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City of Brick: Spatial and Material Explorations in 21st Century Urbanism

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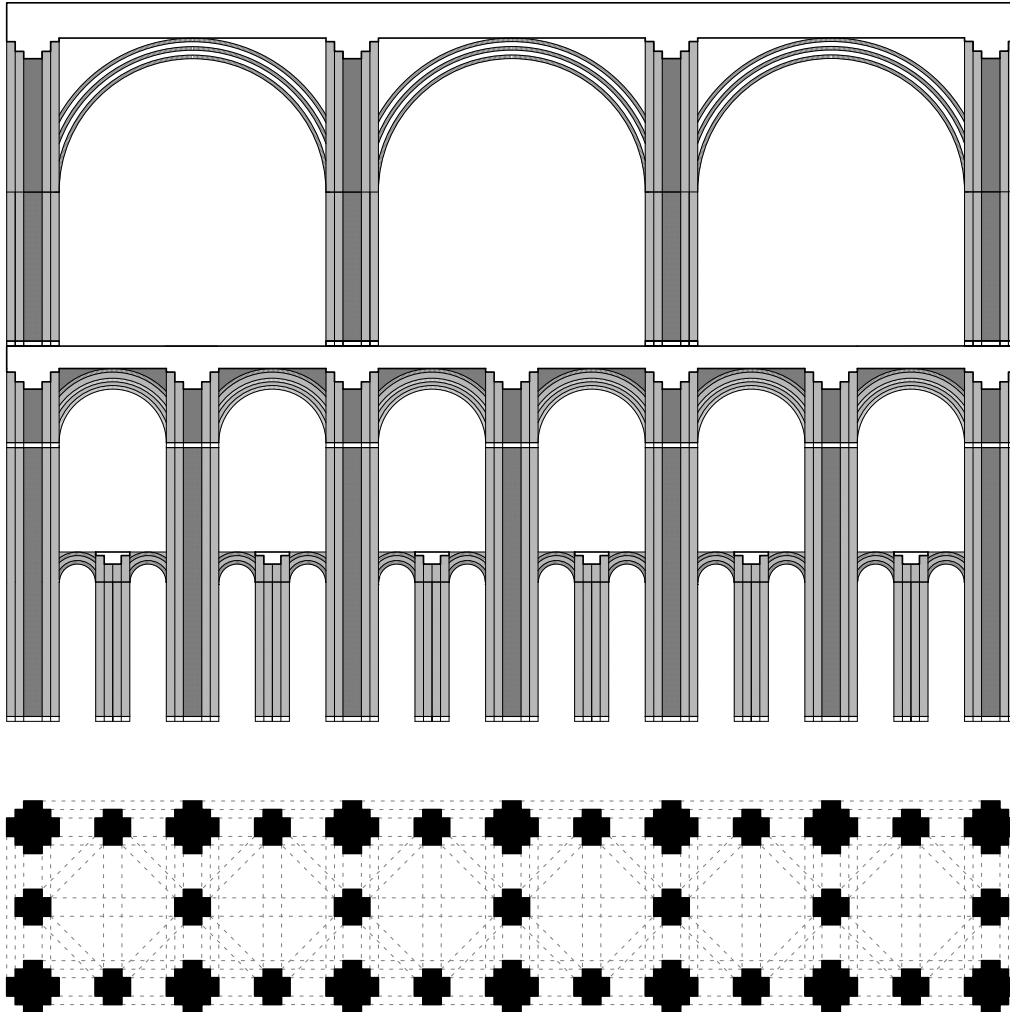
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^^^

Student(s)' Name(s) _____William Collins_____

Advisor's Name   Prof. Jean-Francois Bedard, Prof. Junho Chun, Prof. Roger Hubeli_____

I have reviewed the final version of the Thesis Prep Document or Thesis Document (PDF) to be submitted by the above named student(s) and approve it as meeting the requirements for thorough documentation of the components, ambitions, critical development and outcome of the project presented at the final review.

Advisor's Signature ___For the Committee_____   Date __01/11/2018_____

City of Brick:

Spatial and Material Explorations in 21ˢ Century Urban Devleopment

Thesis Preparation | Fall 2018
William Collins | Advisors Prof. Jean-François Bédard, Prof. Junho Chun, Prof. Roger Hubeli

Thesis Prep. Presentation
Fall 2018
William Collins

Thesis Advisors: Prof. Jean-François Bédard, Prof. Junho Chun, Prof. Roger Hubeli

THESIS STATEMENT

The project I'm proposing, *City of Brick: Spatial and Material Explorations in 21ˢᵗ Century Urban Development*, will analyze the problem of and propose an alternative to the supertall residential tower in the contemporary city. There is a trend in the American city toward the construction of certain 'prestige' projects, namely, supertall skyscrapers with a purely residential function. This is not to say that they are only comprised of units; rather, all programmatic function is at the exclusive service of the residents. The residents themselves do not necessarily live in the particular city in which these towers are located. More often than not, they are members of the global super-rich who purchase units in these towers as investments. This phenomenon is well-documented in the spacious floorplans of these towers; for example, 432 Park Avenue in New York City, though it is the tallest residential building in North America, only contains 104 units.[1]

The continued construction of these projects represents an existential crisis for the contemporary American city for two reasons. The first reason is the exponentially growing premium placed on urban property. Projects like 432 Park Avenue, built not to accommodate density but to create what is, in effect, a vertical suburb, only drive property prices and rents upwards. As cities are still financial and commercial centers that require a growing middle-class workforce, it is suicidal to continually build projects that artificially drive up property values to untenable levels and drive it out.

The second reason lies in the programmatic deserts that these projects create. The conventional morphology of the American city has always encouraged the integration of commercial and residential programs, even at the upscale end of the spectrum; one only has to look at lower 5ᵗʰ Avenue in Manhattan, or any of lower Manhattan for that matter, to recognize this. Instead, the towers are not agents in the city, but monuments (in the sense that they serve no interactive function). This tears at the sense of community necessary for a healthy city, drives people away and ultimately creates an urban "dead zone."

Through my thesis, I will propose an alternative to the prestige residential tower. To this end, I will look to the opportunities for formal and spatial generation presented by new material and construction systems. Through their employment, I seek to avoid the problem of the programmatic desert—it will be flexible enough not only to allow for dense units of habitation, but also for the integration of public programming.

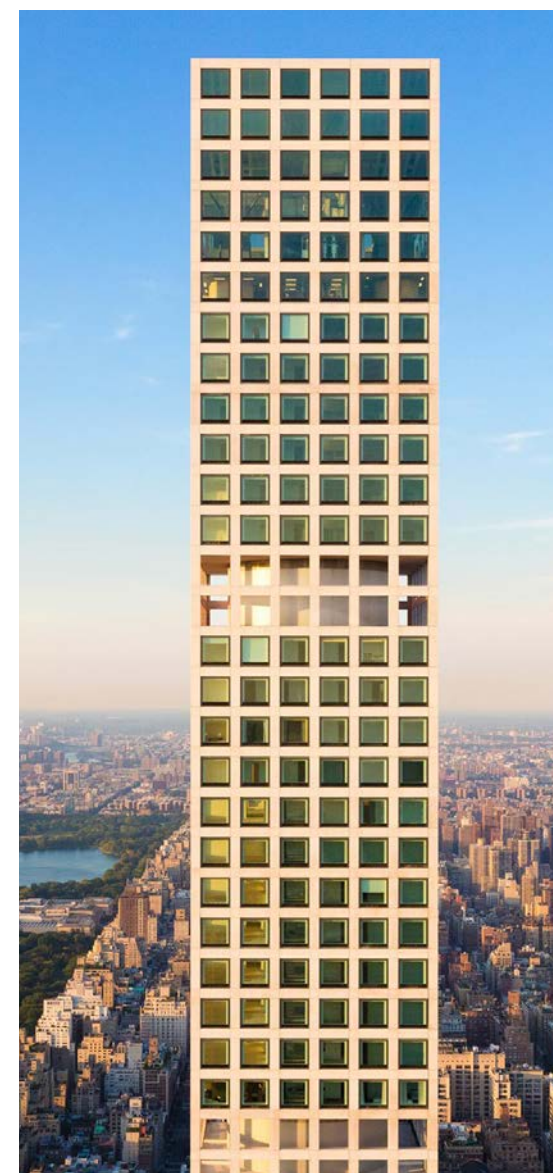1. Keith Williams, " The evolution of Hudson Yards: from "Death Avenue" to NYC's most advanced neighborhood," Curbed.com https://ny.curbed. com/2016/12/13/13933084/hudson-yards-new-york-history-manhattan (Accessed December 10, 2018).

BACKGROUND

The United Nations announced in 2018 that, for the first time in recorded history, over half of the world's population resided in cities. While certainly representing a critical threshold in terms of anthropology, for the architect this moment is not surprising and has long been anticipated—by some with breathless excitement, and by others with apocalyptic resignation. The modernists of the previous century rejoiced at the opportunity for hyper-dense places that standardized every aspect of life. The proponents of new urbanism rejected this movement as impersonal and distopian, and moved away from programmed density towards a traditional model of decentralized, pre-industrial community building. Both responses were utopian in their own ways—one rigidly functionalist, the other historicist.

Through the present day, cities have continued to be economic and financial centers, requiring a large population of white collar, middle-class workers to sustain them. Recently there has been a trend in major American cities, especially Manhattan, where many of the major buildings built as "residential" structures neither house nor support this growing population. Instead, projects like 432 Park Avenue cater to wealthy, often foreign magnates as investment and prestige properties; the only architectural agenda behind them being the maximization of column-free floor space.

However, as Rafael Viñoly, the architect behind 432 Park Avenue said concerning his project, "There are only two markets, ultraluxury and subsidized housing."[2] While it is the tallest residential tower in the northern hemisphere, it only consists of 104 units, most of which are empty. I object to this type of "prestige" development on two fronts: the first, that these prestige properties do nothing to solve the problem of the growing urban population and are, in essence, vertical suburbs that, by virtue of their low density, drive up property values and rents so high that the average person cannot afford them. The second is that buildings like this do not connect to the context. There is no public function, as is traditional in urban architecture, and therefore contribute to a stasis in the urban fabric. These are the problems that I am attempting to solve through my explorations. At a time in which the city is still a regional, if not global economic engine and the urban population is growing, these prestige projects are literally killing cities and relegating the middle class workers, who drive the urban economy, to the periphery of the city.

2.Rafael *Viñoly* in Keith Williams, " The evolution of Hudson Yards: from "Death Avenue" to NYC's most advanced neighborhood," Curbed.com https://ny.curbed.com/2016/12/13/13933084/hudson-yards-new-york-history-manhattan (Accessed December 10, 2018).

3. Photographs from 432parkavenue.com

I. PRECEDENT STUDIES

The precedents selected, though from different points in history, teach certain lessons that are useful to understanding the alternatives to the problem that I have set out to solve. Each represents a different strategy toward density, the relationship of part-to-part and part-to-whole, relationships between differently programmed elements, all within the framework of a formalist design according to behavior, ritual, material and systems of construction. The precedents that I have elected to present here are the Certosa di Galluzzo, Certosa di Pavia, Mezquita de Córdoba, "Biblioteca per il nuovo campo universitario," Temple at Kailasa, Palace of Diocletian and the Monadnock Building. Each precedent is curated in a way that builds on the previous; that is, the important elements and lessons to be learned in one precedent is added to in the next.

The first precedents I looked at were charterhouses—monasteries belonging to a particular order of Catholic monks that emphasizes private religious devotion. As such, these monasteries integrate public programming, where the general public is allowed, semi-public, smaller-scale programming where the monks come together as a community, and finally individual dwelling spaces. What's more, the rhythm of this life is spatially organized along formal grids that are then programmatically aggregated together, forming a specific relationship between public programming, surrounded by a screen of semi-public programming and finally by private spaces. This informs the programmatic relationships in my project.

The next critical precedent examined was the Mezquita (Mosque-Cathedral) de Córdoba. The mezquita consists of a hypostyle space, in which various programs were inserted after the reconversion of the mosque into a Cathedral. What's interesting here is the relationship between constituent parts to the whole of the hypostyle space, and the temporal aspect of the programs—that new programs may continue to be inserted into the space as the need arises. This informs the basic formal structure of my project.

The "Biblioteca," Temple at Kailasa and the Palace of Diocletian present interesting ways at demarcating and arranging program—specifically, along multidimensional formal grids, according to mass, and employing additive and subtractive means of aggregation.

