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Indiana Limestone in Three Classical Buildings Today

La piedra caliza de Indiana en tres edificios clásicos actuales

O calcário de Indiana em três edifícios clássicos atuais

Abstract | Resumen | Resumo

This essay examines the contemporary use of Indiana limestone, a material employed in the United States for over two centuries for its durability and aesthetic qualities. Three recent Classical projects illustrate its versatility: the Chapel of the Holy Cross in Tampa (2018), featuring a Doric portico with monumental columns and carved reliefs; Christ Chapel in Michigan (2019), where massive limestone columns and entablatures support an unreinforced masonry dome; and Capstone Classical Academy in Fargo (2025), with an Ionic facade, inscriptions, and sculptural reliefs. In these applications, Indiana limestone serves as cladding, load-bearing masonry, or sculptural detail, demonstrating technical performance, dimensional stability, and an enduring capacity to embody Classical proportion and ornament in demanding climates.

Este ensayo analiza el uso contemporáneo de la piedra caliza de Indiana, un material empleado en Estados Unidos desde hace más de dos siglos por su durabilidad y sus cualidades estéticas. Tres proyectos clásicos recientes ilustran su versatilidad: la Capilla de la Santa Cruz en Tampa (2018), con un pórtico dórico de columnas monumentales y relieves tallados; la Capilla de Cristo en Michigan (2019), donde grandes columnas y entablamentos de piedra caliza dan soporte a una cúpula de fábrica no reforzada; y la Academia Clásica de Capstone en Fargo (2025), con una fachada de estilo jónico, inscripciones y relieves escultóricos. En estas obras la piedra caliza de Indiana se utiliza como revestimiento, fábrica portante o elemento escultórico, lo que permite demostrar su rendimiento técnico, su estabilidad dimensional y su capacidad para dar forma a la proporción y al ornamento clásicos incluso en climas exigentes.

Este ensaio examina o uso contemporâneo do calcário de Indiana, um material utilizado nos Estados Unidos há mais de dois séculos devido à sua durabilidade e qualidades estéticas. Três projetos clássicos recentes ilustram a sua versatilidade: a Capela da Santa Cruz em Tampa (2018), com um pórtico Dórico com colunas monumentais e relevos esculpidos; a Capela de Cristo em Michigan (2019), onde colunas e entablamentos maciços de calcário estruturam uma cúpula de alvenaria não reforçada; e a Capstone Classical Academy em Fargo (2025), com uma fachada Jônica, inscrições e relevos escultóricos. Em cada caso, o calcário de Indiana serve como revestimento, alvenaria de suporte de carga ou detalhe escultórico, demonstrando desempenho técnico, estabilidade dimensional e sua capacidade duradoura de incorporar proporções e ornamentação clássicas em condições climáticas exigentes.

Salem Limestone, commonly known as Indiana limestone (Siebenthal 1901), has been used in buildings for two centuries in the United States and continues to be an advantageous building material by virtue of its durability and beauty. This essay explores the application of Indiana limestone in three Classical buildings today, presented for their geographic variety, their recent construction, and their prominent use of cubic Indiana limestone. This stone has a consistency suitable for carving, withstands the elements, and can serve as cladding in large cubic pieces or else as a load-bearing material under axial compression in unreinforced masonry (Masonry Standards Joint Committee 2011).



1. Map of the continental USA showing Indiana quarries (Q) and the project locations: (1) Tampa, Florida, (2) Hillsdale, Michigan, (3) Fargo, North Dakota

2. Lawrence County Quarry (Cindy Cornett Seigle)



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Bybee Limestone Company, Indiana



