over a third of the projects included in this first issue of *AsBuilt* are by architecture firms who have main offices in other countries, or principals who were born and trained overseas and have come to America to practice; many others have spent some time studying or working abroad. Foreign architects have to adapt their work to a building culture very different from their own, as well as unfamiliar technology and materials, but the reputations for excellence that got them hired usually translate into greater design freedom than is typically afforded local practitioners. Alsop Architects had already built a structure on giant legs in Britain when hired, in a joint venture with Toronto-based Robbie/Young + Wright Architects, to design an addition for the Ontario College of Art and Design. For a United States or Canadian-based practice, the process of securing approval for such a bold proposal would probably have been much more difficult.

The shortcomings of American building practices have recently been the focus of unflattering comparisons with those of Europe and Japan, but there isn't another country on earth that has so many foreign architects working on commissions of every size. As a result, America is getting better architecture, greater access to more sophisticated technology and materials, and building construction is held to an increasingly higher standard. Whenever foreign architects build in America, different building traditions come together to produce a working process that is a hybrid, often created on the fly. Most of these projects are high-profile, high-budget commissions involving intensive research, innovations in physical technology, novel structural solutions, the introduction of new materials, or all of these, as with the Seattle Public Library, a joint venture between the Office for Metropolitan Architecture based in Rotterdam and local firm LMN Architects. The structural, mechanical, electrical, and plumbing engineering services were provided by Arup Engineering, a global firm of designers, engineers, and planners and the creative force behind several innovative projects in this book. When no locally available material served their purposes, Daly/Genik Architects began to research ethylene tetrafluoroethylene (ETFE) membranes, used extensively in Europe but which had yet to be installed in the United States, for the skylight system at the Art Center College of Design in Pasadena. The introduction of ETFE technology into the United States was eased because the Los Angeles office of Arup, with previous experience in ETFE systems in Europe, collaborated on the design of the delicate steel frames for the forty- and fifty-foot long skylights.

For the skin of the Shaw Center for the Arts in Baton Rouge, Schwartz/Silver Architects designed a wall system that used LINIT channel glass, a translucent linear structural glazing system with a depth and profile not found in conventional glass wall applications, distributed by

Bendheim Wall Systems, manufactured in Germany by Lamberts and used throughout Europe for decades. LINIT eliminates the need for most vertical and intermediate horizontal aluminum members. At the time it was completed, the Shaw Center was said to be the largest building in the United States to be completely clad in U-shaped cast glass, and the first to use the channel glass as the rainscreen for a wall system. GKD Gebrüder Kufferath, a German manufacturer of metal fabrics for architectural applications, hired Dominique Perrault Architecture, who has used their products extensively on various European projects, to design the new GKD-USA headquarters in suburban Maryland as a showcase for the products now manufactured there. GKD architectural metals are now readily available to the American market, where they are already in high demand. Hariri & Hariri—Architecture used a GKD woven stainless steel mesh for their building-sized screen on the Juan Valdez Flagship with an abstracted image of Juan Valdez sandblasted on it. Renowned glass manufacturer Cricursa of Barcelona manufactured forty-three panels of insulating laminated glass for Archi-tectonics's Greenwich Street Project, which curtain-wall fabricators UAD Group modeled and engineered using CATIA to precisely determine the geometries of each glass panel and its relationship to the underlying substructure. At the Figge Museum of Art, David Chipperfield Architects used a glass rainscreen for a multistory, impermeable, double-skinned exterior envelope incorporating passive ventilation in a 3-foot-wide cavity between the outer wall and inner skin structural wall where the thermal barrier is located—a technology developed in Scandinavia in the 1940s and used in Europe and Canada but unknown in the United States until recently.