In addition, I am very interested in the opportunities presented by brick as a system of construction and therefore chose Chicago's Monadnock building as a materials precedent. While brick had been used as a construction material in late 19th Century skyscrapers, it was of limited use and required the employment of incredibly thick walls on the lower floors. In recent years, brick technology has progressed so much that, due to intense compression of the brick at microscopic levels during manufacturing, bricks, in combination with structural mortar, are now able to behave in a way similar to that of steel—allowing for large spans and heights without the use of a steel skeleton or really thick lower walls—something my project tries to take advantage of.
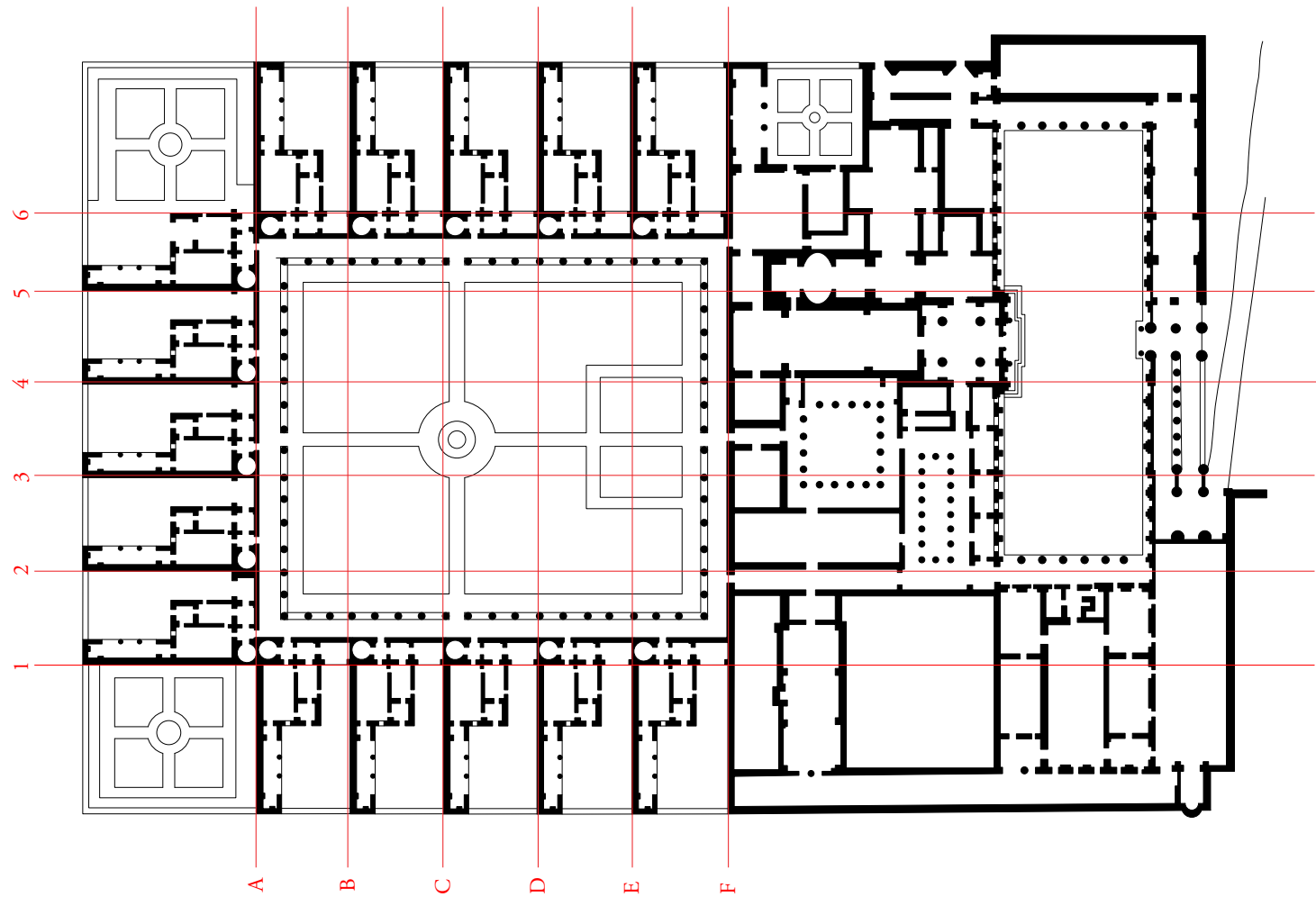
CERTOSA DEL GALLUZZO

Certosa del Galluzzo (*Charterhouse of Galluzzo*) is a monastery located outside of Florence, Italy. The monastery was commissioned by the Carthusians, an order of monks that follow a very strict *regula* that emphasizes humility in solitude. As such, full monks observe a vow of silence and are expected to be self-sufficient, only convening in certain spaces for simple meals and to mark the liturgical hours.

As such, the design of the Charterhouse of Galluzzo formally reflects the life its inhabitants are supposed to lead. The monastery is roughly divided into two parts: that belonging to the monks, and that in which secular clergy and laypeople could visit, conduct business and hear mass. How-

ever, further through the mass of the church and sacristies is the cloister. Around the cloister are 15 individual, 2-story maisonettes, each with its own walled garden. The spatial organization of these maisonettes within the monastery is useful to my project because it demonstrates a way for individual programmatic elements to be aggregated together with each other and with other, dissimilarly-programmed spaces and elements. It demonstrates a potential strategy for the aggregation of program within the context of a relentless grid (with its origins in ritual and behavior).

Fig. 1: Grid Diagram of Maisonettes, Certosa di Galluzzo, 2018.
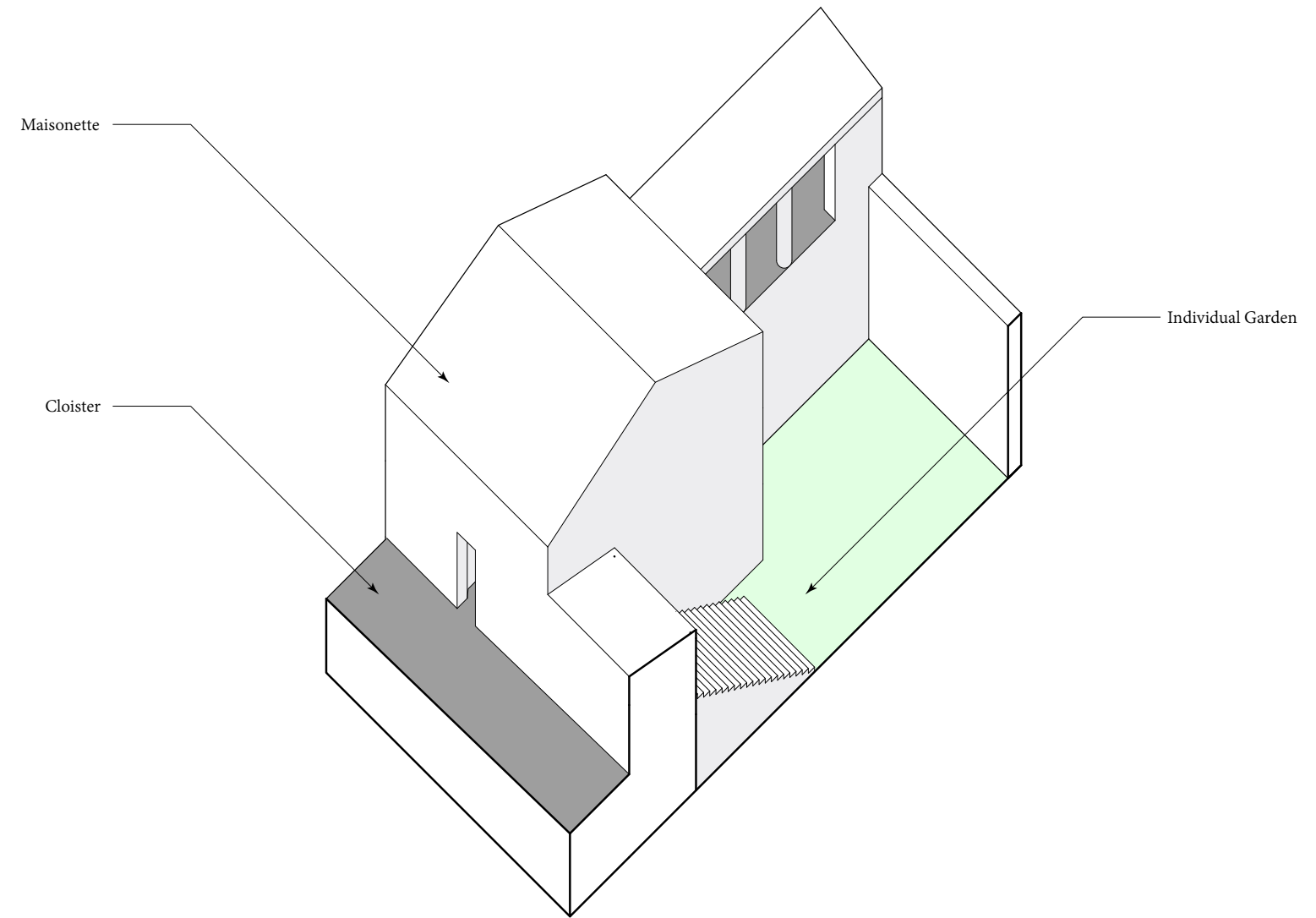
Fig. 2: Axonometric of Maisonette, Certosa di Galluzzo, 2018.

CERTOSA DI PAVIA

CERTOSA DI PAVIA (*Charterhouse of Pavia*), like the Charterhouse of Galluzzo, is another Carthusian monastery located outside of Pavia, Italy. As is the case in Galluzzo, there are individual dwelling units for the monks that. being self-sufficient, are able to exist independently of one another, but are aggregated together in a way that reflects the requirements of Carthusian life. However, unlike in Galluzzo, the programming of the Charterhouse includes very public areas (e.g. guesthouses), community spaces (e.g. refectory, chapterhouse, etc.) and finally the private spaces (dwelling units). These are organized along a different set of formal grids than are the dwelling units. The lesson to be learned from the Charterhouse of Pavia is that of the superimposition of programmed grids within one another. Here, at Pavia, the individual dwellings, the cornerstone of Carthusian life, are aggregated together according to a certain logic within the framework of an informed grid, which has a certain relationship to the larger grids of the programming of the collective.

Fig. 3: Grid Diagram of Maisonettes, Certosa di Pavia, 2018.
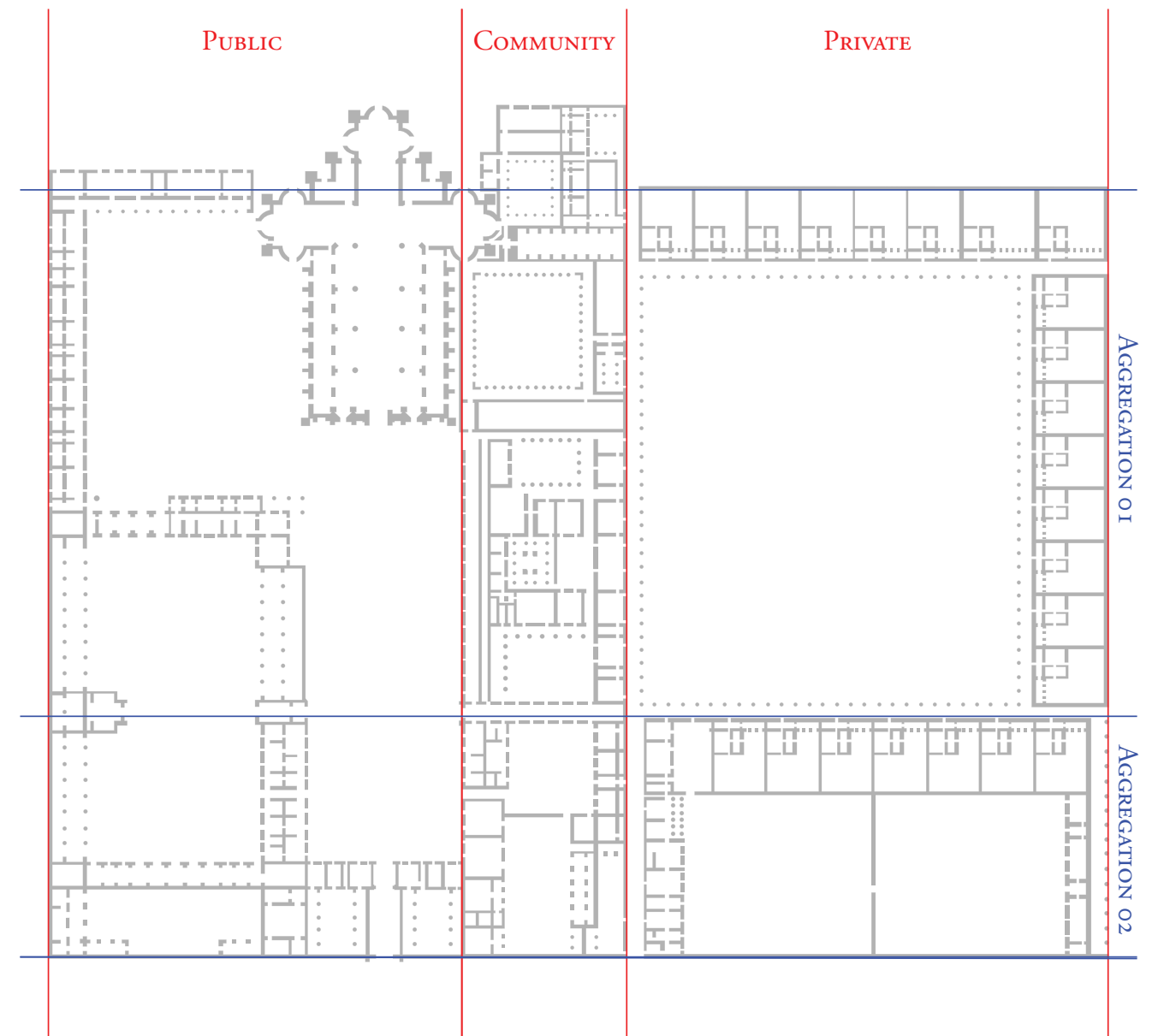
Fig. 4: Grid Diagram of Major Organizations, Pavia, 2018

3. From left to right the photographs of the Certosa di Pavia are taken by Sergio d'Afflitto, 'Tango7174,' and 'Morn' (wikimedia users under open licensing).