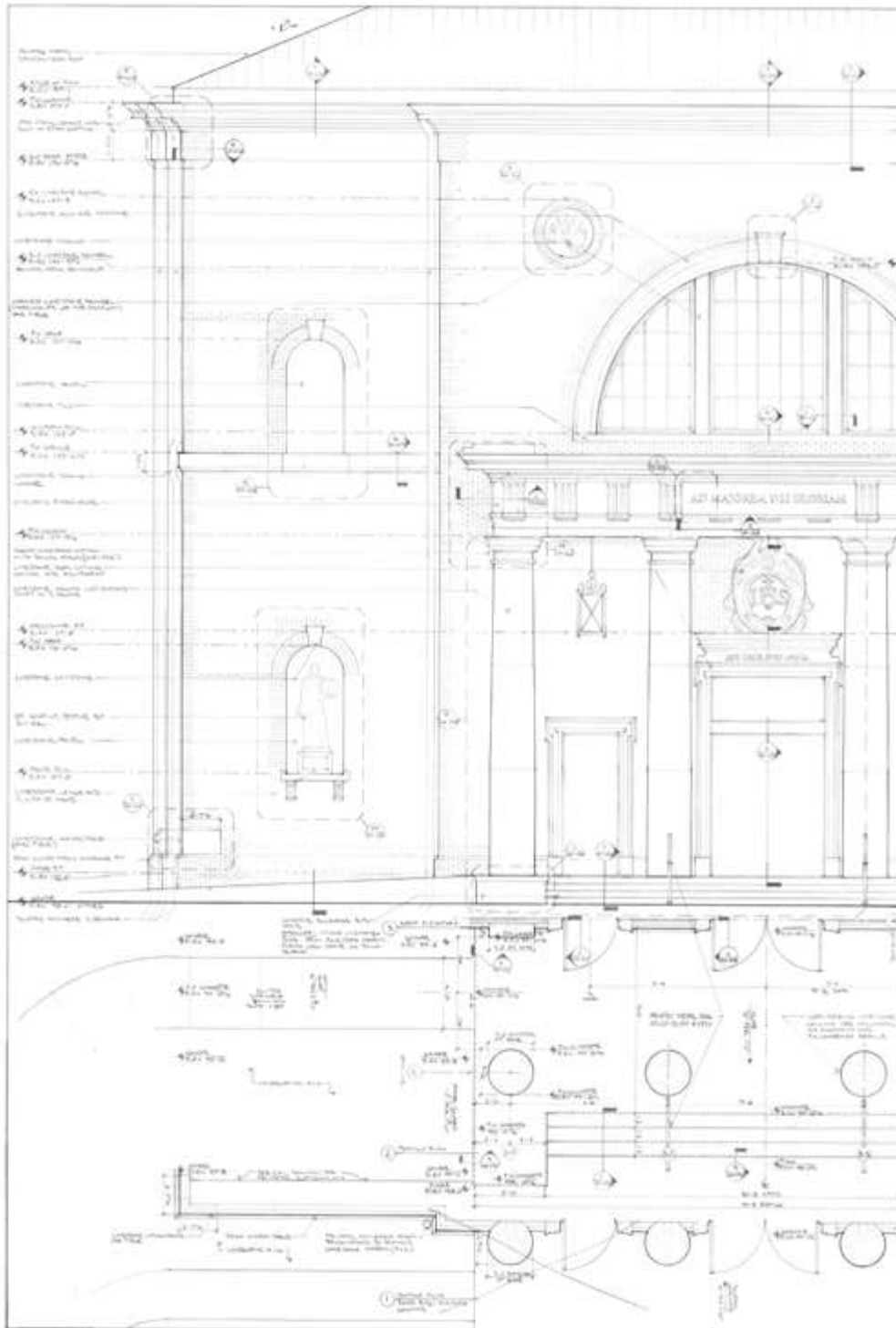
Buff, gray, and variegated Indiana limestone (polycor.com)



Fabricated limestone pieces at Bybee Limestone Company, Indiana

Chapel of the Holy Cross in Tampa, Florida

The Chapel of the Holy Cross in Tampa, Florida, was dedicated in 2018 and employs Indiana limestone in large cubic pieces. The chapel's brick and limestone veneer reflects the color palette of the existing campus, and its significance is marked by a lantern and gold cross on the roof along with a tetrastyle portico on a symmetrical facade. The facade details are all carved in Indiana limestone. The stone specified by the architect was "variegated", which allows the fabricator flexibility in sourcing the blocks.



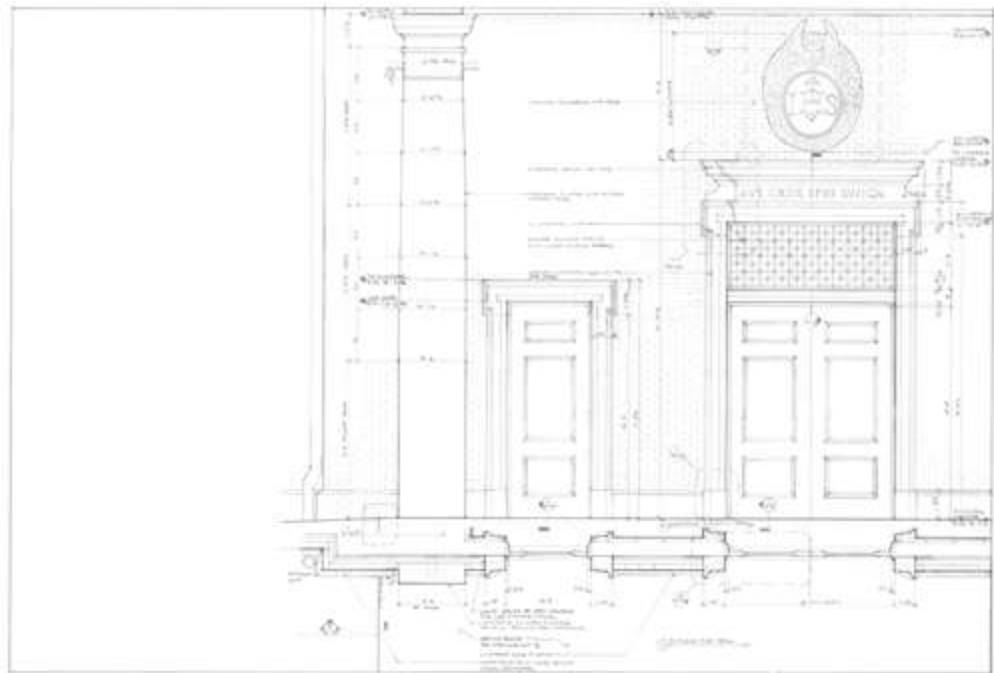
Facade details at the Chapel of the Holy Cross