Formal innovation in architecture is driven by social and technological change. In selecting material for *AsBuilt*, we are particularly interested in architecture that it would have been difficult—or impossible—to conceive and build without computers. Our aim is to include project materials that reveal something of what actually lies behind the physical making of architecture: its structure, material, and form; the much misapplied image of minimal construction; buildings which seem to consist of skin alone; or those that aspire to have no details. It is our intention that *AsBuilt* will contribute to a continuing conversation about architecture-as-building and the process of its realization emphasizing the rationale and development of architectural detail and the significance of drawings, however generated, for the act of creation. Except for press releases, most architects are not accustomed to writing about their projects, or documenting them for publication beyond basic general arrangement drawings: plans, sections, and elevations. It is the purpose of *AsBuilt* to offer practicing architects an opportunity to review how others draw and present their work. Because it is a series, the focus is on the long term and it is our hope that the presence of a venue for technical, formal, and material exploration will stimulate more architects to document their design and construction processes for publication. The twenty-five projects included in this first issue add a dimension to the way American architecture and architects are perceived by the general public and present solid evidence that the most recent renewal of architecture in America is well underway.

Christine Killory

AsBuilt

Sharp Centre for Design, Toronto, Ontario

Alsop Architects Ltd. and Robbie/Young + Wright Architects Inc. in Joint Venture

Alsop Architects Ltd., London, United Kingdom

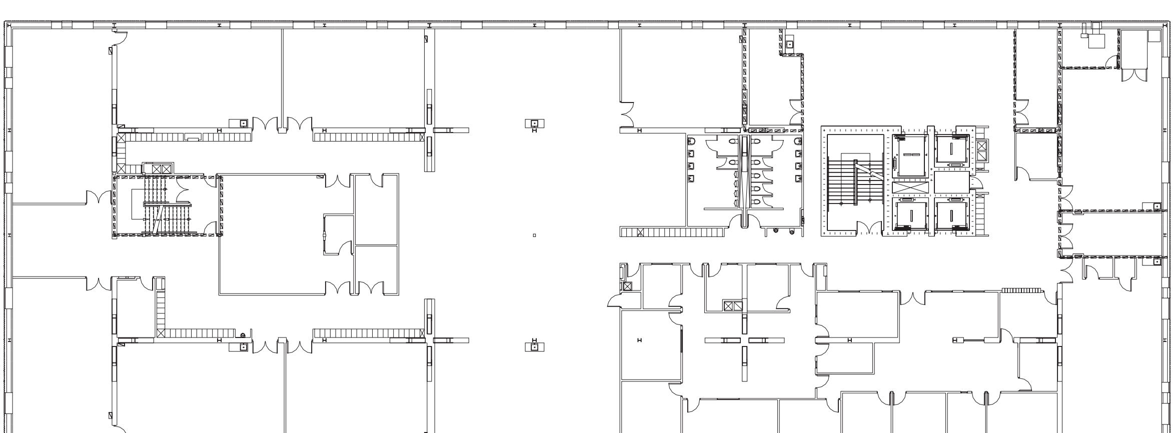
Robbie/Young + Wright Architects Inc., Toronto

The spectacular 80,000-square-foot addition to the extension of the Ontario College of Art and Design (OCAD) is a flying rectangle, or tabletop, on twelve steel columns housing art studios, lecture theaters, exhibit spaces, and faculty offices. The underside of the two-story volume is raised eight stories off the ground, unifying the existing brick structures underneath: Grange Park to the west and McCaul Street to the east. The rationale for raising the building 85 feet off the ground was to preserve views of Grange Park for OCAD's neighbors across McCaul Street. The void beneath the building also provides outdoor expansion space for the college's activities, a landscaped area that is an extension of Grange Park. Because the Sharp Centre is situated above the older main campus building, OCAD created an outdoor park space, connecting Grange Park to the McCaul Street neighborhood.

