

STRUCTURE & FREEDOM

A Montessori School in Georgetown

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This school seeks to embody the Montessori ideal of “structure and freedom”. Through the design process, an “architecture of opposites” emerged – edges and endings, light and dark, solid and transparent, quiet and noise, city and nature, bridge and barrier. It is this struggle between opposing forces that creates a dynamic environment.

A site at the intersection of P and 26th Streets in Georgetown on the western edge of Rock Creek Park was chosen for the project because of its nature as a haven within an urban context.

Stephanie Suzanne Tincher



ABSTRACT

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Finally, I would like to thank my parents for instilling in me a love of learning and for always being there for me. I would also like to thank my Aunt Diane, for keeping in touch with me and being genuinely interested in seeing me succeed.



The design challenge of this project was to create an engaging environment for learning; one that through its architecture, encourages discovery, sensory and intellectual development and stewardship of the environment. The Montessori Method was appropriate for this inquiry because of how it seeks to engage students in the world around them and gives them the tools to guide their own education.

The design of this school seeks to embody the Montessori ideal of “structure and freedom”. I studied ways in which architecture can create an ordered environment, but at the same time provide the opportunity for improvisation and adaptability. What emerged was an “architecture of opposites” – edges and endings, light and dark, solid and transparent, quiet and noise, city and nature, bridge and barrier. It is this struggle between opposing forces that creates a dynamic environment.

A large, relatively flat parcel of land at the intersection of P and 26th Streets in Georgetown on the western edge of Rock Creek Park was chosen for the site. It is a haven within an urban context; the surrounding buildings are two and three stories, the neighborhood is primarily residential and relatively quiet, vehicular traffic is moderate, and it has proximity to a large city with all its inherent educational opportunities as well as a large park system offering the students a connection to nature. Across the park to the southeast is Washington, DC’s business district and, beyond that, The National Mall with its museums and monuments. One half mile to the east of the site is the eclectic Dupont Circle neighborhood and one half mile to the southwest is the center of historic Georgetown.

The school is designed to accommodate 100 to 125 students between the ages of three and twelve. The indoor program includes an entrance hall, administration suite, three primary level classrooms, four elementary level classrooms, a library with separate group study and reading rooms, restrooms, a kitchen, and a large multipurpose space. A central corridor with “side aisles” is the spine that connects all of the spaces and becomes an extension of the classrooms when needed. The outdoor program includes grassy, sand and paved play areas, parking for staff members and a driveway for drop-off and pick-up queuing.



Maria Montessori was born in 1870 in Chiaravalle, Italy to well educated, middle-class parents. From an early age she showed aptitude for the sciences. Her parents were supportive of her education, though her father did not always agree with her career path.

At age 13, Maria enrolled in a technical school with the intention of becoming an engineer. At age 20, she decided to change career paths and applied to the University of Rome's School of Medicine. She was initially denied entry into the all-male program; however, she persisted and was admitted as a student of mathematics, physics and natural sciences (Gutek, 4 & Hainstock, 11). Two years later, she passed the required examinations and became eligible to begin her medical studies, making her the first woman to be admitted into the University of Rome's School of Medicine. During her last two years, she studied pediatrics. In 1896, she became the first woman in Italy to be awarded the degree of Doctor of Medicine.

After graduation, Dr. Montessori accepted a research position with the university's psychiatric clinic. Having studied pediatrics, and then working in the field of psychiatry, she became interested in the work of Jean-Marc Gaspard Itard (1775-1838) and Edouard Seguin (1812-1880). Itard was a French physician who worked with deaf mutes. He is credited with teaching the "Wild Boy of Aveyron". Seguin, a former student of Itard, was a French born American psychiatrist who pioneered modern methods for educating children with severe mental impairments. Both Itard and Seguin were influenced by Jean-Jacques Rousseau (1712-1778) who believed that "the key to learning lay within each individual child, and the concrete was always the best place to start" (Hainstock, 12). Educators Johann Pestalozzi (1746-1827) and Friedrich Froebel (1782-1852) also built their theories on Rousseau's ideas. Pestalozzi advocated the development of the senses in stages through the use of formal exercises, starting with the basics and working towards the more complex (Hainstock, 12) and that schools should be "homelike places where children felt emotionally secure" (Gutek, 10). Froebel, building on the work of both Rousseau and Pestalozzi, began a school for very young children, which came to be known as the "Kindergarten". He introduced educational toys he called "gifts" which allowed the children to self-direct their learning and development. Dr. Montessori agreed with some of the ideas of Rousseau, Pestalozzi and Froebel, such as working from the concrete to the abstract, creating a special environment for the children, didactic learning and use of prepared materials, but felt they "had relied on a philosophical, rather than a scientific, view of

children" (Gutek, 11) and through her work sought educational methods based on science.

In 1900, Dr. Montessori became a co-director of the Orthophrenic School in Rome, affording her the opportunity to apply her developing theories on mentally impaired children. Through observations of the children and their needs, she discovered that "repeating a specifically prepared exercise seemed more effective than having a child try repeatedly to master a task on his own". By teaching them in this way, the impaired children were able to learn and eventually pass exams "on a level with normal children" (Gutek, 9) (Hainstock, 13). Dr. Montessori knew that despite the fact that these children had made great strides, they would always have limitations. She then began to ask herself "Why are the normal children testing so low?" She theorized that her methods could help children of average intelligence as well, but had not yet had the opportunity to test it.

That opportunity came in 1907 when she was approached about establishing a school in San Lorenzo, a slum area in Rome. A philanthropic organization was remodeling tenement housing in an effort to improve living conditions for its residents, but found that children, too young for school, were left unsupervised while their parents worked and were vandalizing the buildings. Dr. Montessori was asked to work with these young, undisciplined children. She set up what she called a Casa dei Bambini or "Children's House" in a room in one of the tenement buildings for fifty students ages three to seven. There she created a well organized environment scaled to the child. The didactic materials that were introduced were designed to stimulate the five senses and develop manual dexterity. The materials were also "self-correcting" allowing the children to recognize when they had mastered the activity. Unlike typical classrooms of the day, the children were permitted to choose what activity they wanted to practice and could work at their own pace. The teacher's role in the classroom was that of "directress". Her job was to instill order and assure that the children were introduced to a variety of materials, but not be the center of attention throughout the day. Montessori anticipated that it would take a while for the children to adjust, but was amazed to find that they adapted to her methods almost immediately.

Word spread quickly about her success and soon educators from all over Europe and the U.S. were coming to Rome to visit the Children's House. In 1909, Montessori began a training program for teachers in response to the

demand. In 1910, she published *The Method of Scientific Pedagogy Applied to Infant Education in the Children's Houses* which evolved a few years later into *The Montessori Method*. In 1914, she published *Dr. Montessori's Own Handbook* "which she wrote as a kind of official guide to the method that would distinguish it from others who were writing about Montessori education." (Gutek, 21) Between 1918 and 1919, she published *Advanced Montessori Method* in two volumes. Throughout her career, she traveled around the world studying children of different cultures, giving lectures and continually revising her methods. She eventually gave up her private medical practice to devote all of her attention to education.