The facade is articulated with a Doric portico of freestanding limestone columns, 732 cm in height and 91 cm in diameter, stacked in three drums. The Doric order was selected because the chapel is dedicated to the Cross of Christ, and moreover the Jesuit campus is educating young men. Vitruvius proposed that the Doric column exhibits male proportions, strength, and grace, and thus that this order's simplicity of ornament is appropriate for certain temples (Schofield 2009).

Over the entrance is carved the motto *AVE CRUX SPES UNICA*, and above that is a large limestone coat of arms bearing the letters *IHS*, monogram of the Society of Jesus. While the inscription is



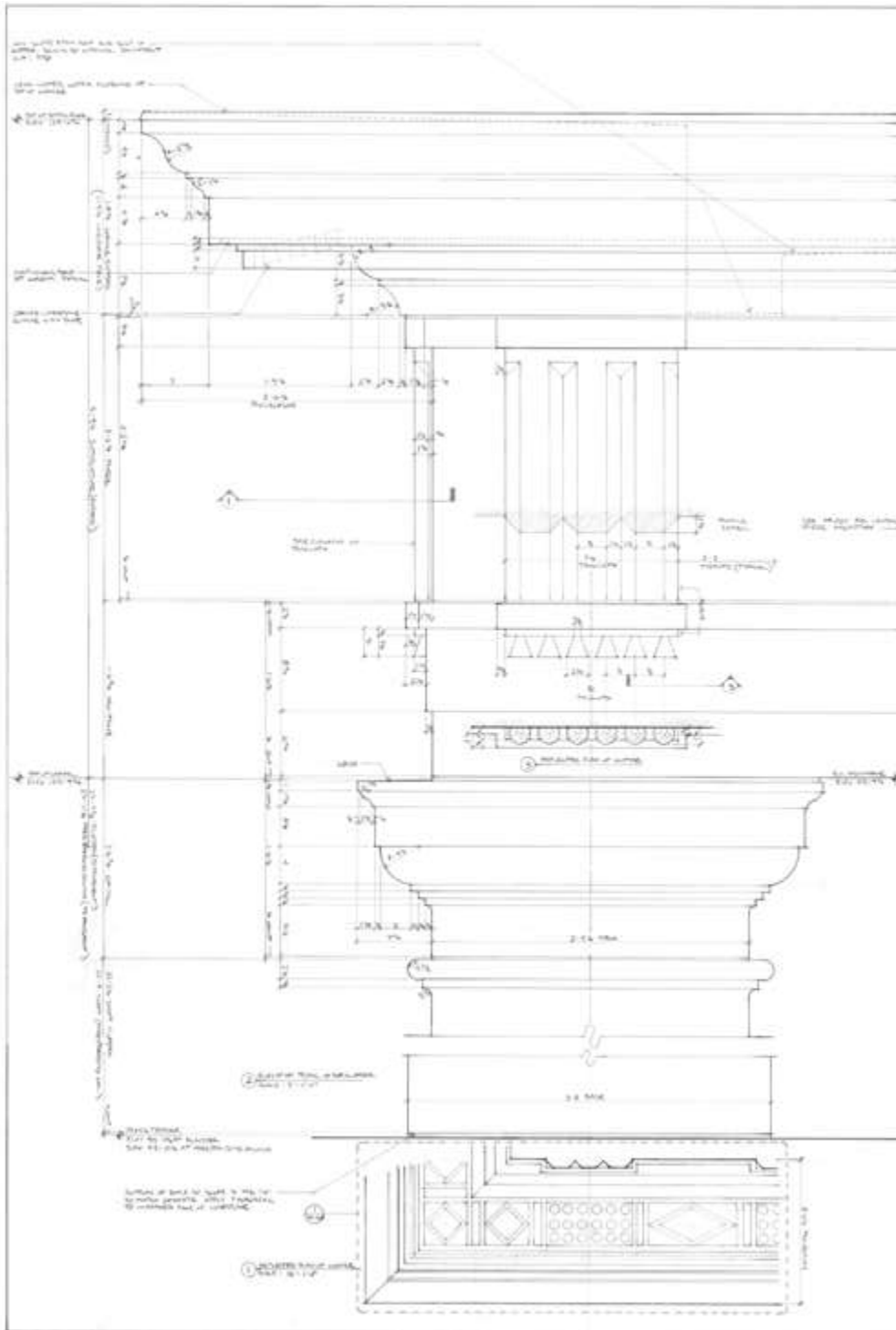
Chapel of the Holy Cross
(Timothy Hursley)