MEZQUITA DE CÓRDOBA

The Mezquita de Córdoba (*Mosque-Cathedral of Cordoba*), was a mosque constructed in phases beginning in 784 AD and ending with the Christian reconquest of the City in 1236 AD. The original form of the mosque resembles very much the warehouse typology; the structure is a large, open plan constructed along the lines of a regular grid, which was based on its original program. However, what is even more interesting about this building is the later Christian intervention within it. Beginning after the reconquet of Cordoba and the conversion of the mosque into a church, various Christian rulers intervened in the original structure and located different programs (e.g. royal chapels, sacristies, etc), culminating in the placement of the main church, within the conditions of the original grid. Not only was there a strategic location of the chapels and new interventions, but circulation between them, as ritual sometimes required, was taken into account. Designing for circulation adds a layer of richness to the project as it links all of the current programs within the context of the historical one. In addition, it takes a definite attitude towards materiality: any new construction is understood as an extension of the form (as derived from construction) within a new context. This idea is reflected in my attitude toward materiality in my project as well as its formal structure.
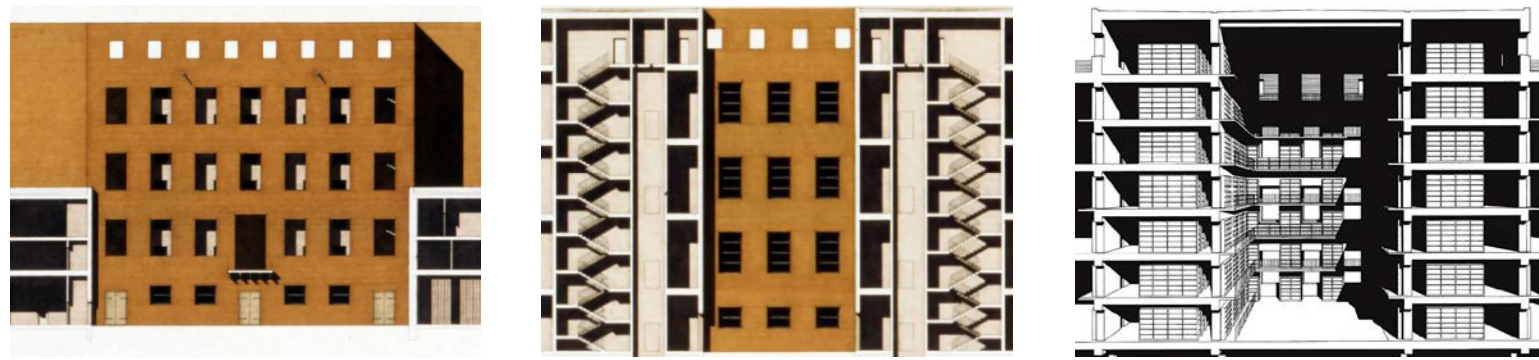

Fig. 5: Grid Diagram of the Mezquita, Córdoba, 2018.
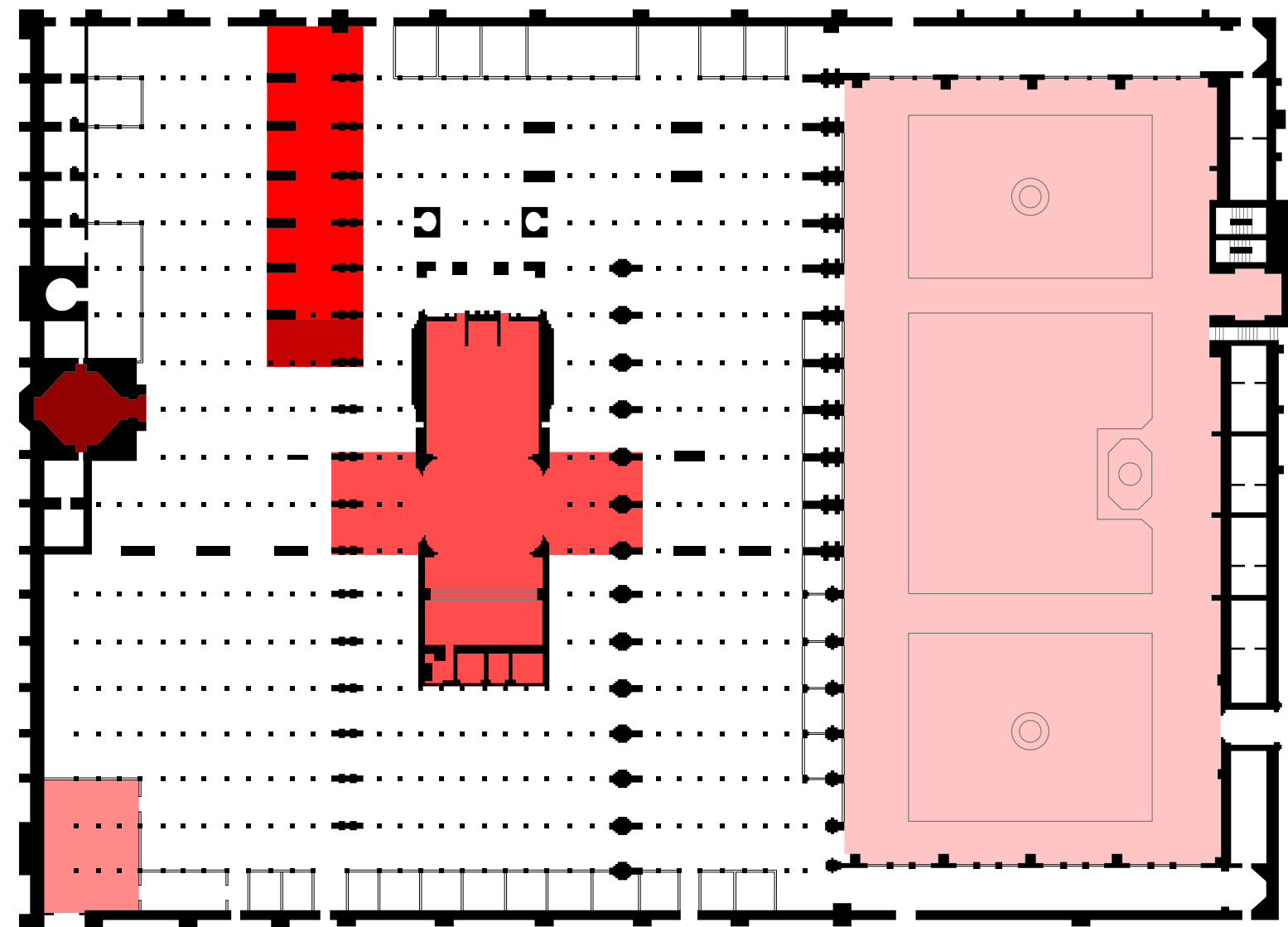
Fig. 6: Programatic Diagram of the Mezquita, Córdoba, 2018

BIBLIOTECA PER IL NUOVO CAMPO UNIVERSITARIO

THE BIBLIOTECA conceived by Giorgio Grassi takes a formalist approach to massing and programming that has much in common with the design of the previous precedents. The genesis of this project was the creation of a library that was not solely a book repository, but a multifunctional space encompassing various programs such as reading rooms, classrooms and lecture halls.

Grassi took a decidedly formalist approach to the design of this prohect. The cruciform shape in the center houses the services as well as the book depository—the theory being that the act of shelving the books is as much of a 'service' as an elevator, as well as being the 'core' service of the library. The other program radiates outwards from the core according to a logical grid that allows for gracefully (and functionally appropriate) programmed spaces of dfferent sorts. This creates a relationship between the parts and part-to-whole. What is also interesting is the materiality of the project. Grassi understood building form as flowing not just from function, but also from systems of construction. From this undestanding, and the selecion of brick for the main buldng material (as it carries certain phenomenological weight), the forms and spaces were generated. This attitude is featured prominently in my project.

Fig. 7: Section and Elevation, Giorgio Grassi, Valencia, 1990

TEMPLE AT KAILASA

The Temple at Kailasa is a Hindu temple located in western India. Remarkably, it is not constructed of individual ma-sonr y units, but is carved and into the cliff. While it does have a clear formal structure and spatial sequencing, it is how these spaces are demarcated that is unique—as the plan be-low demonstrates, discrete programs are bounded via mass. The employment of mass to demarcate program, although in the context of an over-arching and relentless system, is employed throughout my project. Also of note is bi-direc-tional distribution of program and its relationship to other spaces—much like the Mezquita de Córdoba.

Fig. 9: N.A., Photograph of the Temple at Kailasa
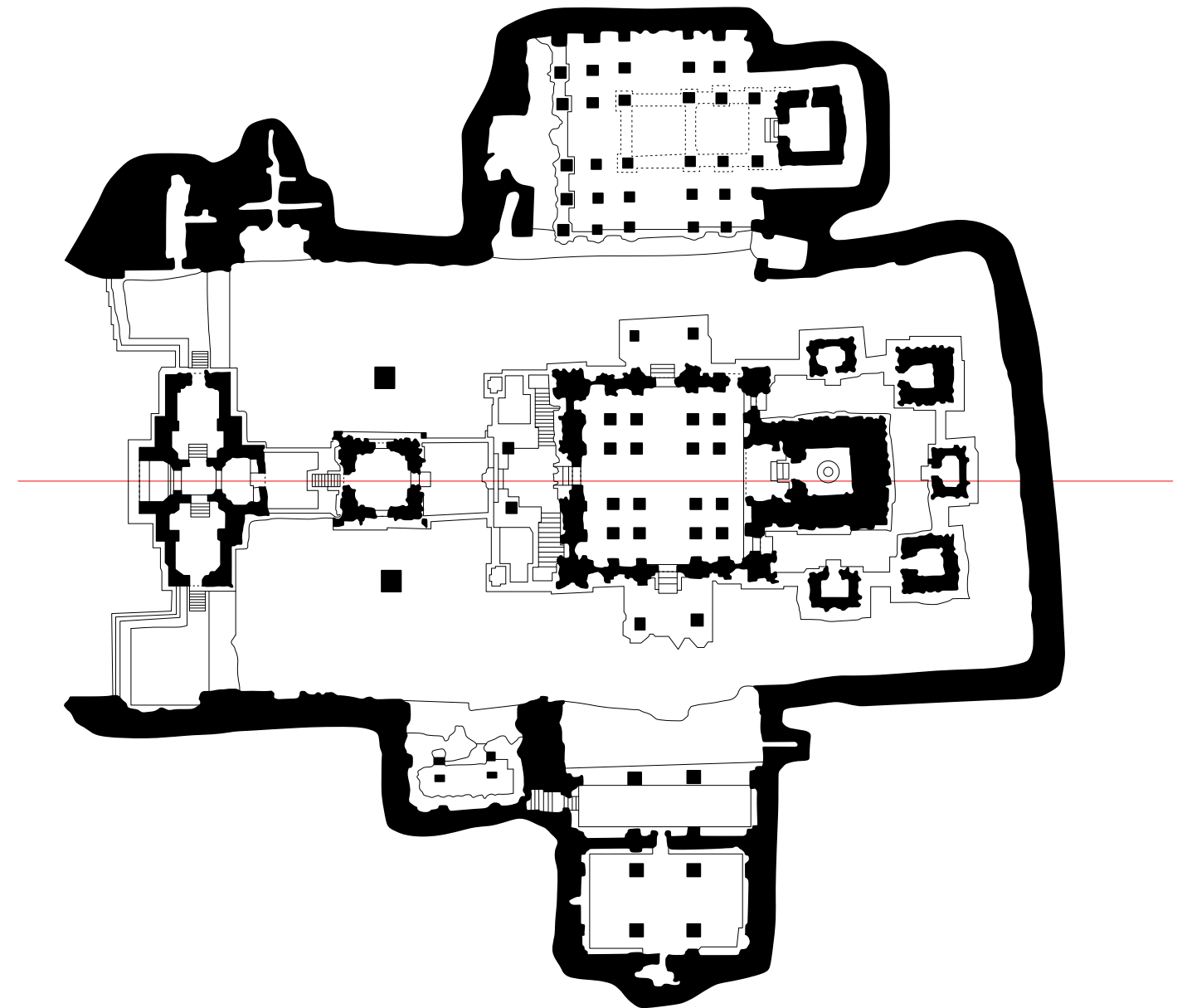
Fig. 10: Plan, Temple at Kailasa, 2018