The first American Montessori school opened in 1911, and within two years there were nearly 100 more (Hainstock, 17). In 1913, Montessori made her first speaking tour of the United States. Though she had the support of many, the American education community had already instilled its own ideas regarding early childhood education on the country. The Froebelian Kindergarten had already taken root, and by World War I, interest in Montessori in the U.S. had waned (Gutek, 29).

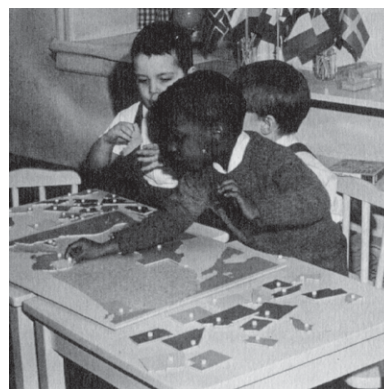
Montessori's ideas continued to gain acceptance in Europe. In 1929, the Association Montessori Internationale (AMI) was founded to manage how Montessori education would be disseminated worldwide. Dr. Montessori had always been concerned with preserving the method exactly as she intended it, and refused to allow alterations or modifications of any kind. When Benito Mussolini refused to name her as sole authority of the AMI in Italy, she left in exile and Mussolini ordered all of the Italian Montessori schools be closed (Gutek, 37). In 1939, she traveled to India to establish a training school. When World War II broke out, the British interned the Italian national for the duration. As she was not considered a threat, she was allowed to continue her work in India (Kramer, 104 and Gutek, 39). In 1947, she returned to Italy to reopen Montessori schools. In 1949, 1950 and 1951, Maria Montessori was nominated for the Nobel Peace Prize. On May 6, 1952, Montessori died in Noorwijk aan Zee, Netherlands. After her death, the U.S. saw a revival of the Montessori method. Today, there are approximately six thousand Montessori schools throughout the United States (Gutek, 40).



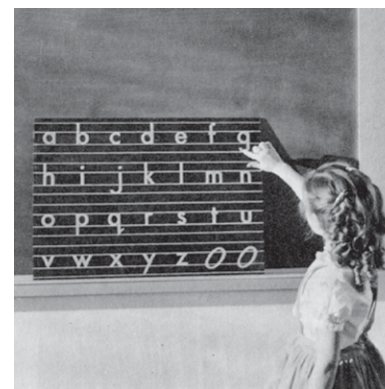
1 | Weighted Tablets



2 | Colored Tablets



3 | Jigsaw Puzzle Map



4 | Sandpaper Letters



5 | Walking on a line

Through her research and observations, Montessori discovered that human formation occurred in four phases each lasting approximately six years. She referred to these phases as “the four planes of development”. Within each of the planes, the child has specific developmental goals and sensitivities which aid in reaching those goals. Montessori was only able to complete curricula for the first two planes before her death; therefore Montessori education today does not extend past age twelve. The following is a brief overview of how the Montessori Method is applied in the classroom.

For the first plane of development or primary education level, the child’s focus is on their formation as an individual. Children in this phase have what Montessori termed “the absorbent mind”. They are capable of deep concentration and enjoy repetition. To the child everything is new and fascinating; fantasy and myth are discouraged in order to direct the child’s focus towards learning about more constructive subjects. Children seek to learn about their environment through the use of all five senses. The teacher introduces each didactic material to the child and explains its purpose and goal. The child then repeats it on his or her own until they have mastered it. They may return to any of the materials later to reconfirm what they have learned. Activities during the first plane focus on manners, practical life skills, motor and sensory skills, and development of numeracy and language.

Discipline and manners are instilled in several ways. The teacher is responsible for setting the example of proper behavior, as children will tend emulate their adult peers (Lillard, 35). In each classroom, only one of each didactic material is provided so that the children learn to share and wait their turn. They are also not allowed to touch any material until the teacher has shown them how to use it. Order is eventually established, despite the fact that each student may be moving around and working on a different activity.

Practical life skills such as how to care for one’s self and one’s environment are developed. Activities include personal care such as hand washing, brushing teeth, and dressing one’s self by means of a variety of dressing frames. Children also perform housekeeping chores such as tidying their belongings, washing tables, dusting furniture, sweeping the floor, setting the table, caring for plants and polishing objects of different materials such as brass, silver, leather, glass and wood. From these activities the children develop a stewardship for their environment and learn skills they will use throughout their lives.

The development of motor and sensory skills is emphasized through the use of a number of didactic materials. Objects for this purpose incorporate different textures, materials (such as cloth, sandpaper, metal, wood, or glass) smells, sounds, weights, and/or colors in order to stimulate each of the child’s senses. Graduated cylinders in sets of ten may range in diameter, height and weight. The child can see and feel the change in weight and size in order to understand the difference between them. Another activity is to transfer a substance from one container to another without spilling. If the container is glass, the child must also be careful not to break it. Activities such as these develop hand-eye coordination while simultaneously providing a foundation for mathematics and language.

Materials specific to numeracy are intended to convey abstract ideas in concrete form. Such materials include numerical rods and beads, which introduce counting, arithmetic, and the decimal system. For example, small rigid wires with a quantity of beads corresponding to numbers one through ten, each of a different color, hang in a frame. The number ten is gold. Ten sticks of ten beads illustrates a square of one hundred beads, ten squares of one hundred illustrates a cube of one thousand beads. Numerical rods are made of wood and work in a similar manner. Many of the materials come in sets of ten, reinforcing the metric system. Several of the materials explore geometric shapes and their properties serving as a basis for geometry and algebra. Through the use of these materials, a variety of mathematical concepts can be demonstrated in a tangible way.

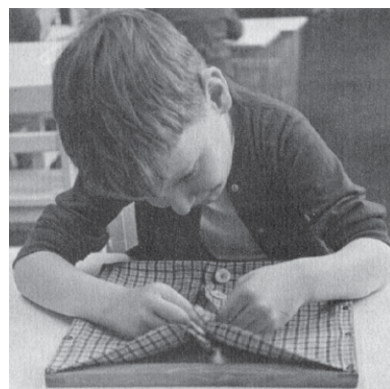
Language is taught using Seguin’s three part method. Using only adjectives, the teacher shows an object and gives it a name: “This is small”, the child is then asked to select an object: “Which one is small?”, and finally the child is asked to pronounce what it is: “What is this? Small”. Only at the end of the lesson is the actual name of the object given. In addition to acquiring language and vocabulary, the child is taught how to organize information and make observations (Montessori, 137). Reading and writing are developed using sandpaper letters and movable letters. The teacher shows the child how to trace the sandpaper letters as if they were writing them and how to pronounce each letter. To begin to form words, the child starts with a box containing half the consonants and all of the vowels. Once they have learned all the consonants and can form small words, they are given a box with the entire alphabet. Soon after, the child is able to write words on their own.