Drawing of a pilaster with entasis at
the Chapel of the Holy Cross

incised into the stone, the coat of arms is carved with raised relief and lettering, finished by hand and completed in a single piece over 180 cm tall.

The Doric columns and entablature are proportioned according to Andrea Palladio's guidelines in his Four Books of Architecture. The bottom column drum is two modules in diameter and bears on a concrete foundation. Each subsequent drum is pinned with stainless steel dowels. The entablature height is proportioned as one quarter that of the columns, so here it is 183 cm. We designed the cornice stones to sit extra deep and rest not only on the stone frieze but also on the steel beams trabeated between the columns.



Portico entablature at the Chapel of the Holy Cross

Normally the raw cubes of stone from the quarry measure 122 cm by 122 cm by 244 cm. When cutting limestone, some fabricators prefer fewer large pieces rather than many small ones, as there can be less waste from each block. Fewer but larger pieces can also simplify the overall preparation and installation. The cornerstone was crafted in Indiana limestone with incised lettering, V-cut with a recommended 2.5 cm minimum height.

We designed the limestone string course to wrap the chapel's tall brick volume and as a spring point for the arcuated windows, limestone archivolts, and limestone facade niches. The string course is set in the brick coursework and allows for an uninterrupted wall cavity behind. It strengthens

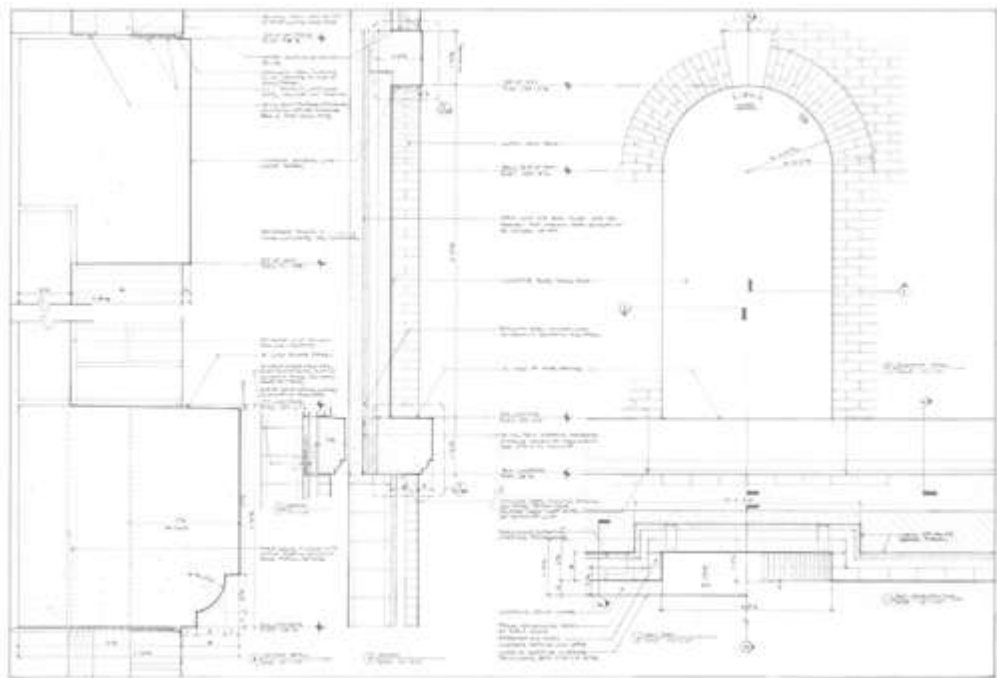


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- 1. Cornerstone laying at the Chapel of the Holy Cross
- 2. Coat of arms during initial rough-out carving by CNC



Drawing of the string course at the Chapel of the Holy Cross

the geometric ordering of each elevation by dividing the chapel walls into portions. The Tampa sunshine and rainfall have weathered the variegated limestone surfaces, gradually making them more homogenous. The initially strong gray striations on the columns have faded and the portico now appears more uniform. The chapel walls and columns have withstood four Florida hurricanes in the last several years, most recently Hurricane Milton.