5. All photographs of the Temple at Kailasa taken from templeadvisor.com

PALACE OF DIOCLETIAN

THE PALACE OF DIOCLETIAN, located in Split, Croatia, builds upon the idea of programmatic aggregaion further. The complex was conceived as a city-within-a-city. Palatial living quarters are aggregated together with, among other programs, temples, shops, and a barracks. As is demonstrated by the plan, the programs are all arrayed within the formal organizaion of the cardo and decumano, and furhter delineated via a relentless grid of columns and walls. However, the relative openness of the peristyle (shown in the large photograph on the preceding page) and width of the cardo and decumano provide relief therefrom. This is an interesting way of relating programs to one another—not only is there an additive operation, but a subractive one as well.
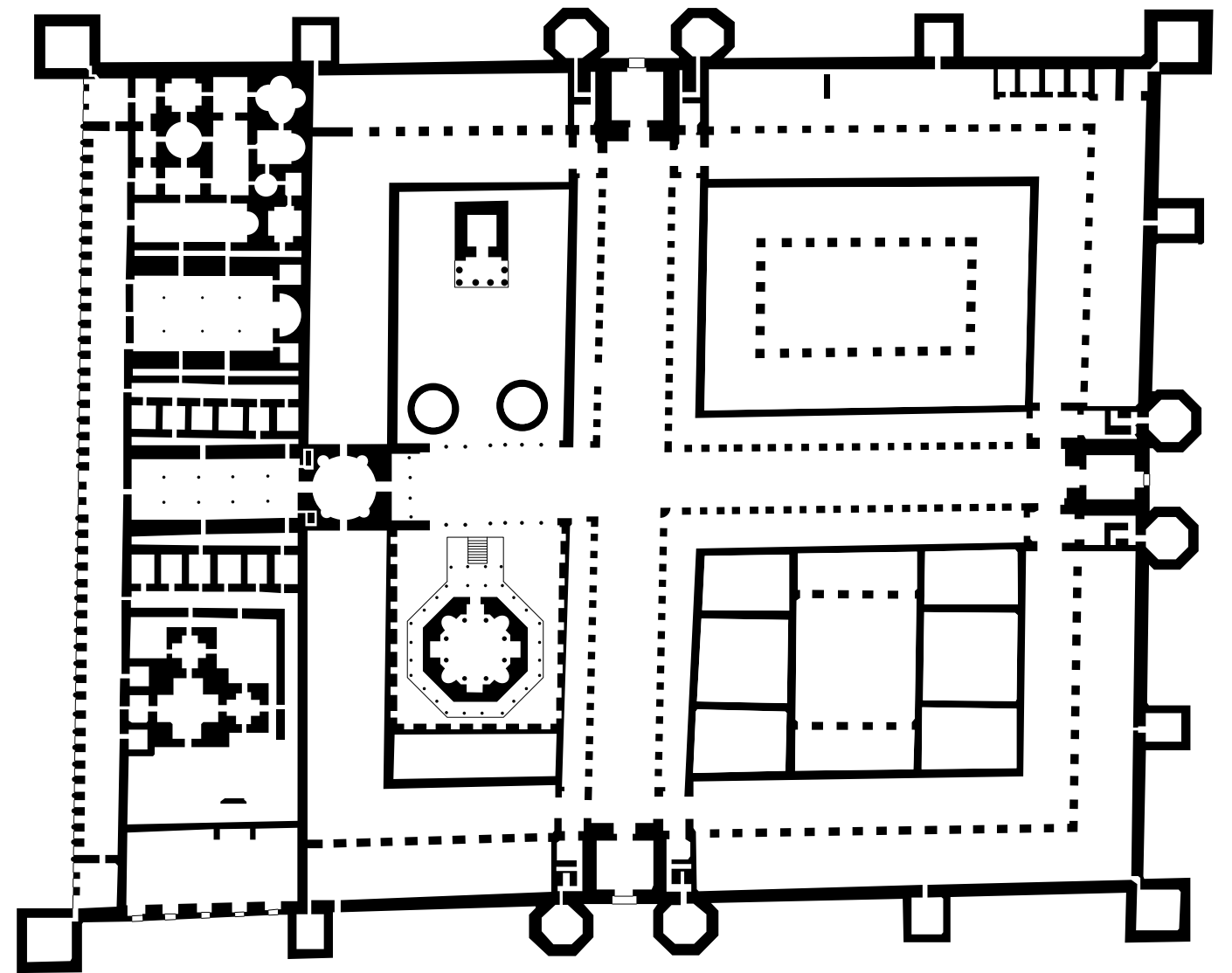

Fig. 11: Encyclopedia Brittanica., Photograph of the Palace of Diocletian

6. The three photos of the Palace of Diocletian (left to right) are taken from 'Ballota' (wikimedia user), diocletianspalace.org, and spiceandsugar.co.uk

Fig. 12: Plan, Palace of Diolcletian, 2018
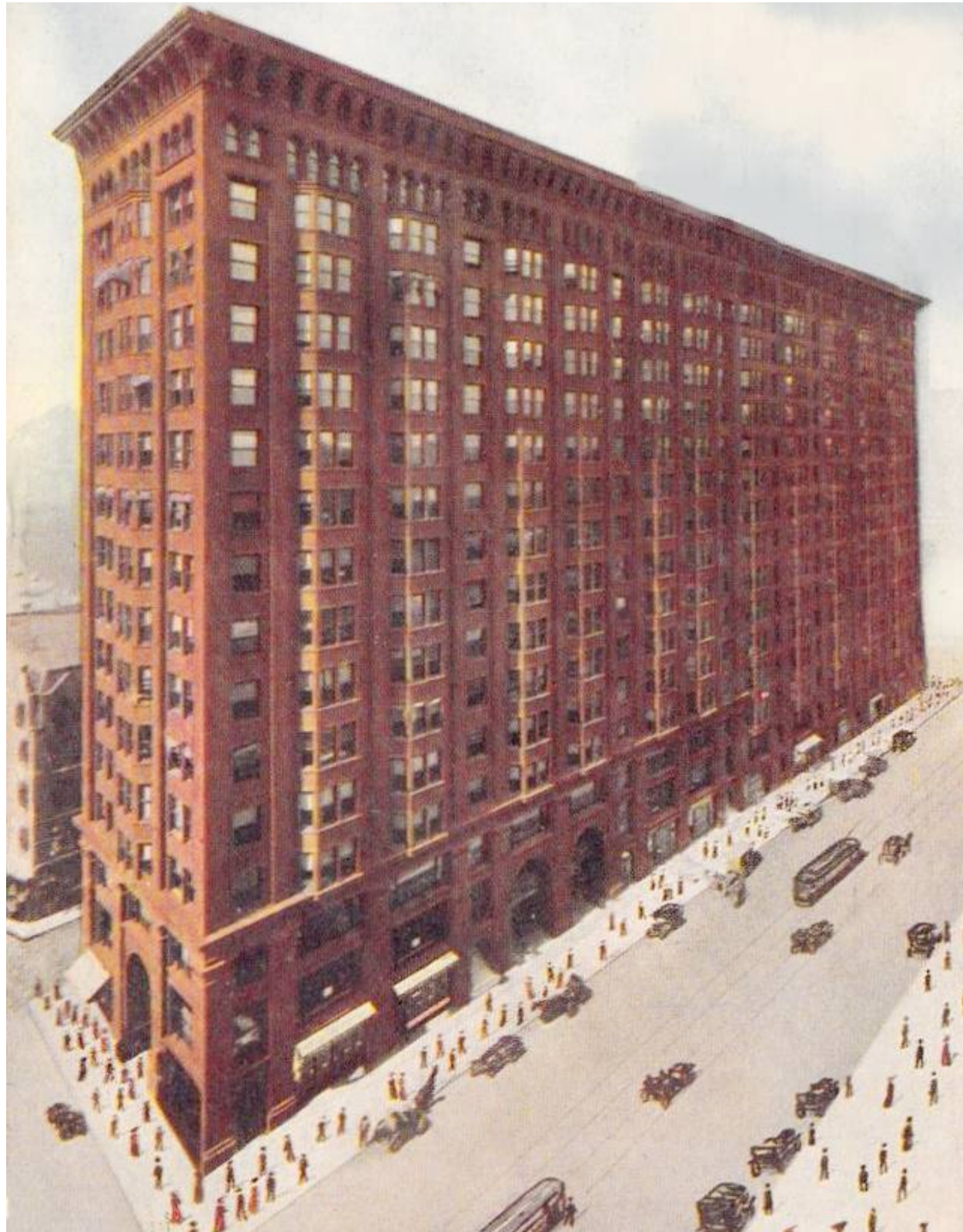
MONADNOCK BUILDING

Fig. 13: N.A., Monadnock Building, 1910

The Monadnock Building, built in 1891, is the tallest skyscraper in the world constructed entirely from brick. However, at the time of its consruction, brick and masonry construction systems were not ideal for achieving verticality. Instead, the brick could only be built to a certain height and incredibly thick foundations were needed. However, due to contemporary advancements in the manufacture of bricks, it is entirely possible not only to build tall structures out of masonry, but the parti of this precedent may inverted. This is one of the goals of my project.
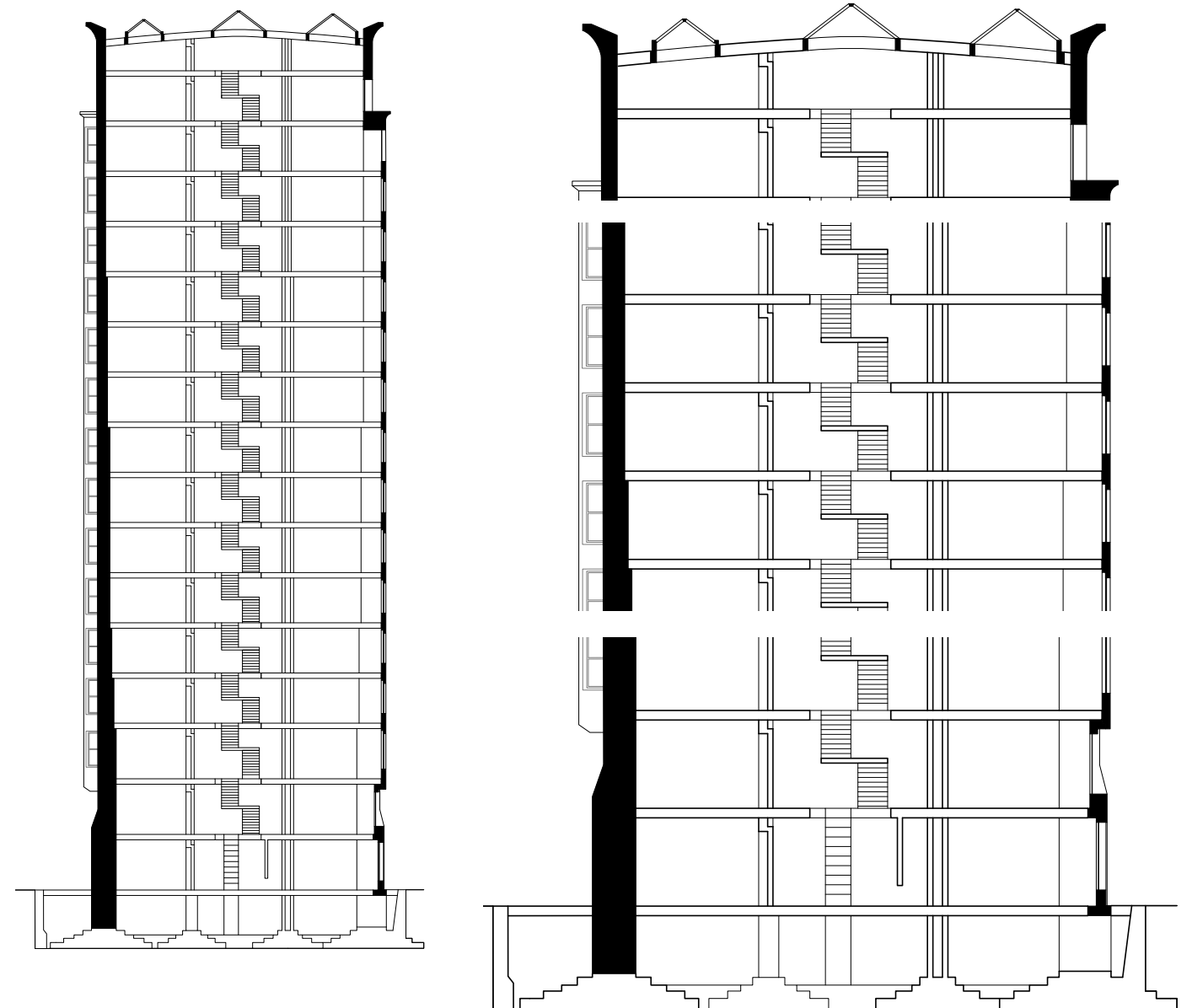
Fig. 14: Section, Monadnock Building, 2018

II. THESIS PROJECT DESCRIPTION

My proposal seeks to provide a counter to the ultraluxury residential tower typology currently en vogue among developers in New York City. To this end, I have chosen Hudson Yards as my site. Currently under development, the plan for the former rail yard is basically a campus of ultraluxury residential buildings with designer flagship stores at street level. While these are a little better than 432 Park Ave at interacting with the public, it is a very specific and limited section with which they interact. I am proposing an alternative to this plan as my project; In a site called "Manhattan's Last Frontier" I am proposing a re-imagined approach to urban housing, one that takes advantage of contextual formal typologies and new construction systems while integrating a public programmatic element.

Since Hudson Yards is located in the former industrial neighborhood of Chelsea, I am looking to the warehouse typology as a means to inform both formal and material strategies, specifically site coverage, formal grid, and brick construction. From here I looked at historical precedents of a similar scale that shared formal grid organizations, integrated public, semipublic and private programs, and/or masonry construction. I also looked at new brick construction technologies that will allow for desired spaces and massing in three dimensions.

The culmination of this formal and material research is the development of a housing project across the entire site. However, instead of a luxury buildings or subsidized housing, I am proposing a campus of dwellings affordable to the burgeoning working and middle-class population that is currently migrating into the city. This campus will not strictly be of a residential program; Rather, to respond to the context and connect it to the city, I propose that public programming be integrated among the dwellings.

OVERVIEW

Based on my precedents, I began to develop a system of construction that would result in the desired spaces and material expression. With the new brick technology, the parti of the monadnock building may be inverted, with large open spaces near the ground and smaller ones above all supported by this masonry system.

I am very interested in the opportunities presented by brick as a system of construction. I chose brick because of its contextual meaning in Chelsea and also due to its capabilities as a building material. While brick had been used as a construction material in late 19th Century skyscrapers, it was of limited use and required the employment of incredibly thick walls on the lower floors.

In recent years, brick technology has progressed so much that, due to intense compression of the brick at microscopic levels during manufacturing, bricks, in combination with structural mortar, are now able to behave in a way similar to that of steel—allowing for large spans and heights without the use of a steel skeleton or really thick lower walls—something my project tries to take advantage of.

According to a study by the university of Plymouth[7], a beam made from bricks and laid in a certain type of bond, "the Quetta bond" was found to potentially produce excessive tensile stress beyond the steel yield stress." As you can see, this particular bond treats bricks not as two-dimensional walls, but as three-dimensional objects. Once they are stabilized in three dimensions, the construction itself is strengthened. The bond may even be three dimensionally rotated and meshed with another laid in a different direction. Combined with contemporary brick technology and reinforced, this brick has construction potential beyond that of a simple veneer or small-scale construction.