At the second plane of development or elementary education level, the child’s focus is on the formation of their intellect and social skills. Classes are divided into two age groups: six to nine, and nine to twelve. At this plane, the child is more independent, and wants to go out into the world and explore. In order to accommodate this intellectual curiosity, the Montessori Method’s goal is to “present them with the universe” and stimulate their imagination. Five “Great Lessons”, listed below, are presented at different times to the entire class.

- I *The Creation of the Universe and Coming into Being of the Earth:* Introduces creation of the universe in a neutral manner.
- II *The Coming of Life:* Introduces biology of plants and animals.
- III *The Coming of Human Beings:* Introduces human civilization and history.
- IV *The Story of Communication in Signs:* Introduces how different civilizations developed written and spoken language.
- V *The Story of Numbers:* Introduces how different civilizations used numbers; basic mathematical concepts advance into algebra and geometry.

Each “Great Lesson” is followed by a rest period to allow the new information to “incubate” in the child’s mind. Each child draws from the lesson some aspect which interests them and pursues it as a research project. The teacher then presents any one of a number of minor stories called “Key Lessons” to smaller groups or individuals. These “Key Lessons” provide more detail on a particular topic, but not enough to satisfy the child’s interest. The research projects may take children on trips to libraries, museums, aquariums, zoos, buildings, historical sites, or parks, which they organize themselves. Children naturally divide into groups based on their interests and are encouraged to work together. Though they will hear the same stories many times, the child will take away something different each time as they grow and their interests change.

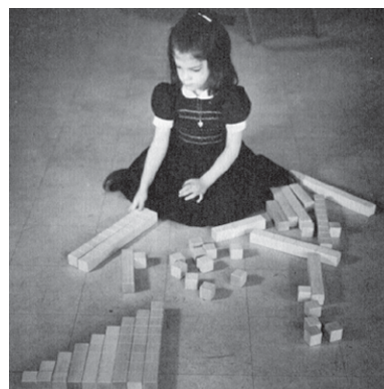
Sources: *Dr. Montessori’s Own Handbook, The Essential Montessori, Montessori Today,* and my own observations at The Aquinas Montessori School in Alexandria, Virginia. Refer to the bibliography for complete information on each of the books listed above.



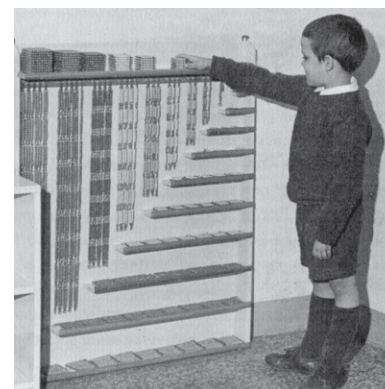
1 | Dressing Frame



2 | Musical Staff



3 | Numerical Rods



4 | Bead Materials



5 | Graduated Cylinders



L'Enfant's Plan for the Federal City

pre-1608 Numerous Indian villages along the Potomac River. (Tilp, 1)

1608 Captain John Smith sails up the Potomac River.

1697 Maryland General Assembly establishes a ferry, important to commerce, on Rock Creek.

1703 Lord Baltimore deeds 795 acres on the north side of the Potomac River to Colonel Ninian Beall who names it "Rock of Dumbarton" after a landmark castle in Scotland. (Tilp, 309)

1703 Indian trading post named "Saw Pit Landing" established on the west bank of Rock Creek where it meets the Potomac River. (Tilp, 212)

1711 Baron Christopher de Graffenreid deems Rock Creek delta to Potomac "suitable for sailing of great merchant vessels". (Tilp, 213)

1744 Tobacco warehouse at the end of High Street (Wisconsin Avenue today) becomes an official inspection station; assures settlement. (Tilp, 213)

1748 Georgetown becomes part of Frederick County.

1751 Maryland General Assembly recognizes "Town of George" as covering 60 acres and was plat mapped according to boundaries set forth by Maryland legislators, but was never incorporated as a city. (Caemmerer, 179)

1751-1827 Georgetown operates primarily as a tobacco port due to its proximity to the tobacco plantations in Maryland. (Tilp, 213)

1762 Public wharf constructed at the foot of High Street (Wisconsin Avenue, today). (Tilp, 213)

1775-1783 American Revolution

1783-1784 Winter storm and spring thaw deposit rocks on Georgetown side of Mason's Island in the Potomac River, and cut Virginia side deeper. (Tilp, 214)

1789 George Washington inaugurated as first President of the United States

1789 Georgetown University founded.

1791 Territory of Columbia established by Congress.

1791 Pierre L'Enfant arrives to plan the capital city.

1792 Georgetown exports reach peak value.

1800 Papermill Bridge built at a ford in Rock Creek near P Street.

1800 Congress moves from Philadelphia to Washington, D.C.

1805 Stone causeway built from Mason's Island to Virginia shore, blocking past shipping route and forcing ships to the north side of the island. (Tilp, 213-214)

1808-1809 Long Bridge (14th Street Bridge today) is constructed causing shipping trade to Georgetown to diminish. (Tilp, 214)

1825 Chesapeake & Ohio Canal Company plans to build canal connecting the Potomac with the headwaters of the Ohio River.

1826 Papermill Bridge burns down, abutments remain. Washington wants to rebuild, but Georgetown does not want to pay their half. Alternate route had to be used to cross Rock Creek instead. (Mitchell, 1)

1828 C&O Canal construction begun.

1828-1889 Georgetown operates primarily as a canal town.

1831 Canal becomes municipal property by Act of Congress. (Tilp, 228)

1833-1881 Federal government makes channel improvements above Long Bridge (14th Street Bridge today).

1834 Aqueduct Bridge construction begins.

1837 US Coast survey reveals that sediment at the bottom of the Potomac may be as much as 50 feet deep. (Tilp, 214)

1849 Oak Hill Cemetery established.

1850 C&O Canal construction stops at Cumberland, Maryland, 185 miles above Georgetown. It never reaches the Ohio River. (Tilp, 230)

1850s "Tidal sedimentation, erosion of soft marshy earth embankments, dishonest contractors and internal politics in the city joined together with railroads to hasten the inevitable downfall of all the city canals."