The tabletop is supported by a conventional concrete stair and elevator core as well as six pairs of tapering steel column legs, which touch the ground in an apparently random fashion. The core sits on twelve steel-reinforced caissons, 5 feet in diameter, extending 40 to 60 feet into the ground and an additional 5 feet into the bedrock. The six pairs of legs sit on five steel-reinforced caissons, each 8 feet in diameter. Also extending into the bedrock, the 100-foot-long hollow legs, originally fabricated for use as segments of a natural gas pipeline, are made of steel approximately 1 inch thick. Like all exposed steel in the Sharp Centre, the legs are covered with many coats of intumescent paint, a fireproofing material that swells when exposed to intense heat, increasing in volume and decreasing in density, to provide a protective cushion around each leg. Although all the legs are the same size, seven are multicolored and five are finished in black to make them appear thinner, an even more persuasive optical illusion at night when the black legs become less visible and seem to disappear; the architects wanted the building to have a completely different nighttime look. The bright red steel tube that connects the new addition to the existing brick college building is used as an emergency exit. As a cost-saving measure, what was intended to be a multicolored translucent cladding is instead a corrugated aluminum skin painted in black and white to resemble pixilation, a visual effect intended to blur the scale of the building and affect the way it is perceived.

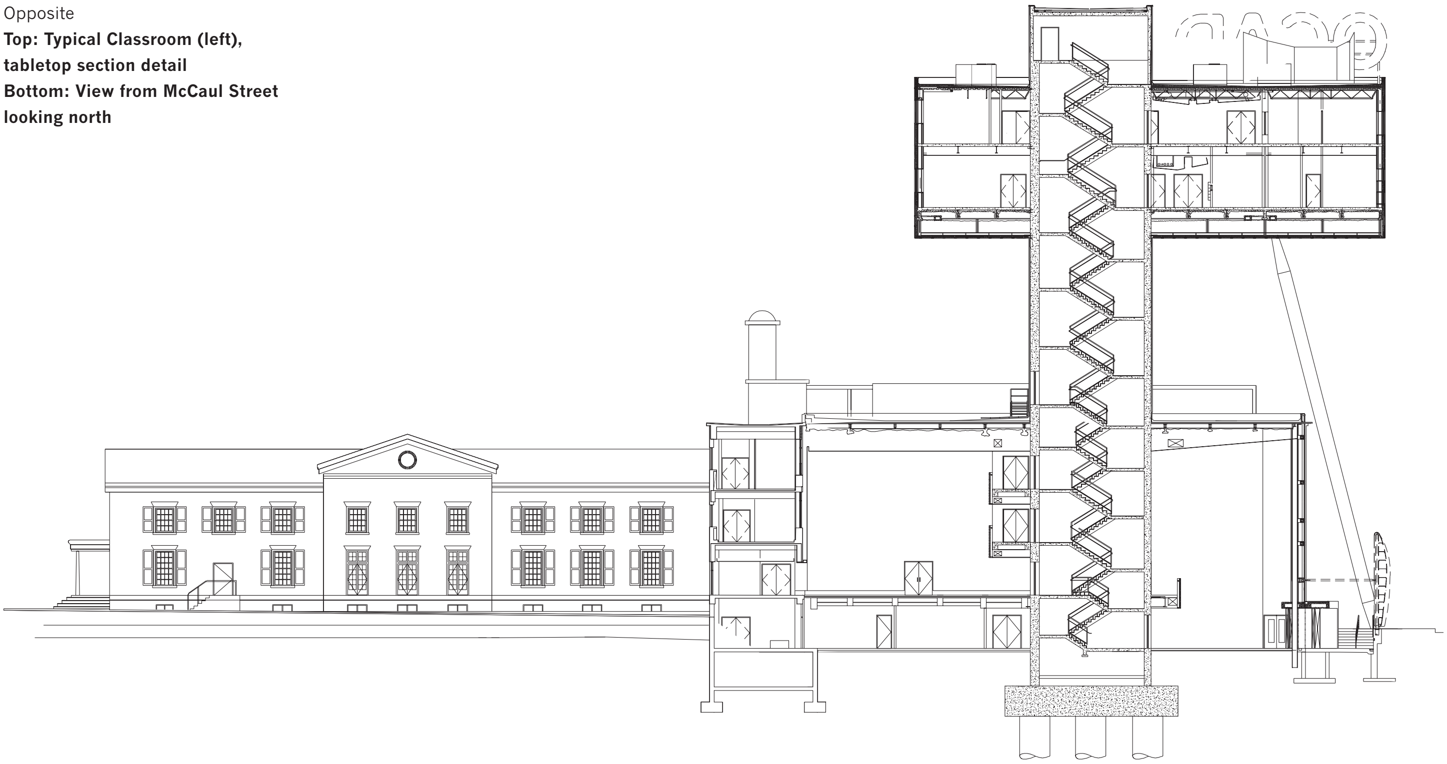
This page
Level 5 plan

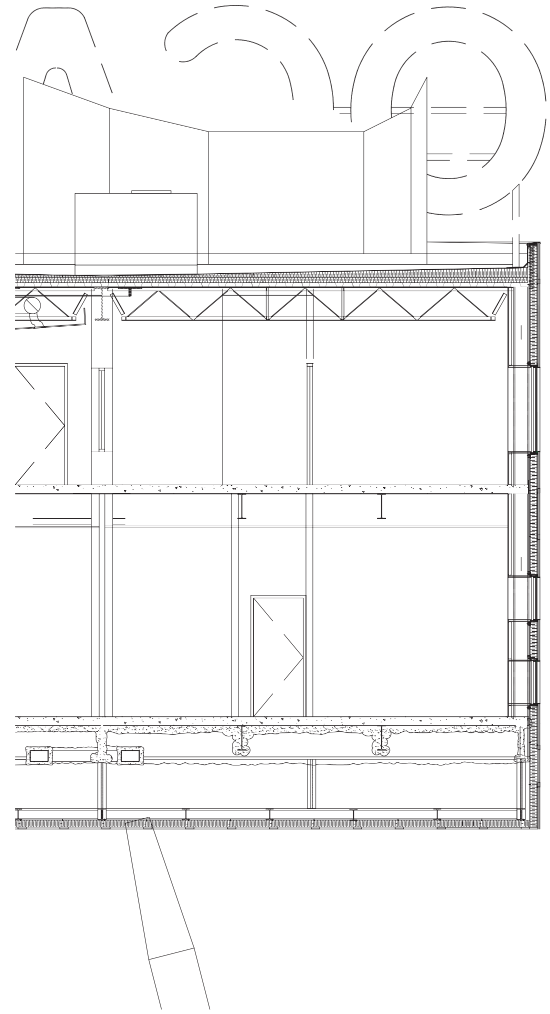
Opposite
Top: McCaul Street view south
Bottom: West elevation from Grange Park