As my site axonometric will show, I envision a Córdoba-like field condition of this arcuated and vaulted system where program is arrayed horizontally and vertically based on the diagrammatic spatial organization of the charterhouse. While no means a polished final product, this axonometric drawing begins to develop the deployment of this system—large, public programming at street level is intermingled with smaller community programming. As one moves upwards residential programming starts to appear, organized around "private" open spaces and community programming.

This drawing is not meant to be a literal representation of what the system will be, but it is representative of what it can be—a development of a flexible formal structure based on the material properties of contemporary brick construction system that allows for an integration of three levels of programming.

Finally, since the last meeting I have looked into ways in which these spaces may be inhabited—once again, the material system provides a potential opportunity. While the masonry vaults offer a grid proper to themselves, the bonding and reinforcement creates a meta-grid of its own that may be used for the further dividing and habitation of space.

7. Colin Southcombe, *An Investigation into Reinforced Brickwork Beams using Quetta Bond*, Plymouth: University of Plymouth, 2003, Accessed December 10, 2018, https://pearl.plymouth.ac.uk/handle/10026.1/2289
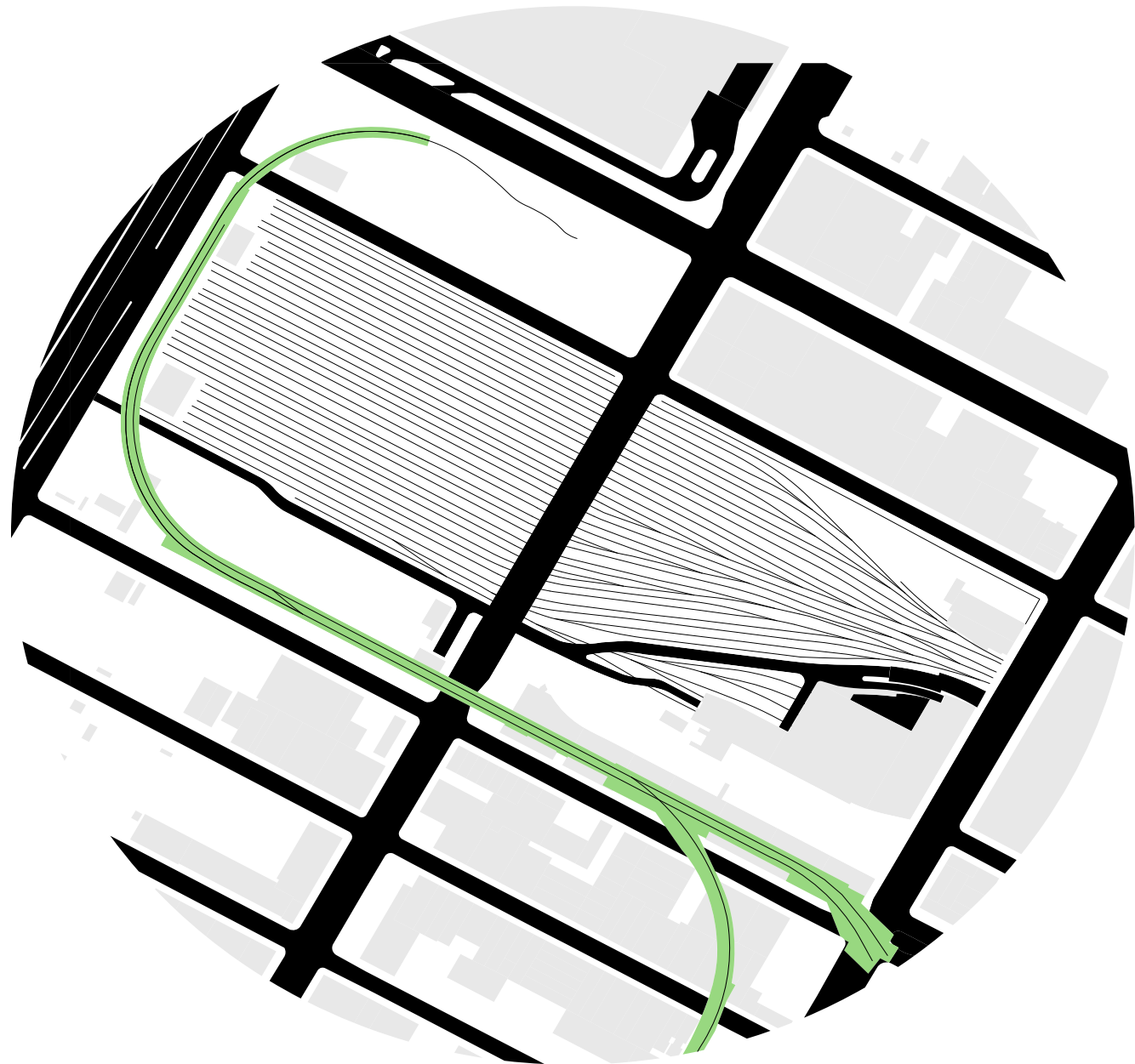
I have chosen Hudson Yards as my site as a way to juxtapose my project against the ongoing development there. The large size of the site is ideal to demonstrate the various opportunities made possible by the employment of contemporary structural brick[8] in combination with the self-reinforcing quetta bond.

Hudson yards is located in the former manufacturing Manhattan neighborhood of Chelsea, and is surrounded by old brick warehoues. I used the warehouse as a starting point to inform the material systems in my project. The warehouses, with their relentless grids and total site coverage, also informed my formal ambitions. Like the Chelsea warehouse, my project will take advantage of the formal grid and superimpose it upon Hudson Yards.

SITE AND PROGRAM

Fig. 15: Hudson Yards Site Map
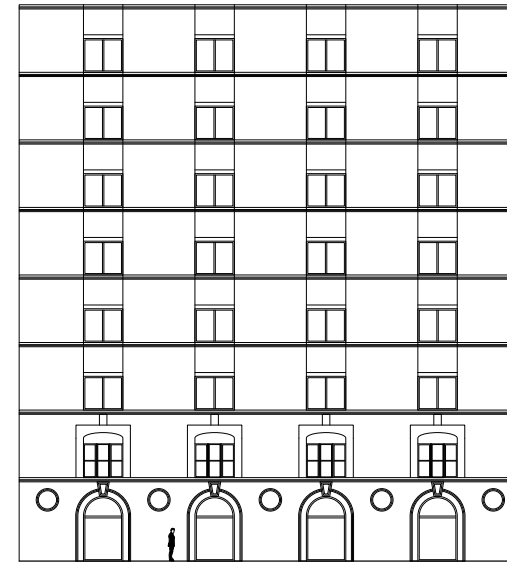
Fig. 16: Elevation of 302 11th Avenue, a contextual and formal brick building
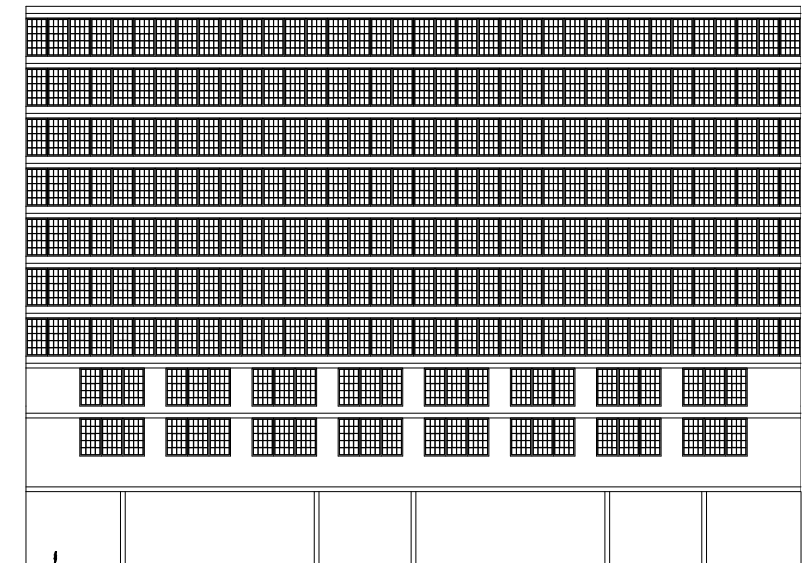
Fig. 17: Elevation of the Starett-Lehigh building, a large brick warehouse constructed from a formal grid
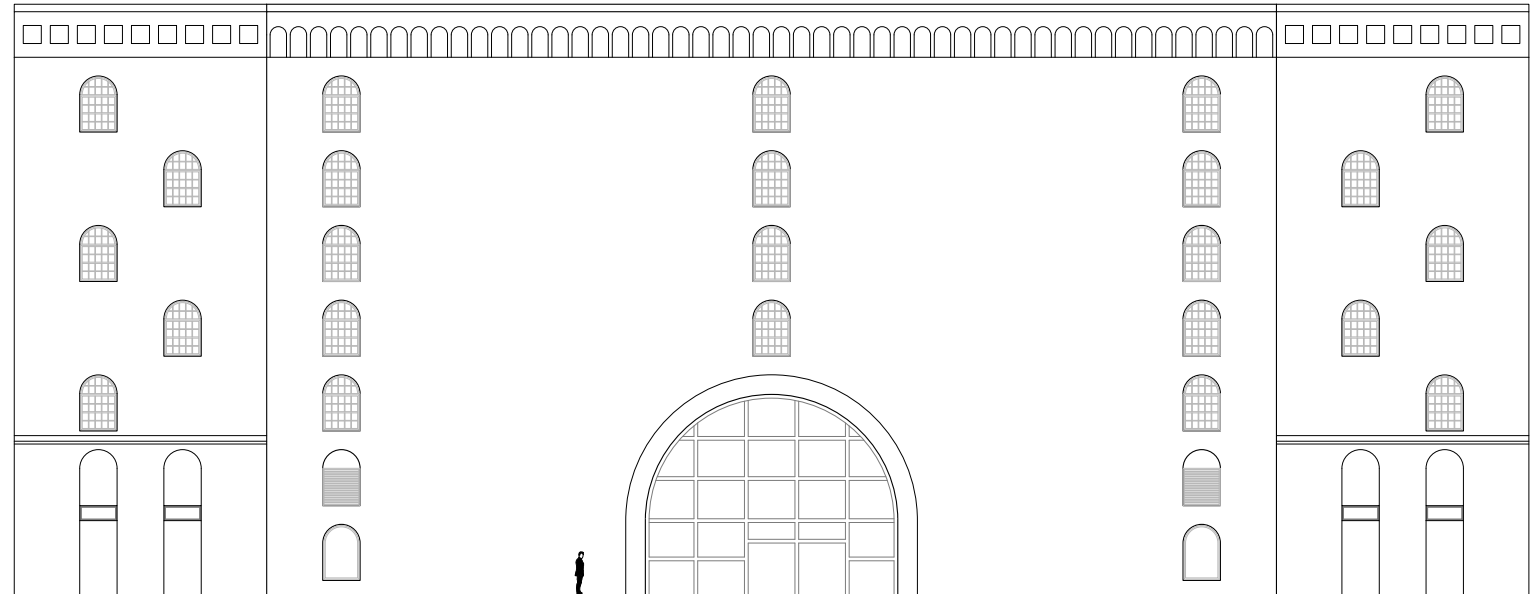

Fig. 18: Elevation of the all-brick terminal warehouse building

8. N.A., *Atlas Brick Technical Data,* Interstatebrick.com, https://www.interstatebrick.com/sites/default/files/library/atlas20brick20technical20data20brochure.pdf, Accessed December 11, 2018.
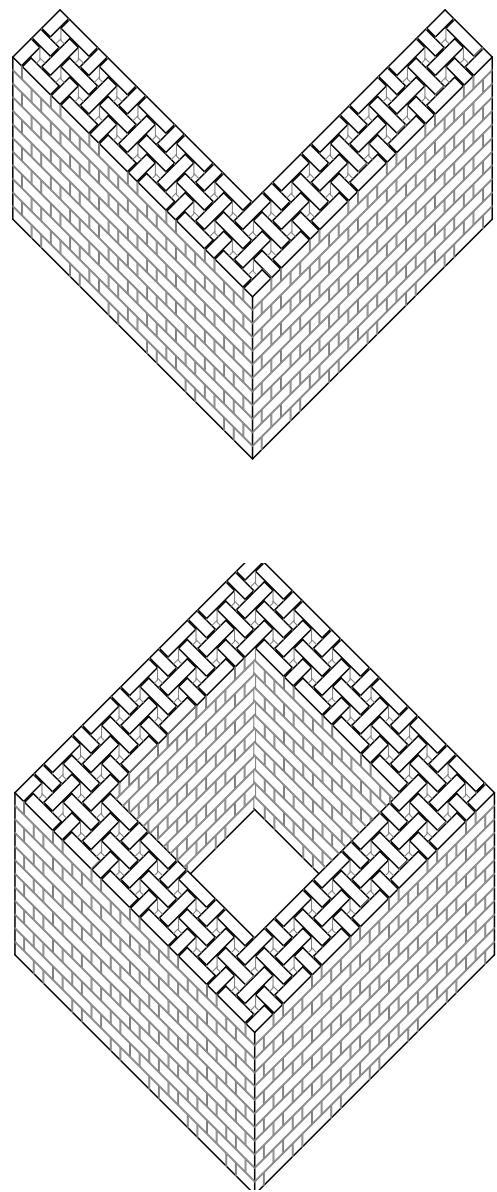
TECTONICS

My decision to engage with the entire site of Hudson Yards is ideal to demonstrate the various opportunities made possible by contemporary structural brick in combination with the self-reinforcing quetta bond. As the diagrams on the preceding page demonstrate, the cavities formed from the bond may also be filled with reinforcement. The result is a system with which it is possible to reach heights and span distances previously not possible. This ablity also allows for further modulation of the system into different sizes tailored to program. As my project aims to integrate three levels of programming—residential, small-scale public/community and large-scale public—the use of this material and construction system allows for a closer relationship between the material, formal and spatial agendas. Below are some early attempts at proportioning and form-making with the system

Fig. 19: Quetta bond assembly diagram

Fig. 20: Quetta bond intersecting systems and three-dimensional reinforcement diagram.