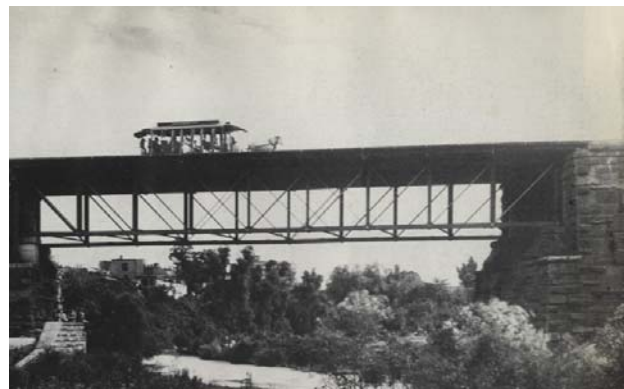
1860 First proposals for creating a national park in D.C.

1861-1865 American Civil War

1861 Aqueduct drained and used as a bridge by Union troops. (Mitchell, 58)

1865 Reconstruction begins, freed slaves move to "Herring Hill" in east Georgetown south of P Street. (Mitchell, 90)

1867 George Peabody donates funds for the first library in Georgetown. (Mitchell, 48)



1 | P Street Bridge, c1885



2 | Aqueduct Bridge during the great flood, 1889



3 | Georgetown Trolley, c1890



4 | Lower Ford of Rock Creek, c.1900



Map of Georgetown, 1861

1871	Congress passes the Territorial Act and Georgetown becomes part of D.C. Board of Public Works created and paves roads in Georgetown. (Caemmerer, 179)	1889	Major flood renders C&O Canal unoperational for 7-8 years, milling drops sharply.	1935	Peabody Library moves to Georgetown Neighborhood Library on R Street.
1871	Second bridge at P Street built.	1890	Congress purchases the Rock Creek Valley to preserve natural land within the rapidly developing city. One plan suggests in-filling the Rock Creek valley south of Massachusetts Avenue. to the Potomac and creating a tunnel through which the creek would run, thereby raising the level of the land to that of the surrounding area. At this time, the valley was used as a sewer. The AIA fights the plan and wins. The valley is cleaned and restored to a natural state.	1938	National Park Service purchases C&O Canal, makes repairs and reopens for pleasure craft and tow path for pedestrians.
1872	Metropolitan Railroad Company lays track from Connecticut Avenue to Wisconsin Avenue along P Street. (Mitchell, 46)	1893	Subdivisions are rampant outside the limits of the L'Enfant Plan. Legislation passes for a street plan encompassing all 100 square miles of the District. However, there was no provision for the extension of the park system. (Caemmerer, 69)	1939-1945	World War II
1876	Peabody Library, the first circulating public library in Georgetown, opens on O Street. (Mitchell, 48)	1895	Act of Congress removes the name "Georgetown" from maps of D.C. Georgetown street names changed to match those of D.C.	1940s	Population of metropolitan D.C. reaches one million, two-thirds live in the District.
1876	Roughly three-quarters of Georgetown has been developed. (Mitchell, 52)	1900	Decline in canal trades. Railroad by-passes Georgetown, routed from Alexandria to Baltimore, then west. Alexandria and Baltimore take over shipping and industry as the C&O canal and Potomac River silt up. (Weeks, 7)	1945	Georgetown residents: New Dealers who encouraged the Historic Preservation movement and working class African Americans. (Miller & Gillette, 158)
1883	Pendleton Act brings educated civil servants to D.C., many of whom settle in Georgetown. (Mitchell, 61)	1901	McMillan Commission: Primary duty to design appropriate parks outside the L'Enfant Plan.	1949	Georgetown flourishes as a residential area. Whitehurst Freeway constructed over K and Water Streets separating Georgetown from the waterfront.
1888	Federal government buys aqueduct from private owners, and restores it. Georgetown regains direct and toll-free connection to Virginia. (Mitchell, 85)	1910	Commission of Fine Arts established.	1950	Congress passed the "Old Georgetown Act" to preserve Georgetown's architectural character.
		1911	Playground Department established.	1967	The Washington Metropolitan Area Transit Authority created to build and operate mass transit in the national capital region. Due to topography, a metro stop was never planned for Georgetown.
		1924	C&O Canal stops operations after flood causes significant damage. (Tilp, 230)	1976	First phase of the Metro is operational.
		1924-1926	Park and Planning Commission deems that progress made since the McMillan plan in 1901 is unsatisfactory. Recreation areas and playgrounds for each community planned. (Caemmerer, 108 & 150) New policy: "Every child shall have a place to play". (Caemmerer, 151)	1990-1998	Whitehurst Freeway rehabilitated.
		1930s	Renewed interest in Georgetown as a place to live.	2009	Georgetown Waterfront Park between Key Bridge and Washington Harbour completed, restoring the shoreline for public recreational use.
		1935	Stone P Street Bridge completed.		



1 | Mass Baptism, P Street Bridge, c1900



2 | Connecticut Pie Company, c1900



3 | C&O Canal, 1862



4 | Aqueduct and Key Bridges, 1922

25' Contours

Waterway



LAND FORMS

The steep banks and depth of the Rock Creek valley create a physical barrier between and Georgetown and D.C. The terrain on the east shore of Rock Creek is much steeper, affording large flat areas for building, whereas the west side slopes more gradually, affording fewer flat areas, and perhaps dictating the smaller scale of the buildings. The intersection of the two waterways creates an ideal location for commerce and trade. Above Georgetown on the Potomac River are falls which prohibited ships from sailing further. During colonial times, Rock Creek was navigable by merchant ships. The construction of the C&O canal circumvented the falls, expanding trade to the west.

Expressway or Parkway

Major Arterial Road

Minor Arterial Road

Bicycle/Pedestrian Path

MetroRail



INFRASTRUCTURE

The formation of Georgetown and D.C. as separate entities is evident when studying the street grids. The scale of Georgetown is relatively small owing to its colonial origins and development over time. By contrast, D.C. was planned by L'Enfant to be monumental in scale with wide diagonal avenues connecting various circles and focal points. The diagonal axes of the L'Enfant Plan have no relationship with points in Georgetown. Two major arteries connect the business districts of Georgetown and D.C. Two minor arteries connect residential and mixed use areas of the city. The long stretch of open space along Rock Creek provides a suitable location for a parkway. Open space along the Potomac River became a convenient location for a modern expressway in an already established city. Pedestrian and bicycle trails follow the three waterways.