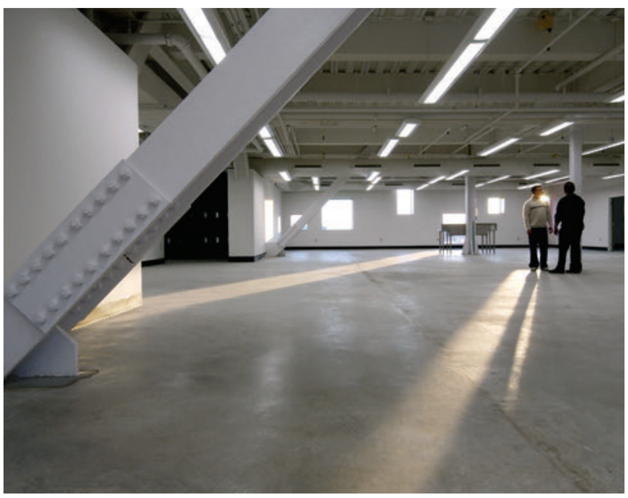


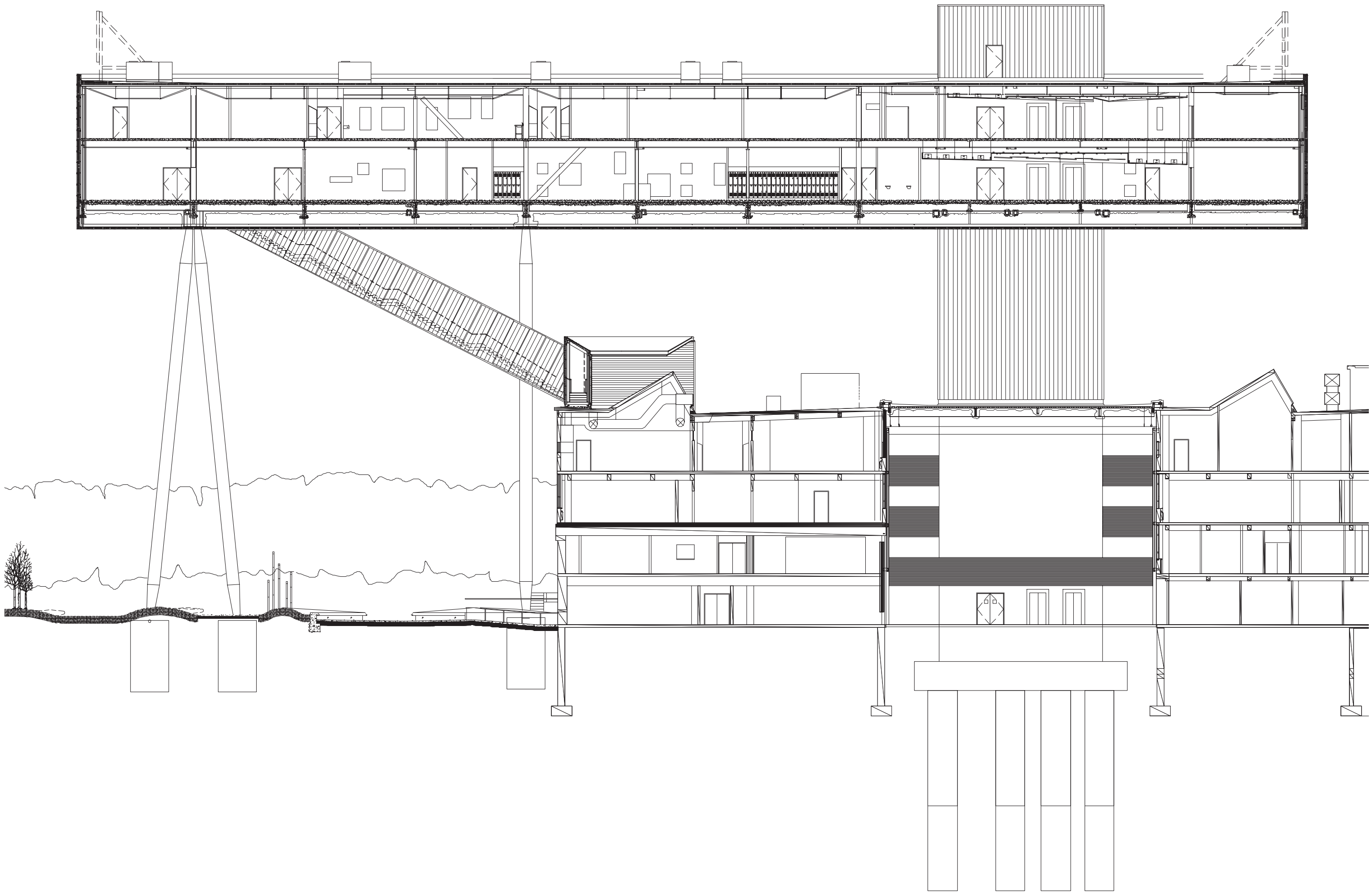
This page
Top: Tabletop cross section east-west
Bottom: Last legs installation

Opposite
Top: Typical Classroom (left), tabletop section detail
Bottom: View from McCaul Street looking north