Christ Chapel in Michigan

A second project is Christ Chapel in Michigan, dedicated in 2019. “Variegated” Indiana limestone was specified for the exterior and “rustic buff” for inside. The portico centerpiece is of freestanding limestone columns supporting a masonry dome spanning 9.75 m and each weighing some 11,800 kg. Above is a curved denticulated Doric limestone entablature. Each curved architrave and frieze piece bears on mortar joints at the top of the column and fits around a steel plate and tube supporting a tension ring, metal deck, and copper dome roof. The brick dome is unreinforced and works naturally in compression. The masonry contractor used centering formwork, removed slowly and uniformly once the limestone rosette “keystone” was in place and the 2.5 cm mortar parge topping had cured.

The main entrance is framed with a curved limestone surround and crowned by a concave curved pediment with hand-carved modillions. Indiana limestone is especially consistent in grain for detailed carving such as in the brackets supporting the cornice given its properties as a “free stone”, meaning it has uniformity of composition and texture without pronounced cleavage planes. The weather barrier and insulation run continuously behind the limestone at the structure’s surface.

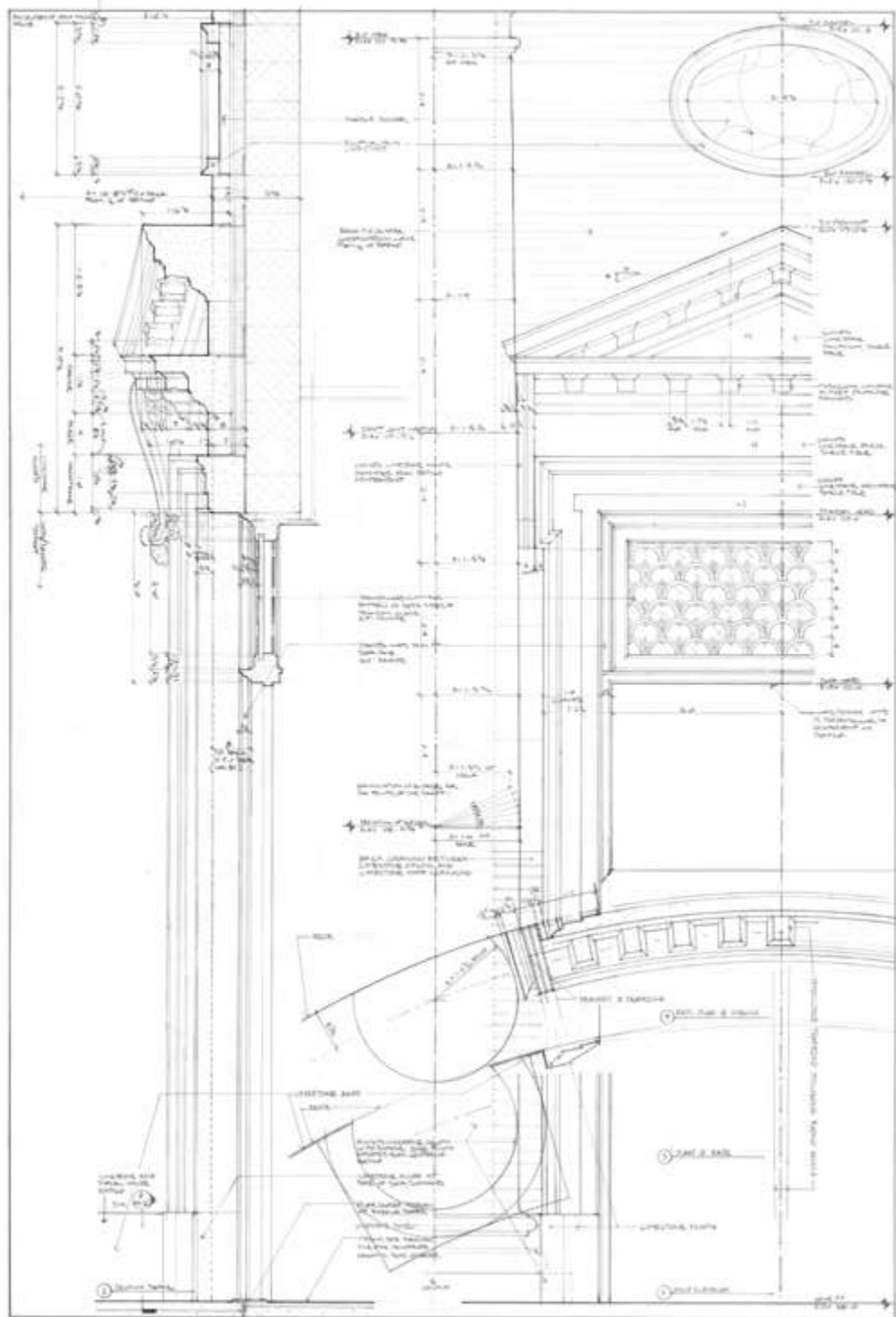
At the side elevation, Doric pilasters are articulated in brick with limestone bases and capitals integrated with the masonry coursing. The pilasters are of multi-wythe brickwork. At the apex of the 9.75 m windows are limestone keystones supported by brick arches which transfer the veneer load to the remaining wall below.