Commercial

Residential

Mixed-Use Residential & Commercial

Institutional

Recreation & Open Space

Industrial



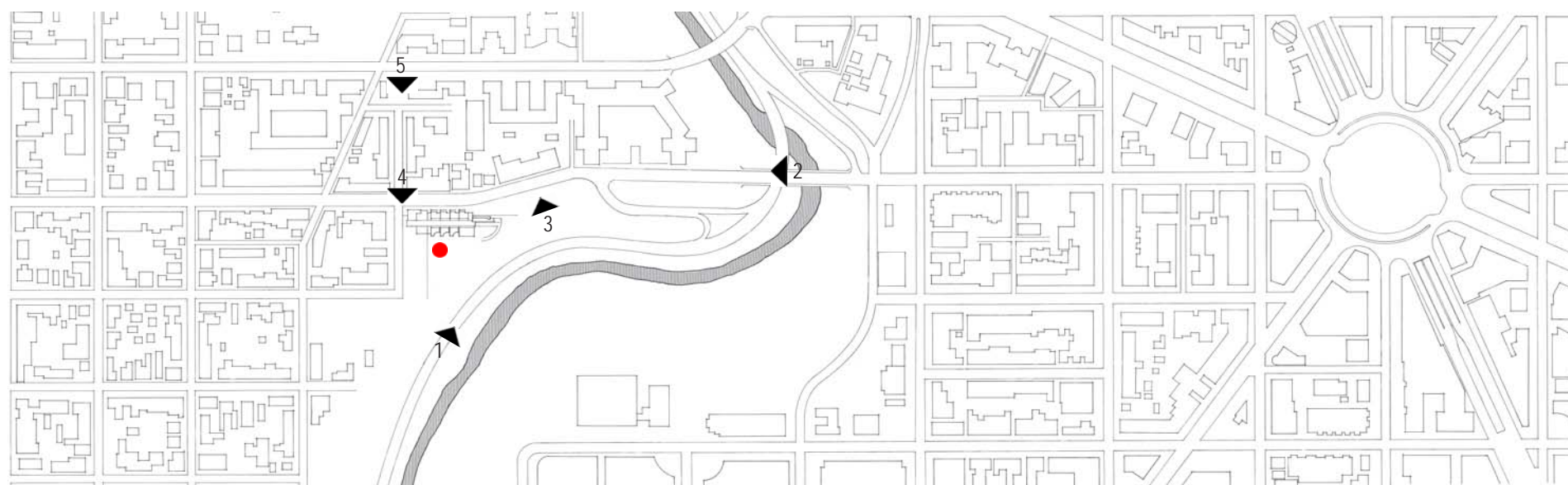
LAND USE

The commercial cores at Wisconsin and M Streets in Georgetown, the business district in D.C., and Rosslyn, Virginia clearly emerge as centers of their respective communities. The mixed-use areas provide transition and a unique urban character to both the Georgetown waterfront and the Dupont Circle neighborhoods. Residential uses fill out the areas between commercial/mixed-use and the recreation or natural areas. Georgetown University is the dominant institutional use, with smaller pockets, primarily schools and libraries, occurring at a variety of points between the residential and commercial areas. Recreation areas clearly follow the three waterways: the Potomac River, Rock Creek and the C&O Canal. A modest amount of light manufacturing use exists between the canal and the river, at the west end of Georgetown.



FIGURE GROUND

This map delineates the fabric of the city as context, buildings are solid black. In D.C., the buildings are larger, the streets are wider and the open space is concentrated into focal points. In Georgetown, the buildings are smaller and more numerous, the streets are narrower and there is no concentrated open space within its fabric. In both areas however, the buildings clearly define the street edge, with open spaces toward the center of the block.



BUILT FORM

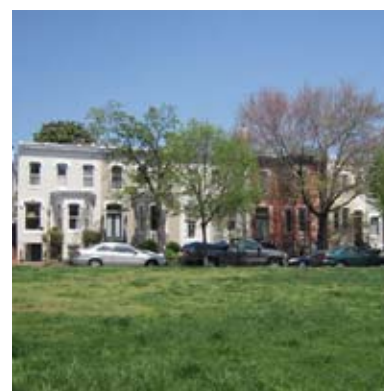
This map illustrates the architectural development of the city. Georgetown, founded in colonial times, is of a much smaller scale than the rest of D.C. which was laid out on a monumental scale fitting the capital of the United States. The two areas are divided by Rock Creek valley and connected by few bridges. Since the two cities initially developed independent of one another, the street grid does not align.