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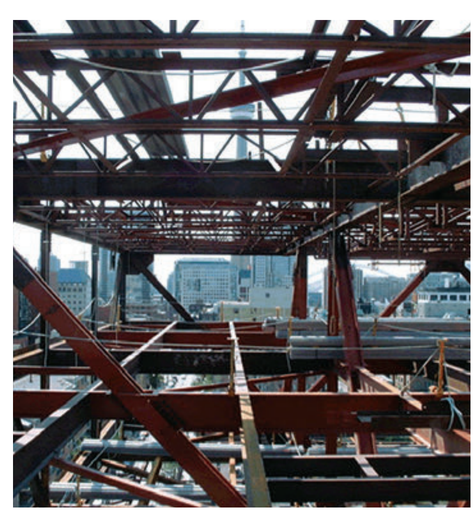
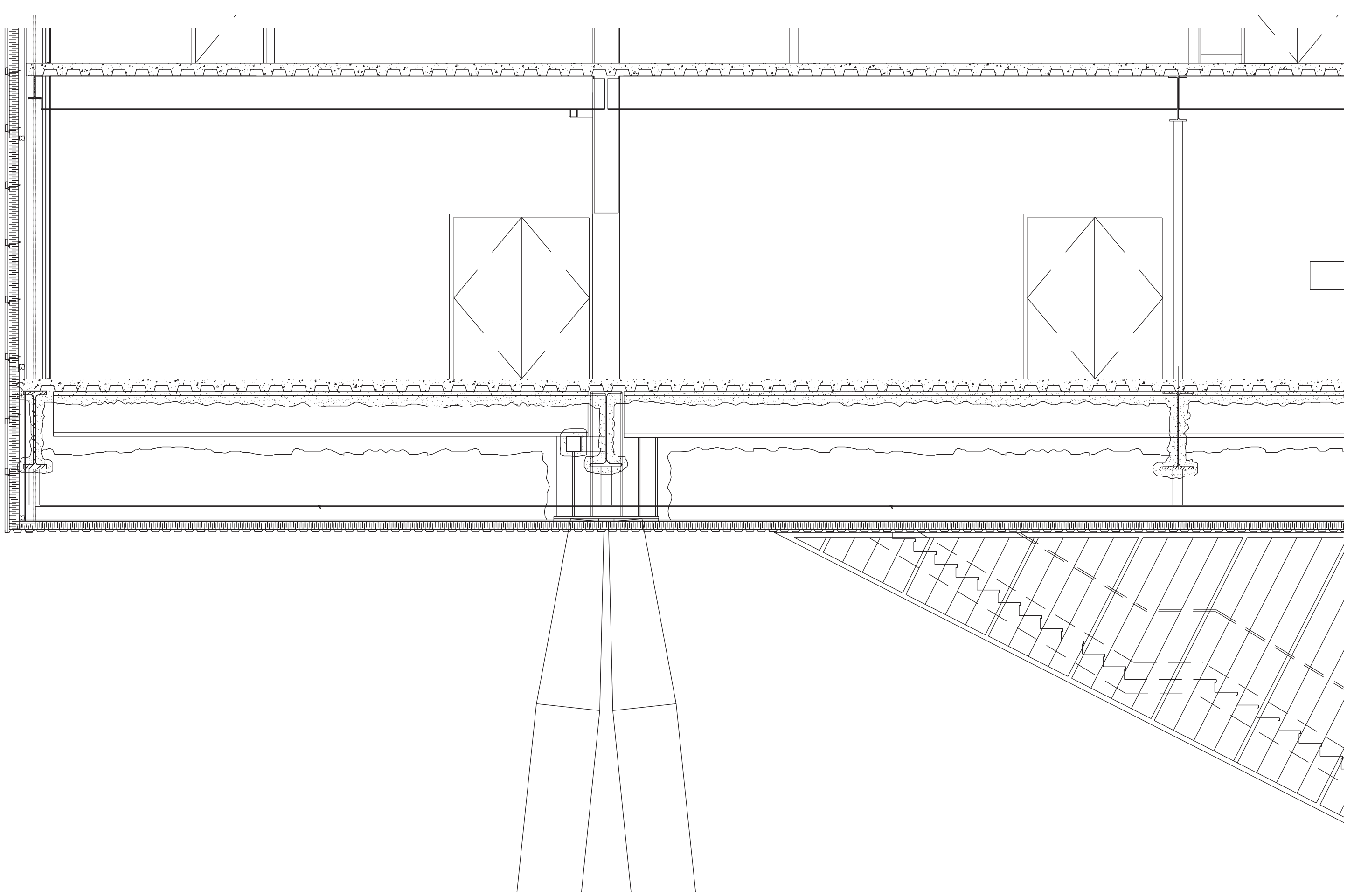
Top: Tabletop, longitudinal section, north to south looking west
Bottom (left to right): Lower keg connection, upper leg connection, tabletop framing view south