Facade at Christ Chapel
(Francis Dzikowski/Otto)

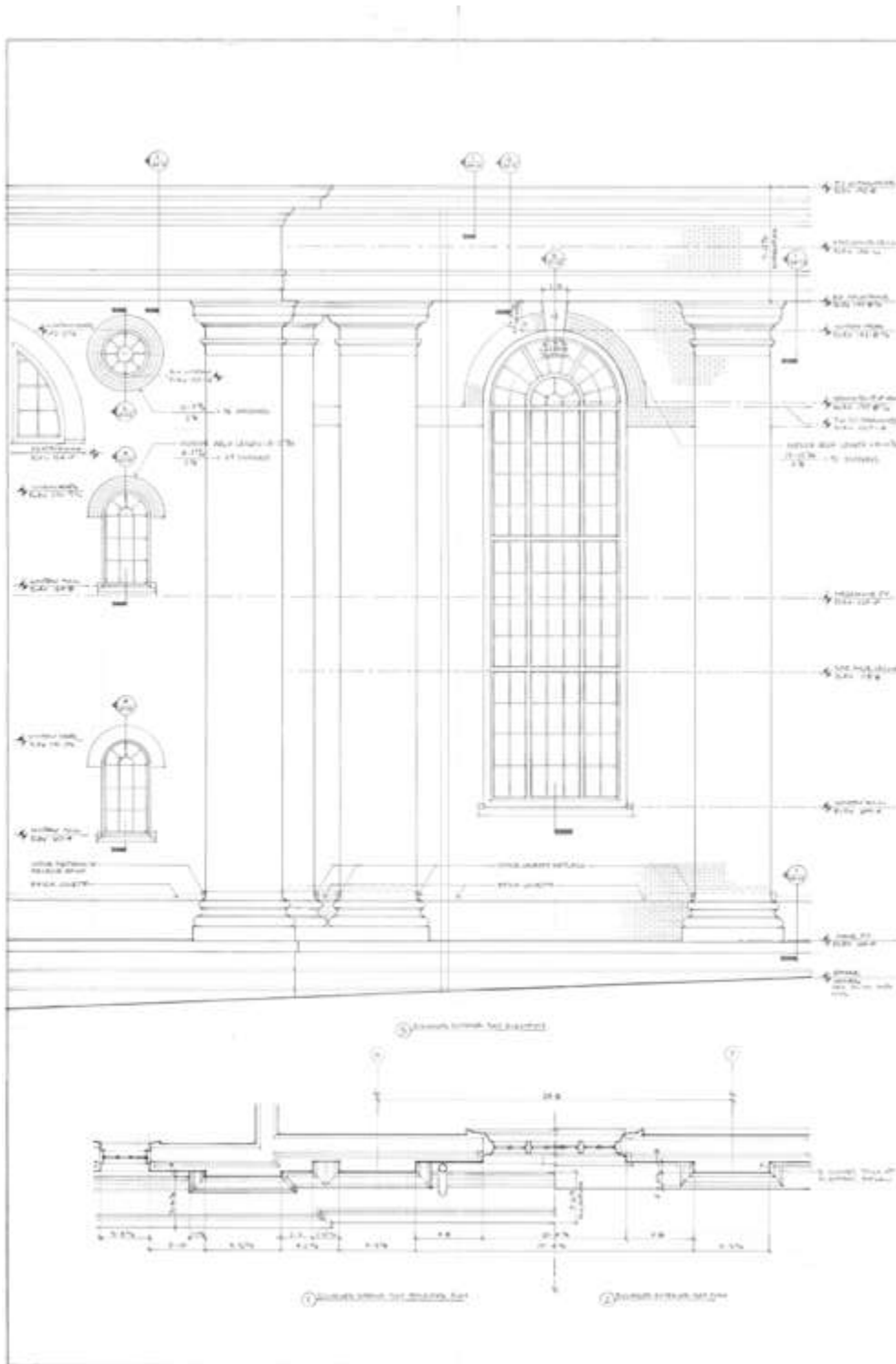


Side elevation at Christ Chapel
(Francis Dzikowski/Otto)



Curved limestone entrance surrounds at Christ Chapel

Exterior limestone cladding can be of large cubic blocks or small veneer pieces. In a non-seismic zone the limestone pieces can be supported in compression by the masonry veneer below (Masonry Standards Joint Committee 2011), but they need to be anchored to a structural back-up wall for lateral support against wind loads and differential movement in clay-brick veneers. At Christ Chapel, the structural back-up is of concrete masonry units, which exhibit shrinkage through the initial seasons with exposure to carbon dioxide. Given the differential movement and volume changes in brick, limestone, and back-up walls, anchors should be placed under specialist guidance.