Fig. 21: Projective axonometric diagram

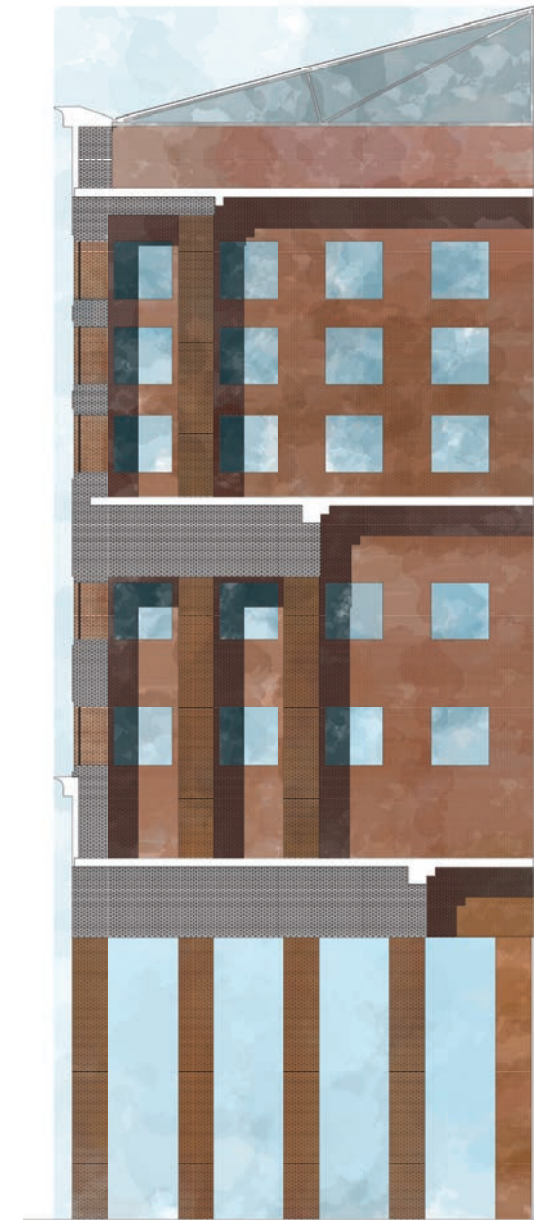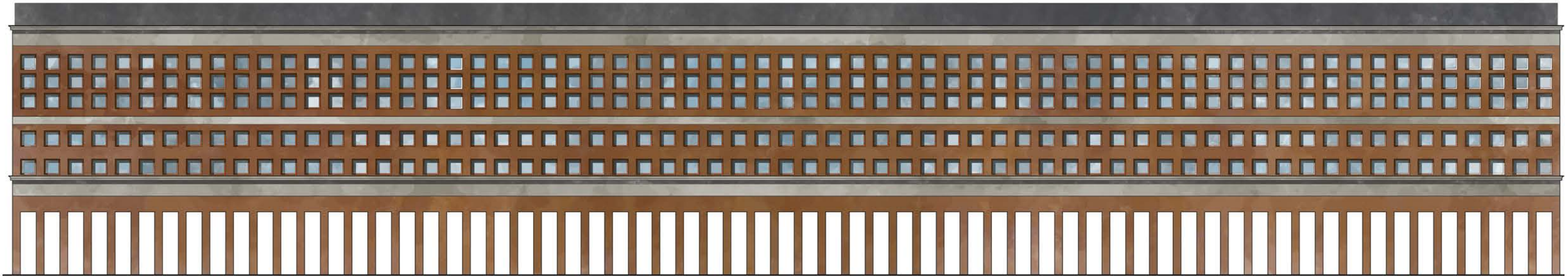Fig. 22: Projective sectional diagram

TECTONICS

Fig. 23: Projective Elevational Diagram

III. DESIGN STRATEGIES

Based on my historical and material precedents, I endeavored to develop a system of construction that would result in the desired spaces, forms and material expressions. I began by appropriating the formal grid and total site coverage of the contextual Chelsea Warehouse. It is at this scale to not only achieve the density lacking in ultraluxury construction, but to also allow the chosen construction system to be articulated in its various proportions in relationship to one another.

Across the formal grid I created a Mezquita de Córdoba-esque field condition of columns. These columns form the basis of the construction system, in which program is nested. The construction system that I developed is an arcuated and vaulted masonry system comprised of structural bricks laid in the quetta bond. This allows for reinforcement where it is needed, as well as building systems to be run through the construction itself. As such, large spans and heights can be reached with comparatively little material.

It is my goal to use this system to showcase the possibilities of contemporary masonry construction through the inversion of the planometric and sectional partis of the Monadnock building. Therefore, the most amount of totally open space should be toward the street level while the amount of smaller-scale vaulting may increase vertically. To accomplish this I developed a modular system of proportional vaulting (large, medium and small) that corresponds to totally public, community and residential programing, respectively.

From this point I looked to the charterhouses as precedents for programmatic organization. Basically, the spatial organization of a charterhouse is a totally public program (the church), surrounded by a screen of community programming (e.g. the refectory, library, etc.) and finally the individual dwelling space. I decided to employ a similar method of organization. However, where the spaces of the charterhouse are only arrayed horizontally, I have arrayed those in my project both horizontally and vertically. This results in a richer set of relationships between the constituent parts of the construction system, as well as opens up more opportunities for different part-to-whole relationships.

Finally, I have looked into ways in which these spaces may be inhabited—once again, the material system provides a potential opportunity. While the masonry vaults offer a grid proper to themselves, the bonding and reinforcement creates a meta-grid of its own that may be used for the further dividing and habitation of space.

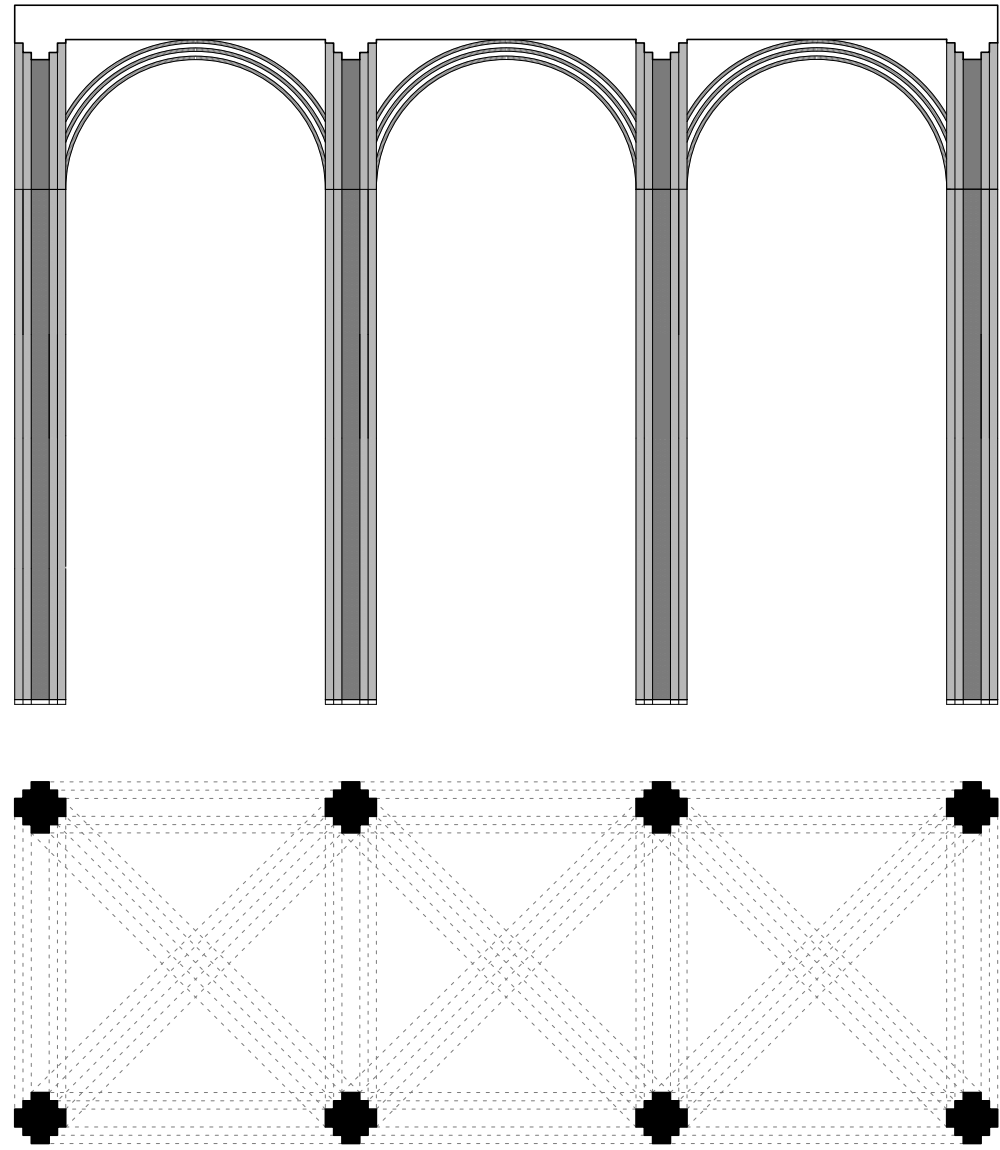The following drawings are representative of the ideas de-
scribed as design strategies. Working primarily in axonomet-
ric and section, I developed a formal articulation of the brick
construction system that results in the spatial and program-
matic expression I desired. On the following pages are draw-
ings representing the modules of construction, spaces creat-
ed by ths modules and the overall result of their aggregation
across the site.

DRAWINGS

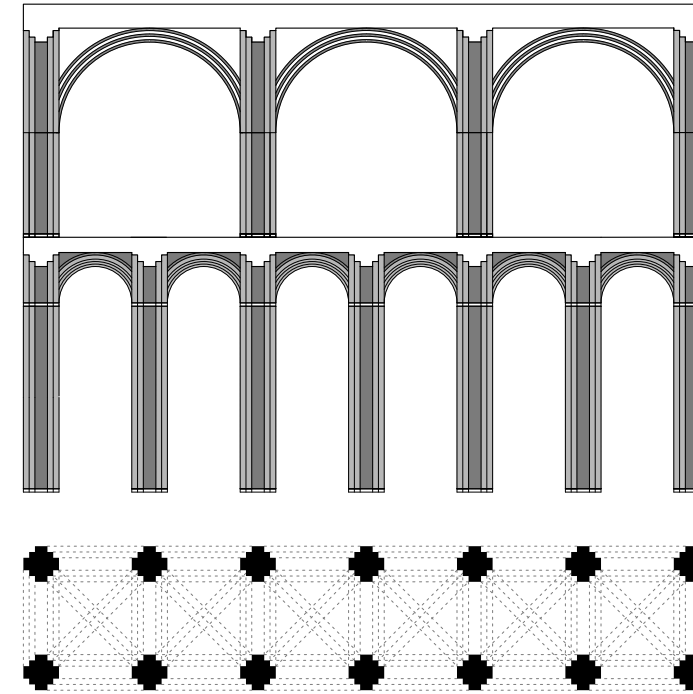Fig. 24: Section and plan of the largest construction module

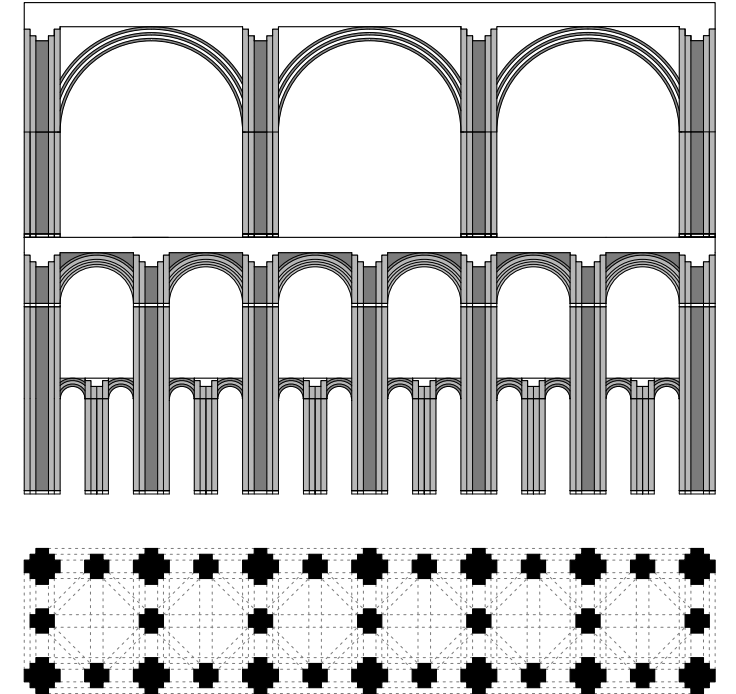Fig. 25: Section and plan of the medium module