1 | Rock Creek Parkway



2 | P Street Bridge looking west



3 | P Street townhouses

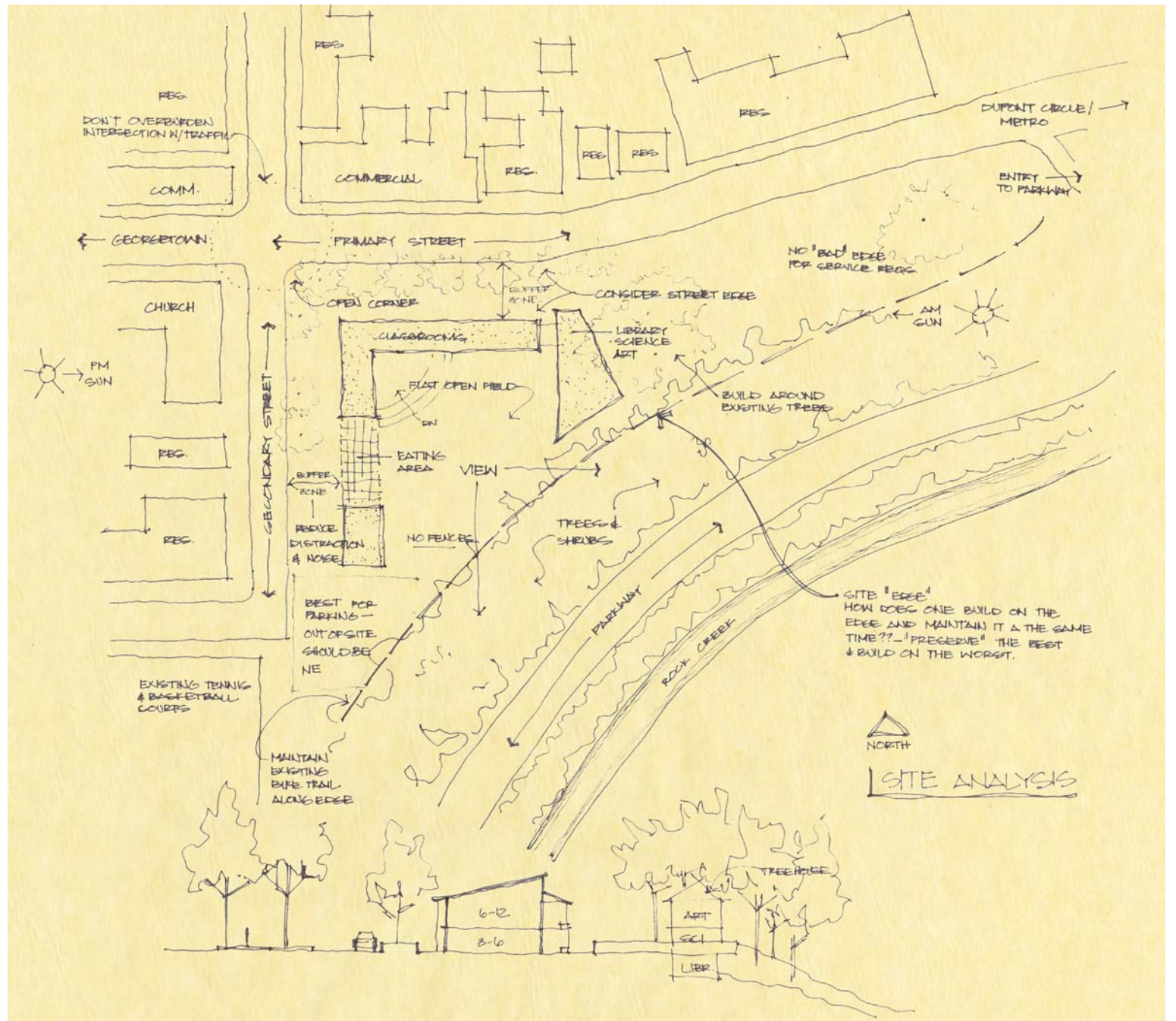
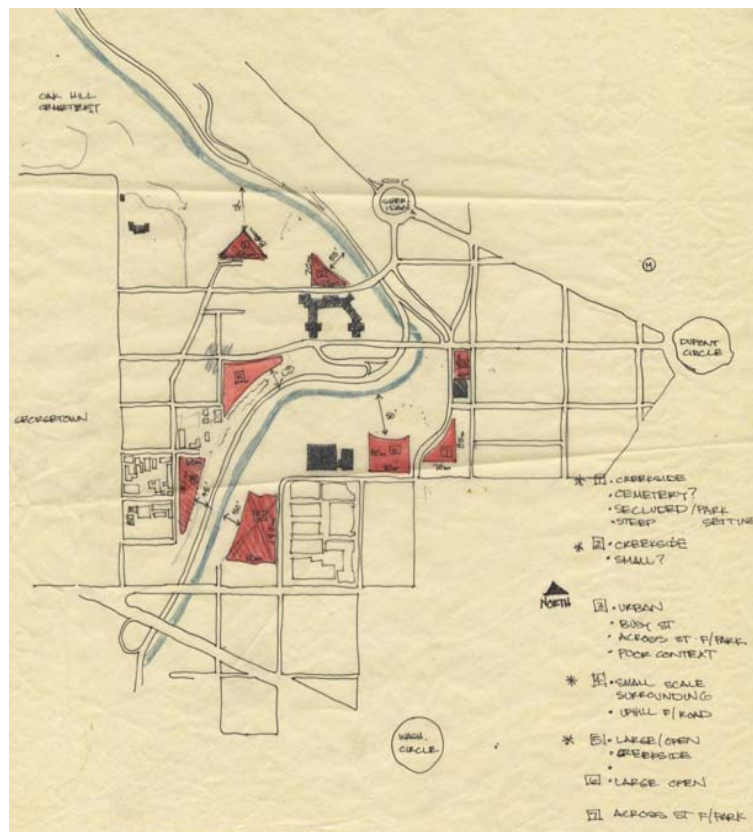