Side elevation bay at Christ Chapel

The nave's limestone columns are structural and support the live load of the side gallery seating as well as the chapel roof. Steel beams from the exterior wall rest in a side pocket in each stone column. On top of the limestone capital is a base plate for a steel column reaching to the beams of the roof. Limestone in compression behaves similarly to unreinforced concrete.

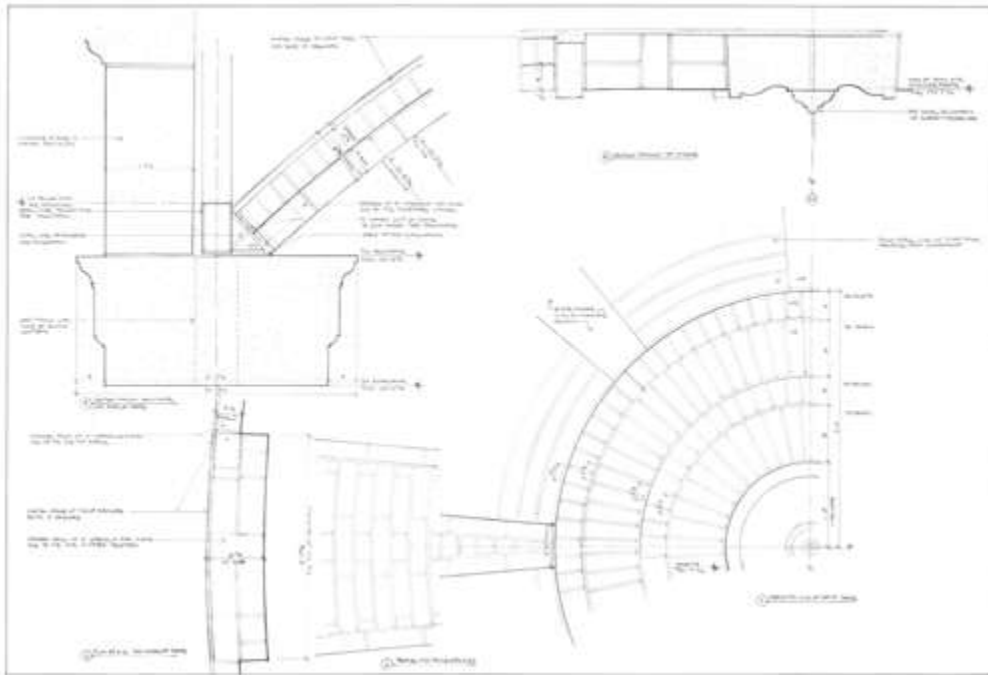
1. Erection of the portico dome shoring at Christ Chapel
2. Carved limestone bracket in progress for the front entrance at Christ Chapel



Portico at Christ Chapel
(Francis Dzikowski/Otto)



Portico dome at Christ Chapel
(Francis Dzikowski/Otto)