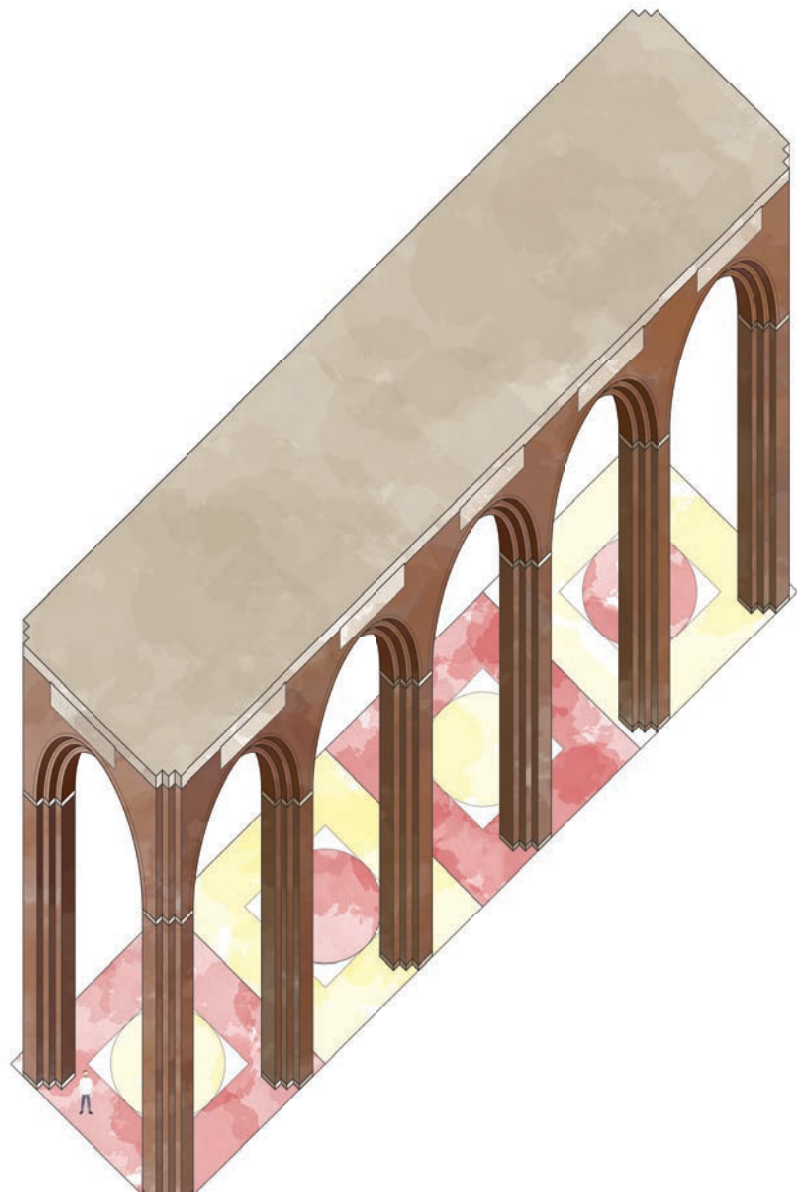Fig. 26: Section and plan of the small module

DRAWINGS

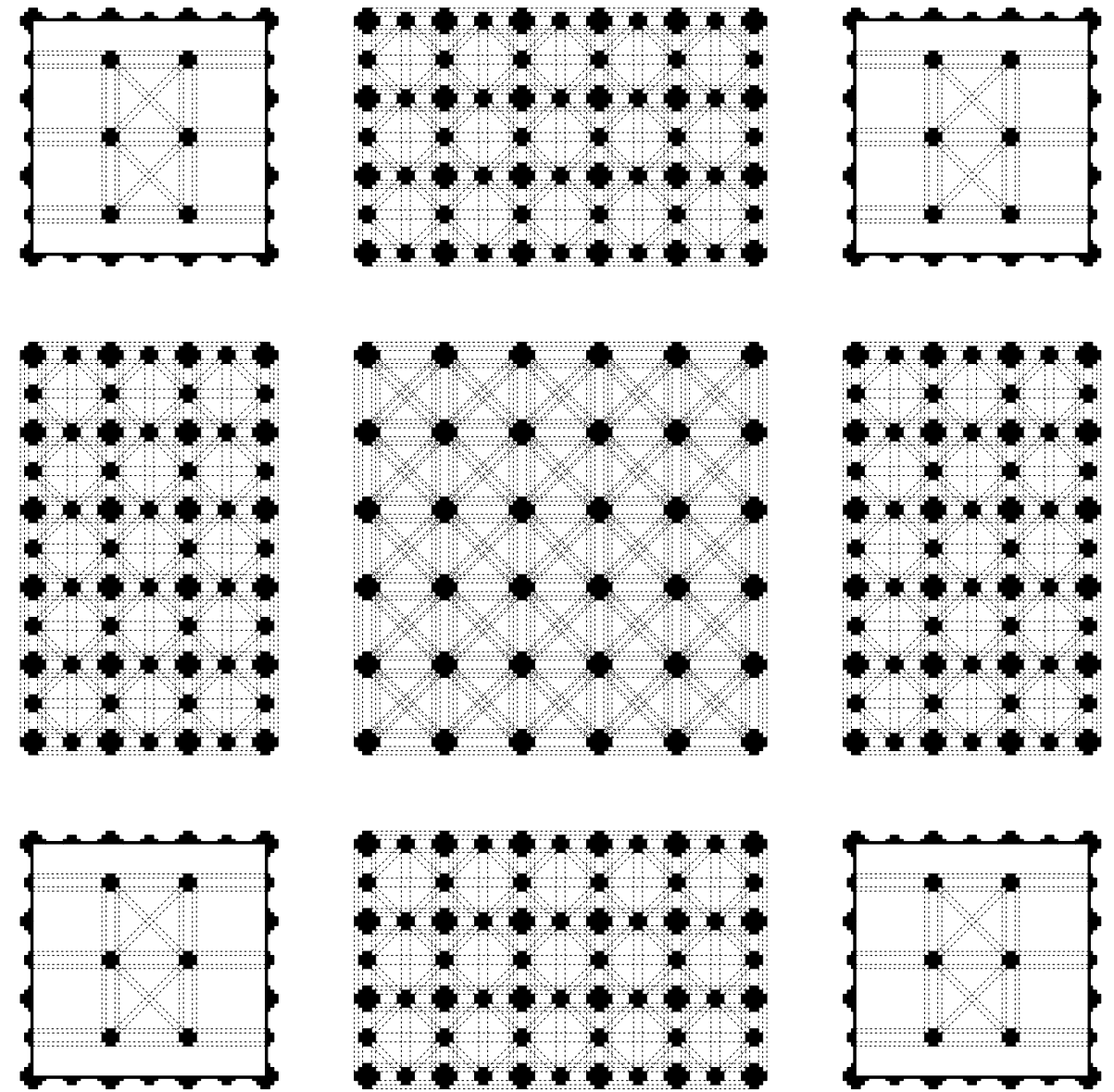Fig. 27: Axonometric of publicly-programmed space

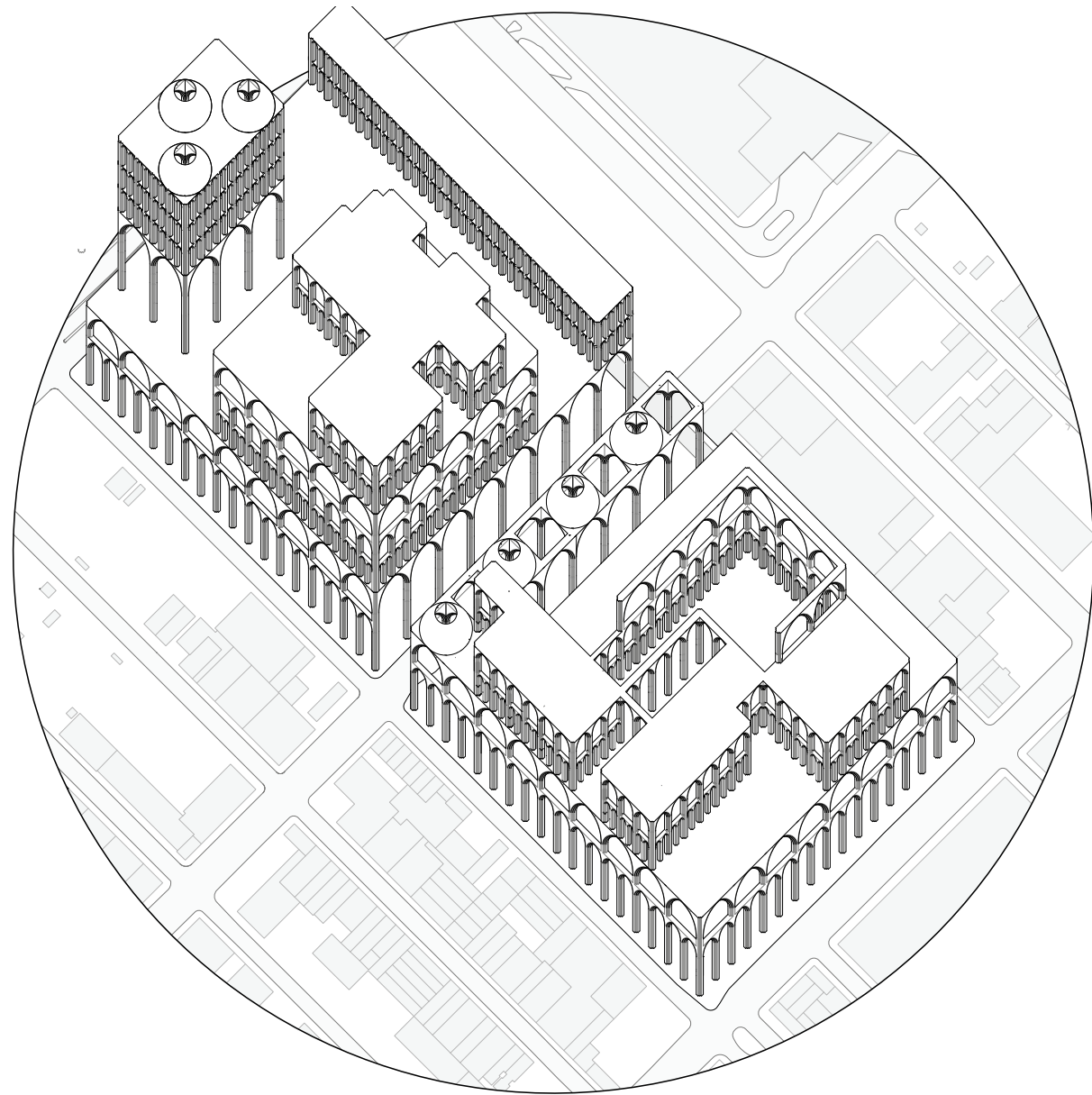Fig. 28: Diagrammatic plan of formal relationships

DRAWINGS

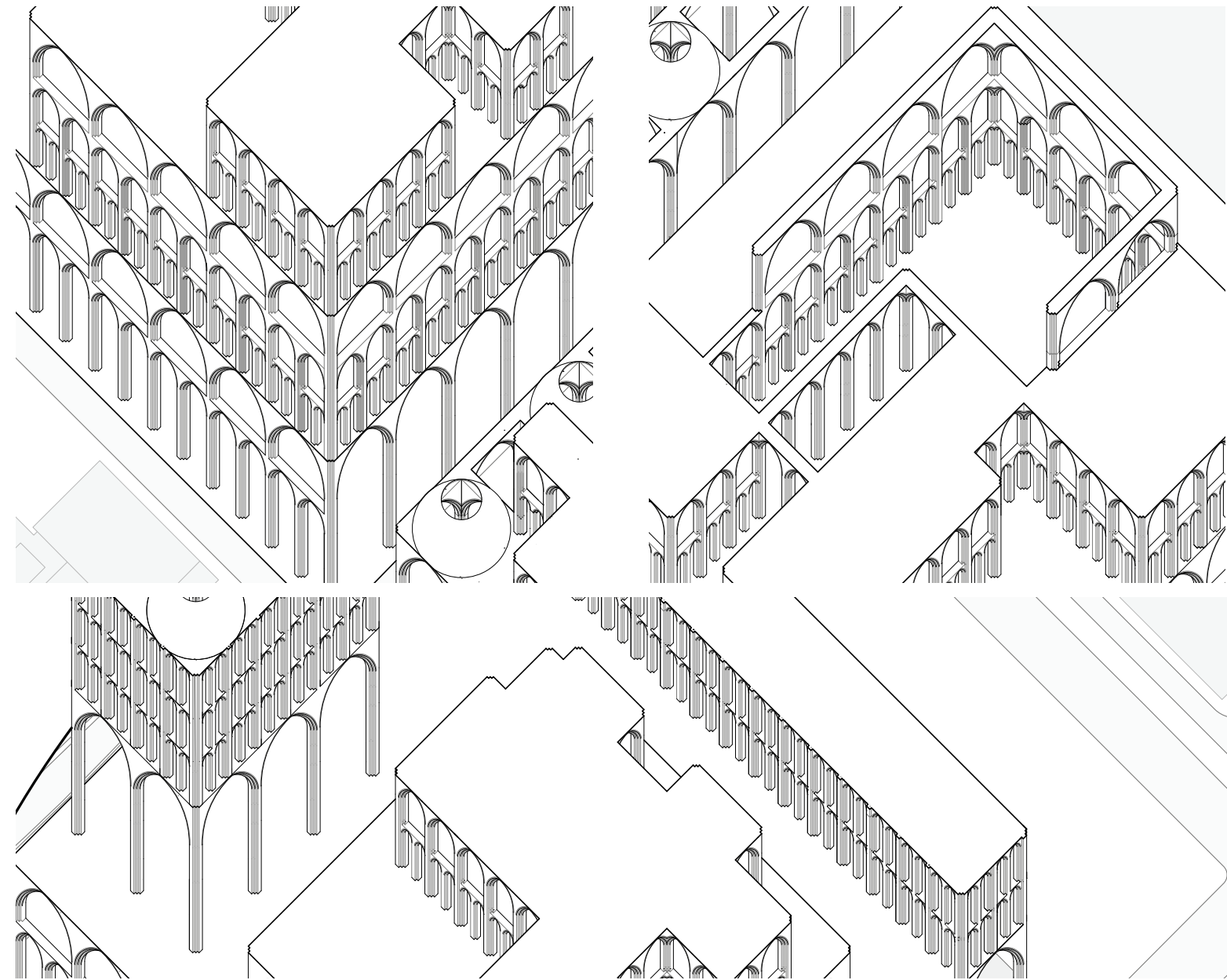Fig. 29: Site Axonometric showing aggregation of program within formal grid and construction system

Fig. 30: Details of Site Axonometric

DRAWINGS

ANNOTATED BIBLIOGRAPHY

Aureli, Pier Vittorio. *The Possibility of an Absolute Architecture.* Cambridge: The MIT Press, 2011.
Book introducing the idea of formalism as a way to create an "absolute" architecture—one that is neither dependent on prevailing political systems nor "useless" in the sense of existing without or with diminished function.