4 | P and 26th Streets looking south



5 | 26th Street looking south

SITE ANALYSIS



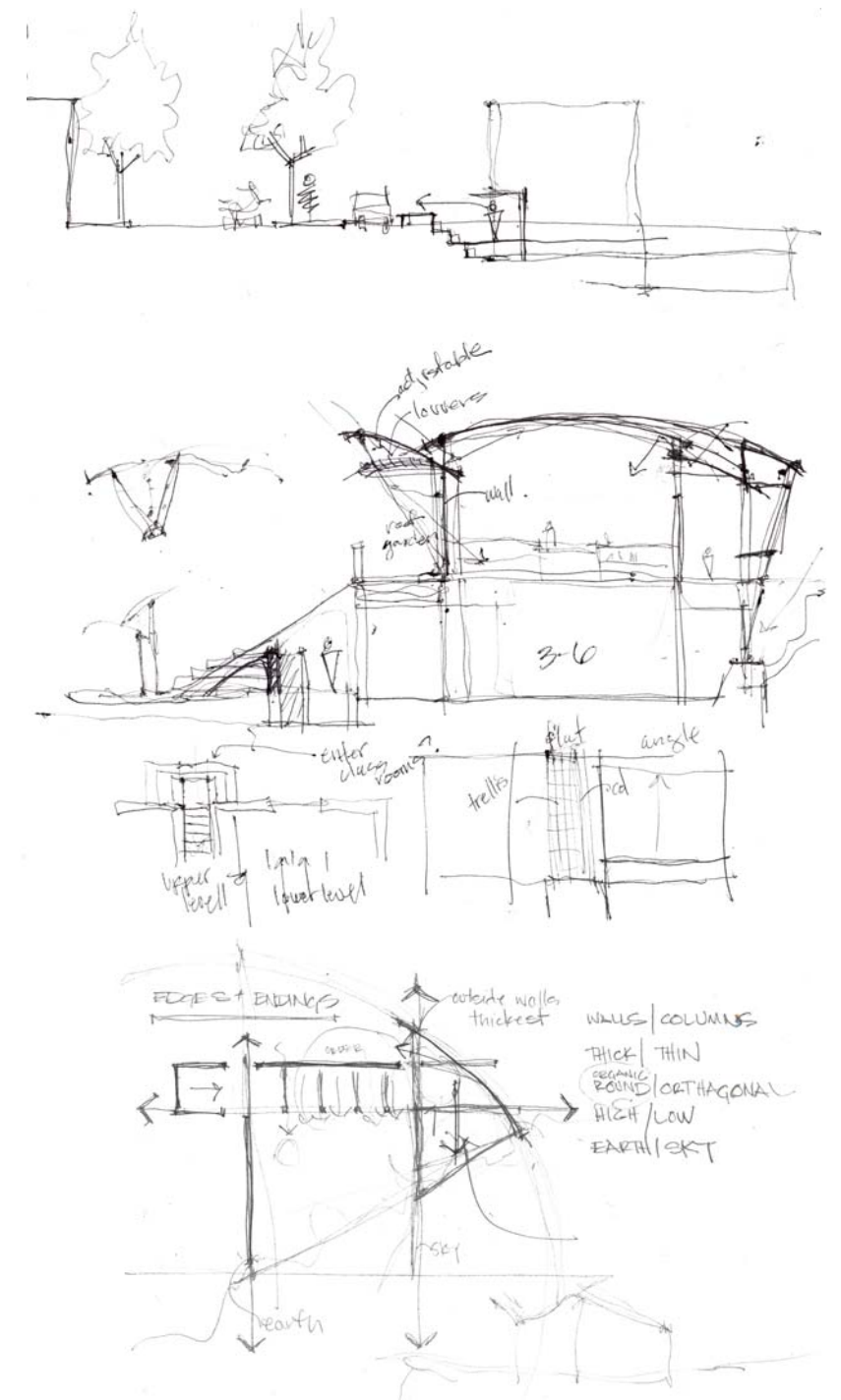
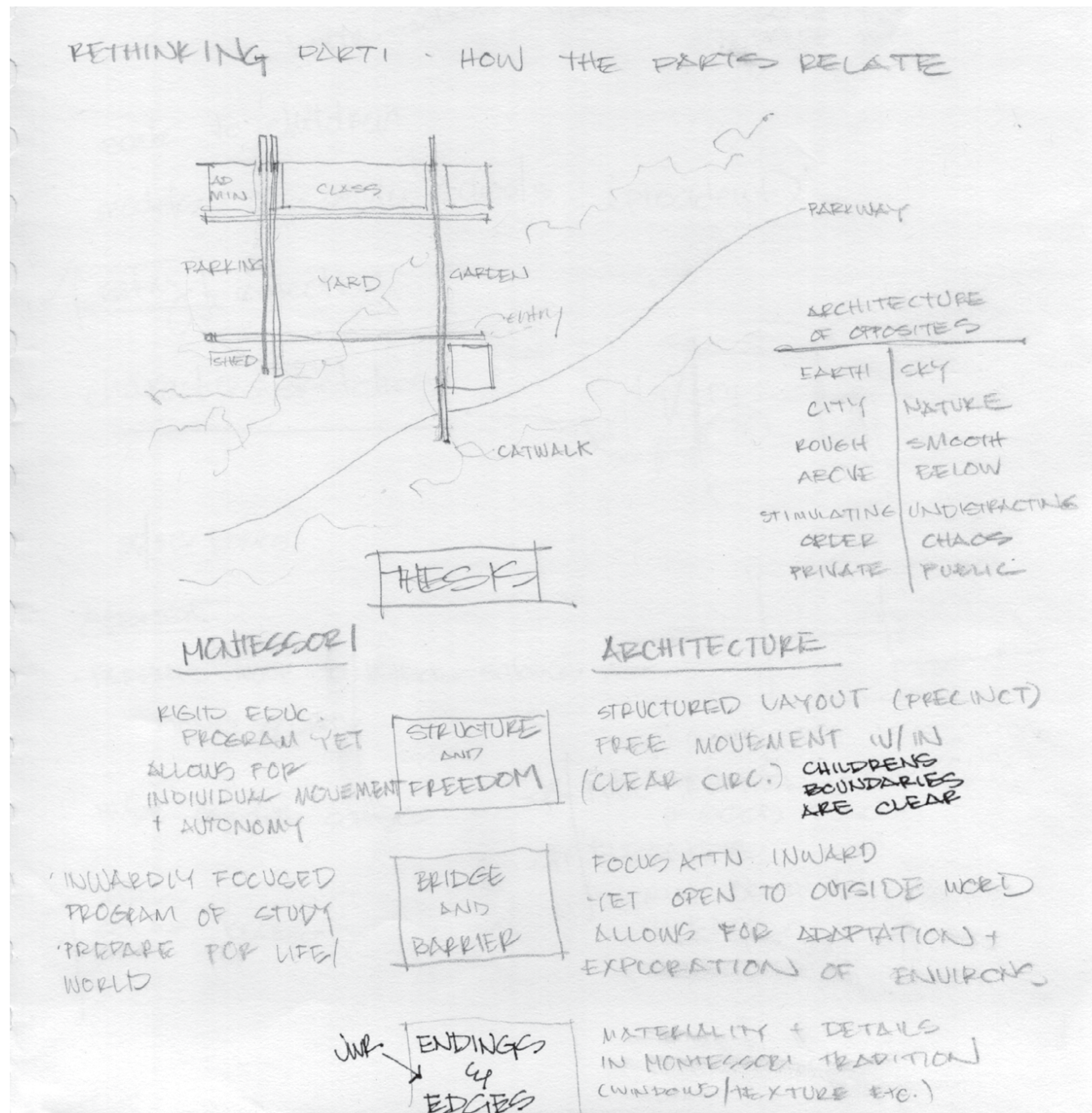
Site selection focused on Washington, D.C. Desirable characteristics for the site were that it be in a relatively residential neighborhood so that children could walk or bike to school, and that it be near educational opportunities such as museums, historical sites, libraries, and parks. Another consideration was the desire by District residents for more choice in schools, such as magnet and charter schools. There is also an international community in the area that would be familiar with Montessori philosophy. An "infill site" was sought so that the school could become part of the existing community infrastructure.

Based on these characteristics, a number of sites between Georgetown and DuPont Circle near Rock Creek Park were considered (see diagram above left). Sites 1 and 2 were very steep, small and felt too secluded. Site 3 was

bounded on three sides by busy streets, was too small to allow for outdoor play areas at grade level and was adjacent to high rise buildings. Site 7 was larger than site 3 and had only one street front, but was shadowed by high-rise buildings to the south and was separated from the park by a street. Sites 5 and 6 were adjacent to the park with a sizable amount of land, but were also shadowed by neighboring high-rises. Sites 4 and 8 were adjacent to the park, in more residential neighborhoods, and each had sufficient land. Site 8 was ultimately chosen because it was slightly larger, had a longer east-west dimension for solar orientation, and was bounded on one side by a primary street for vehicular access.

The chosen site was then studied for how to best utilize the available attributes (see diagram above right). Along the north edge is P Street, a primary link

between Georgetown and D.C. The west edge is defined by 26th Street, which is only two blocks long, and is not heavily travelled. The third edge of the site is defined by the Rock Creek valley. In order to preserve as much open space as possible, the building was positioned along the street frontages. At the same time, a buffer zone between the street and classrooms was left in order to reduce distraction and noise for the students. A separate wing for a library and music, art and science rooms was planned towards the east end of the site as a gesture towards the cultural amenities of the city and to possibly serve as inspiration. Placing the parking area at the corner of O and 26th Streets offered direct vehicular access as a continuation of O Street. A large open space was to be retained as outdoor play space. The existing trees and views across the park were to be preserved for the enjoyment of the students.