Dome section details at
Christ Chapel

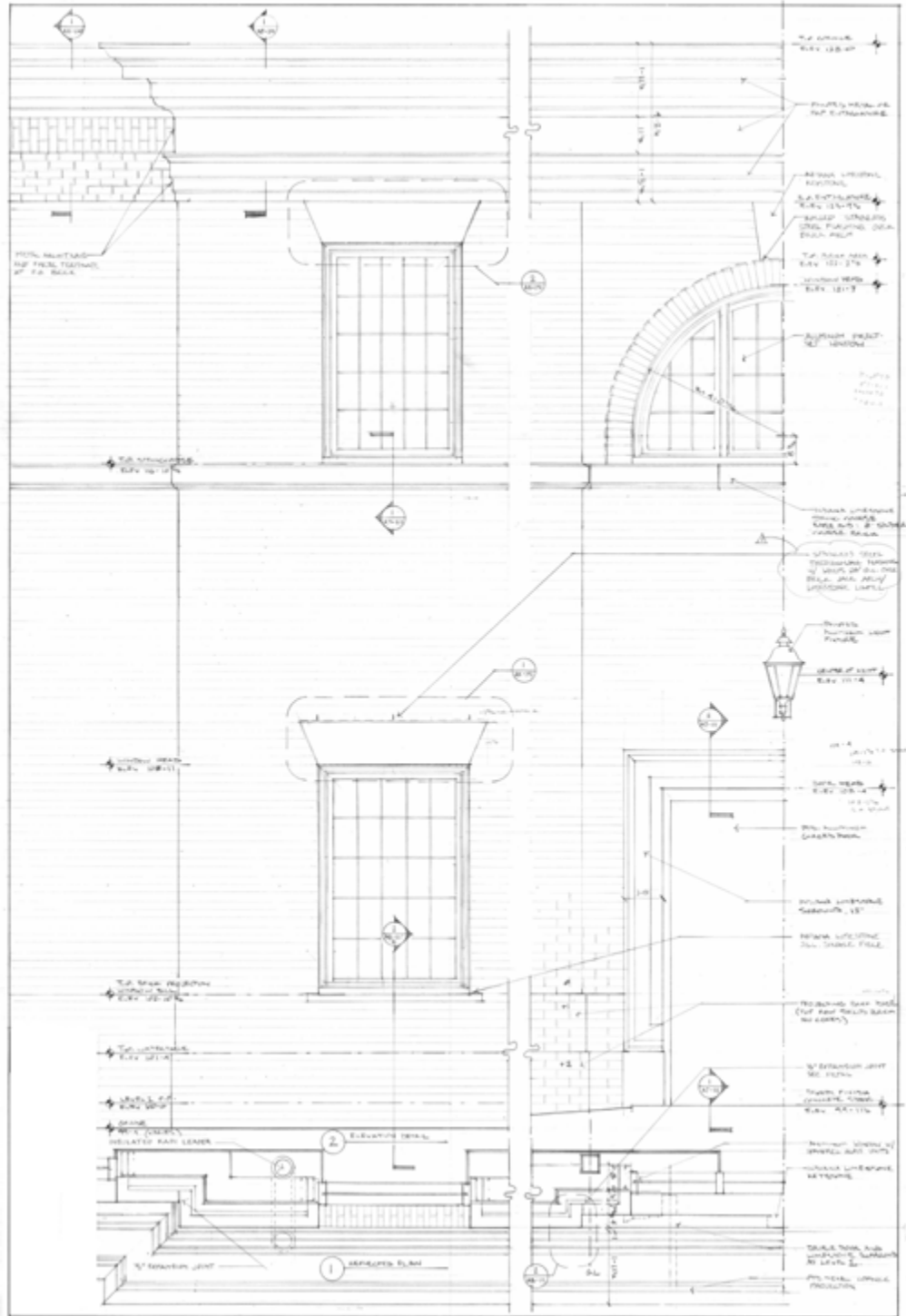
Capstone Classical Academy in Fargo, North Dakota

A third project is the Capstone Classical Academy in Fargo, North Dakota, completed in 2025. The limestone pieces are “variegated” and cut to a smooth finish. The facade columns are Ionic, nine diameters tall as recommended by Palladio. This order originated in Ionia with the construction of a temple to Diana inspired by woman’s slenderness, ornament, and proportion (Rowland and Howe 1999). The volutes of the capital are like locks of hair, and the column has an “attic” base profiled in limestone. The V-cut inscription in the entablature frieze is a verse from the Gospel of John. At either side of the inscription are hand-carved raised laurel crowns. Two figures in relief by the Scottish sculptor David Mitchell represent the philosophers Aristotle and Thomas Aquinas.

Window and door openings are spanned with brick arches and limestone lintels. The architect designed the lintels to be 18 cm thick for increased bearing capacity and modulus of rupture. Flexural tension stress from the lintel and veneer weight above runs parallel with the bed joints at either jamb side.



Capstone Classical Academy,
completed in 2025
(Francis Dzikowski/Otto)



Fenestration drawing for Capstone Classical Academy

The stone door surrounds are proportioned to be no thinner than one sixth of the opening width, as recommended by Palladio. In Fargo the material proved its dimensional stability and durability through two winters of construction. Resilient to weathering and with high internal elasticity, Indiana limestone endures great variations in temperature.

These three recent projects illustrate how Indiana limestone can be used in Classical proportions and ornament, and in a way that withstands the elements, whether as cladding integrated into a masonry cavity wall or as load-bearing column drums. Indiana limestone has proven to be one of the most durable natural building materials over two hundred years of continuous use in America.



Capstone Classical Academy
(Francis Dzikowski/Otto)

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Biography | Biografia | Biografia

Thomas D. Stroka

Thomas Stroka is a registered architect at the firm of Duncan G. Stroik Architect and has served as Adjunct Assistant Professor of Architecture at the University of Notre Dame. Thomas has been practicing for fifteen years, executing projects under the direction of the principal. Thomas likes to work on civic buildings and believes in the timelessness of Classical architecture and the durability of traditional materials such as Indiana limestone. The firm drafts construction drawings by hand and attempts an architecture that may seem worthy to future generations. Thomas lives in South Bend, Indiana with his wife and children.