Aureli, Pier Vittorio. *The Project of Autonomy: Politics and Architecture within and against Capitalism.* New York: Princeton Architectural Press and New York: The Temple Hoyne Buell Center for the Study of American Architecture, 2008.
Book tracing the development of autonomy in architecture from its development in the Italian cities of the 60s and 70s through the present. It argues for the adoption of an autonomist design ethos, especially in urban areas, to as a means to combat the exclusive development of construction as diversified investments.

Grassi, Giorgio. trans. S. d'Amico and C. H. Evans. *Architettura, Lingua Morta.* Milan: Rizzoli, 1988.
Monograph on the work of Giorgio Grassi that focuses on his design process and choice of material. According to this work, architecture, as Grassi conceives of it, is resultant from construction and material processes. I agree with this determination and employ it in my choice of materials and form-making.

Saraiva, Alexandra and Tormenta Pinto, Paulo. "El proceso continuo - producción social de la arquitectura de Hestnes Ferreira." *Rita* 9 (2018): 112-119.
Journal article analyzing the architecture, especially the social housing, of Raul Hestnes Ferreria. Includes the idea of "participatory" architecture and design as well as the importance of integrating communit function.

Southcombe, Colin. *An Investigation into Reinforced Brickwork Beams using Quetta Bond.* Plymouth: University of Plymouth, 2003. Accessed December 11, 2018. https://pearl.plymouth.ac.uk/handle/10026.1/2289
This study was useful in the selection of bick as the primary material of construction. According to this study, a beam composed of bricks laid in the Quetta bond may be able to withstand greater tensile stresses than that of steel. Based on the results of this study, brick became a viable option to achieve the heights and spans that my project required.

Ursprung, Philip. "Exposures" in *Materiality and Architecture.* Ed. Sandra Karina Löschke. New York: Routledge, 2016.
Essay arguing that the use of images as signifiers and holders of information can—and should—be integrated into the structure and tectonics of buildings. It also argues that building materials themselves are endowed with certain cultural signifiers and, therefore, have phenomenological value. This is related to my choice of brick, contextual to the site, as the main construction and material system.

Weinstock, Michael. *The Architecture of Emergence: The Evolution of Form in Nature and Civilization.* Chichester: John Wiley & Sons Ltd., 2010.
Book analyzing the emergence of patterns of human activity; specifically analyzes cities, patterns of settlement, urban and material forms. It makes the case that nothing ever emerges or exists in isolation—that houses, for example, did not exist by themselves when they first developed. Rather, they were first communal spaces that evolved into individual/familial dwelling units that are related through circulation, and finally in relation to commercial activities. This also provided an impetus to the aggregation of public spaces among the dwellings of my project.
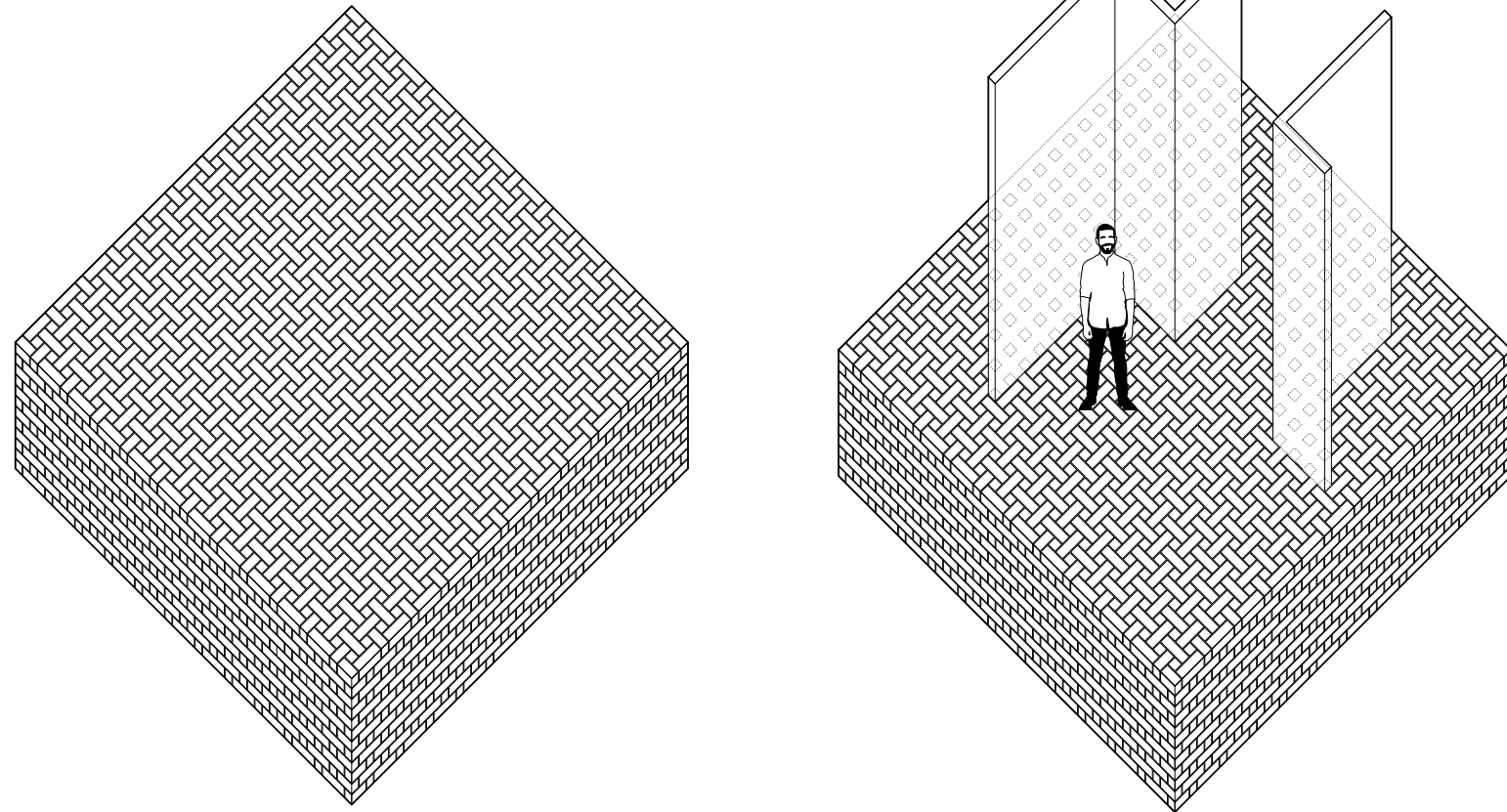
Fig. 29: Axonometric diagram showing the secondary system formed by the bonding pattern and reinforcement, and how it may be used to furher divide space for habitation.

City of Brick:
Spatial and Material Explorations in 21ˢ Century Urbanism

William Collins
Advisors Prof. Jean-François Bédard, Prof. Junho Chun, Prof. Roger Hubeli
(No Advisory Group Title)

The project I'm proposing, City of Brick: Spatial and Material Explorations in 21st Century Urbanism, will analyze the problem of and propose an alternative to the supertall residential tower in the contemporary city. There is a trend in American cites toward the construction of 'prestige' projects, namely, skyscrapers of luxury apartments purchased as investments. This phenomenon is well-documented in the spacious floorplans of these towers; for example, 432 Park Avenue in New York City, though it is the tallest residential building in North America, only contains 104 units.

My proposal seeks to provide a counter to the ultraluxury residential tower typology currently en vogue among developers in New York City. To this end, I have chosen Hudson Yards as my site. Currently under development, the plan for the former rail yard is basically a campus of ultraluxury residential buildings with designer flagship stores at street level. I am proposing an alternative to this plan as my project; In a site called "Manhattan's Last Frontier" I am proposing a re-imagined approach to urban housing, one that takes advantage of contextual formal typologies and new construction systems while integrating a public programmatic element.

Since Hudson Yards is located in the former industrial neighborhood of Chelsea, I am looking to the warehouse typology as a means to inform both formal and material strategies, specifically site coverage, formal grid, and brick construction. I looked at historical precedents of a similar scale that shared formal grid organizations, integrated public, semipublic and private programs, and/or masonry construction. I also looked at new brick construction technologies that will allow for desired spaces and massing in three dimensions.

The culmination of this formal and material research is the development of housing across the entire site. I am proposing a campus of dwellings affordable to the burgeoning working and middle-class population that is currently migrating into the city. This campus will not strictly be of a residential program; Rather, to respond to the context and connect it to the city, I propose that public programming be integrated among the dwellings.
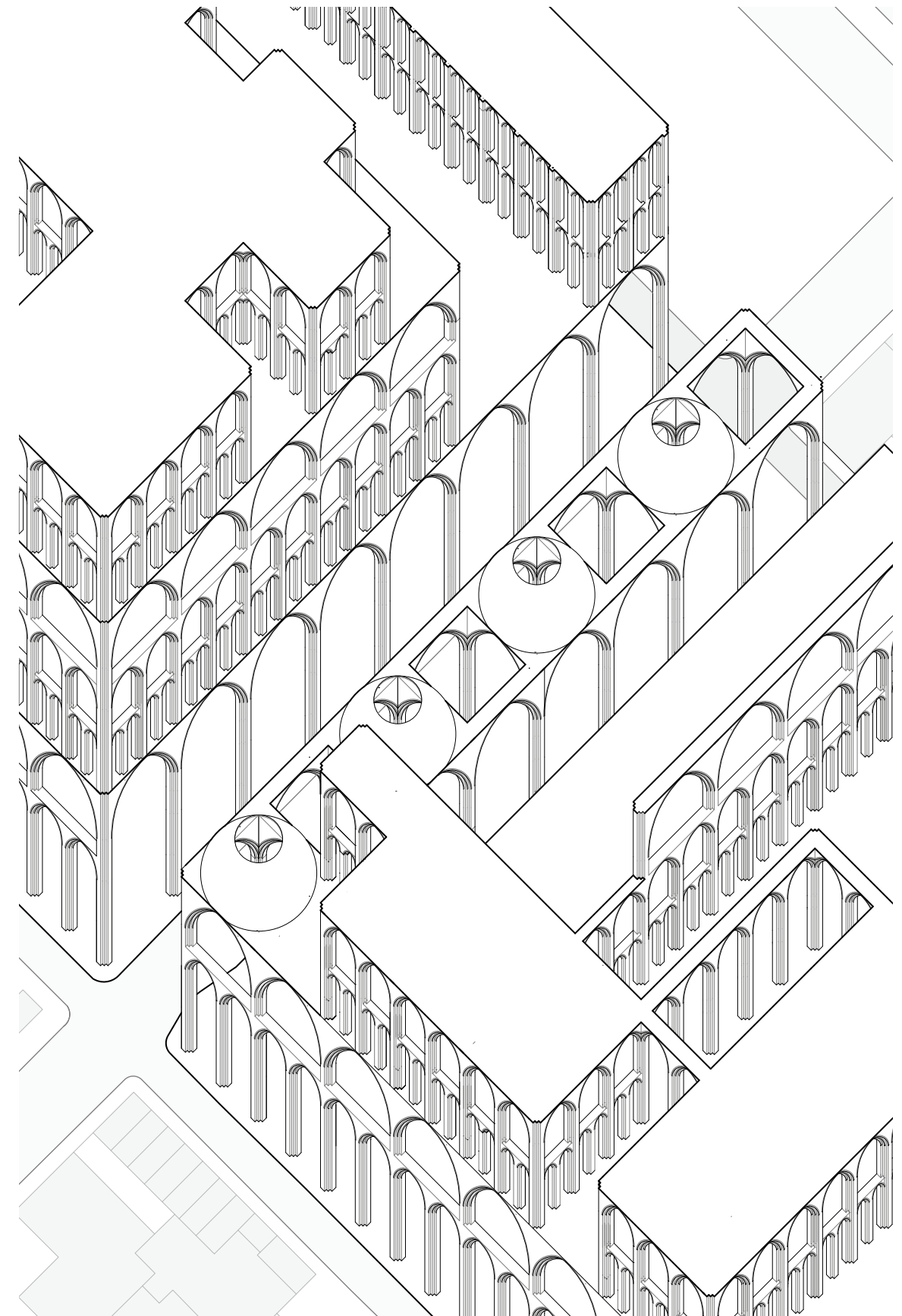

Figure 1: Site Azxonometric