Opposite
Top right: Lobby
Bottom: Tabletop section detail





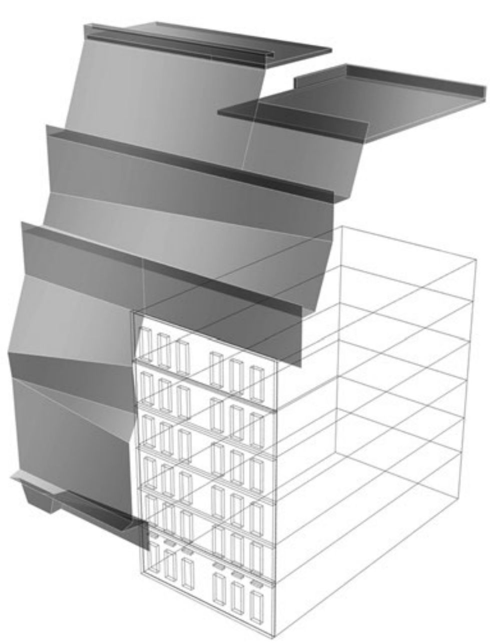
Greenwich Street Project, New York, New York
Archi-tectonics, New York

Architect of Record: David Hotson Architect, New York

The Greenwich Street Project includes the renovation of a six-story warehouse with a four-story penthouse added to the top, and the creation of a new eleven-story building, resulting in a total of twenty-three residential units as well as a commercial space on the ground floor. The west-facing main facade is a complex three-dimensional wall of transparent blue-green glass that cascades down the entire facade. The city building code allowed for a straight rise to a height of 85 feet and a building envelope setback of 1 foot from the street for every additional 2 feet-eight inches of height over 85 feet. Asymmetrical waves of glass move diagonally across the facade following the sloping profile of the setback angle.

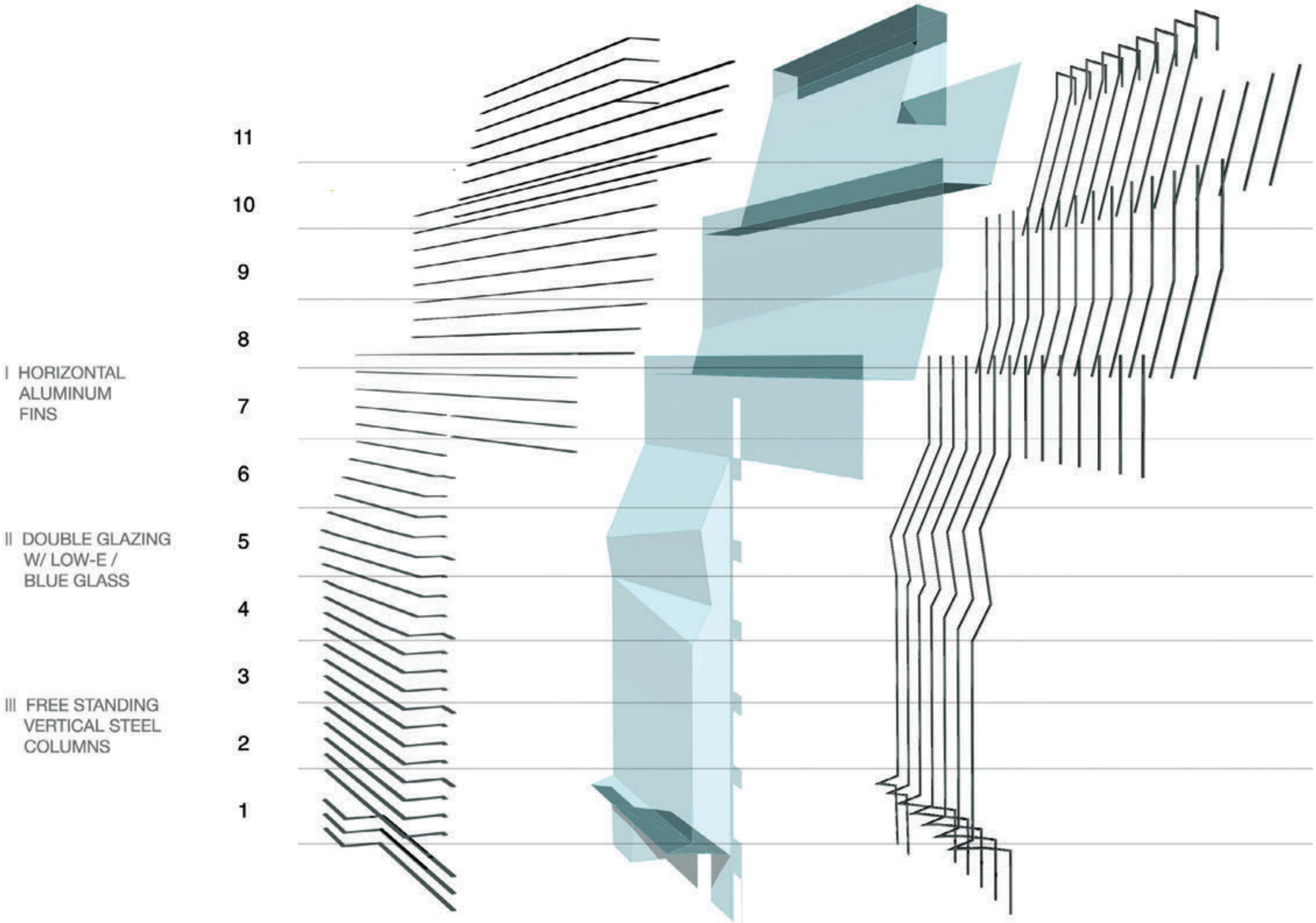
The complex geometries of the glass wall provided an engineering and fabrication challenge. Cricursa of Barcelona manufactured forty-three panels of insulating laminated glass consisting of a 1/4-inch-thick layer of tempered blue-green glass, a 1/2-inch air gap, and one layer of laminated glass comprised of two 1/4-inch-thick sheets of glass bonded together using a layer of polyvinyl butyral (PVB) film. The angled west-facing wall of glass has a low-E filter, a thin layer of metallic oxide applied to the third surface of the insulating glass to block radiant heat transfer and ultra-violet radiation. To create the folds in the glass, the manufacturer bent flat sheets of glass over molds, varying the temperature at which different areas of the glass were heated.

Curtain-wall manufacturer UAD Group and New York–based consultant Israel Berger & Associates modeled and engineered the complex curtain wall using CATIA to determine with precision the geometries of each glass panel and its relationship to the underlying substructure. Three principal groups of components were used to construct the curtain wall: sloping glass bend lines, three on the fourth, fifth, and sixth floors, and one on the ninth floor; inclined horizontal extrusions at four different degrees, 8, 14.99, 23, and the typical 90; and cambered floor edges. The layered facade consists of aluminum fins covering the joints between the glass panels and thermal breaks between them, the bent glass panels and freestanding steel columns spaced 7 feet apart. The horizontal glass panels, all less than 3 feet wide, are supported by steel S4 I-beams on either side of the building and bolted to the vertical steel lattice. Stainless steel rods are used as cross-bracing tensile members, reducing the thickness and visual impact of the steel columns. Awning windows hinged at the top in the glass wall satisfy a code-related ventilation requirement for residential buildings. To prevent sound from traveling from loft to loft through the multistoried crystalline skin, insulated aluminum panels fill the space between the floor slabs and the curtain wall. To further reduce sound migration between lofts, drywall on party walls is extended to overlap the curtain wall mullions.



This page
Facade model

Opposite
Curtain wall detail



This page
Top: Curtain wall components
Bottom (left to right): Curtain wall roof framing, curtain wall framing detail, gallery entrance

Opposite
Facade axonometric