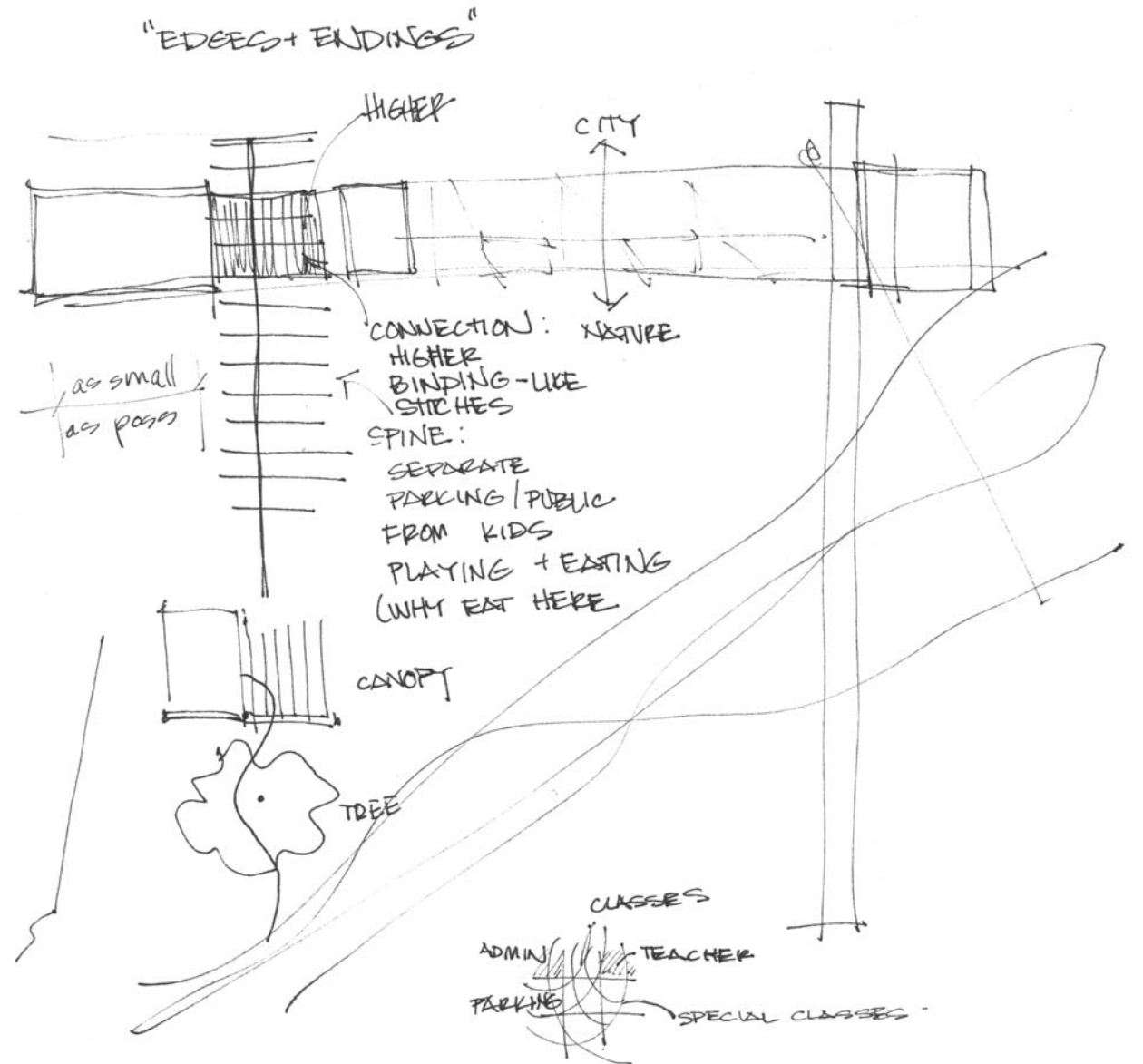
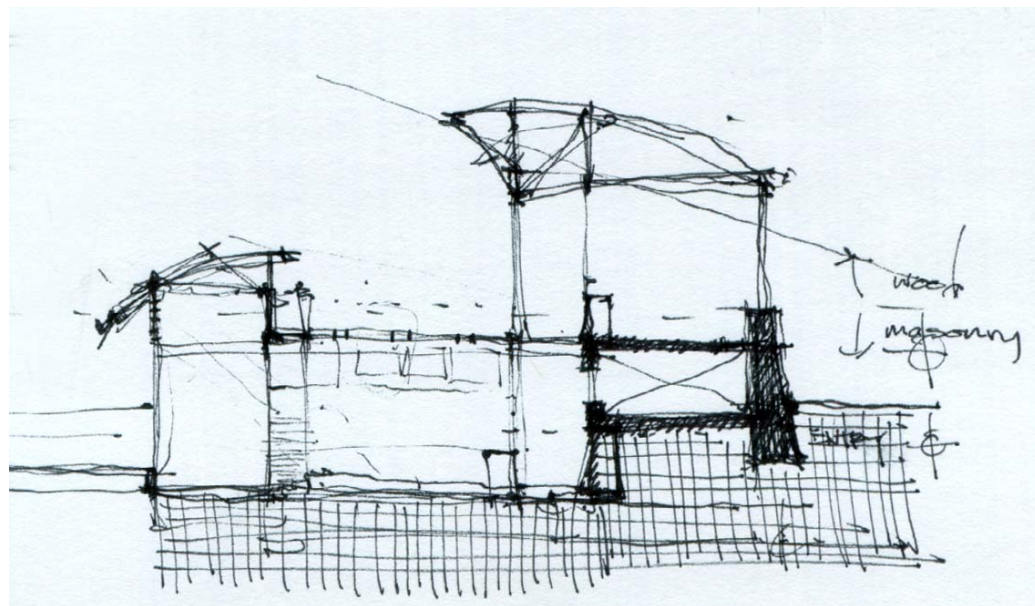
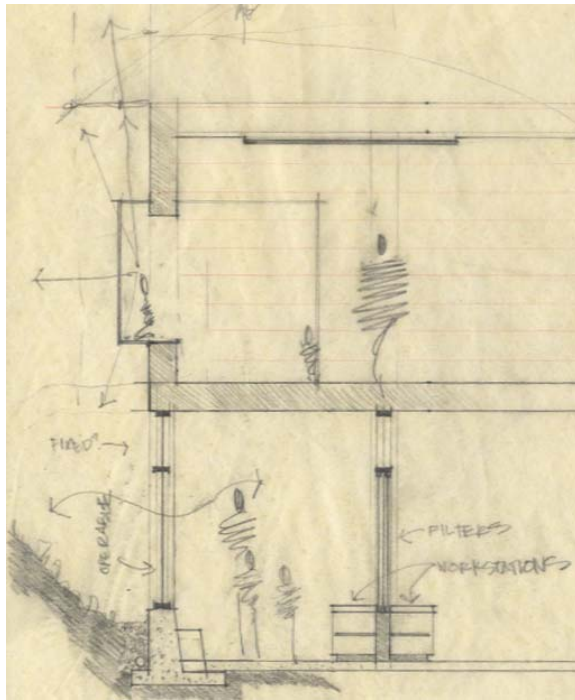


Through my research, a number of requirements for the design of a Montessori school emerged. The directress is central to the school and maintains close ties with all of the students. There should be openness within and among the classrooms so that students of different ages may learn from and teach one another. Classrooms should be stimulating, but not distracting, and should be flexible enough to allow for a number of activities to be going on at any one time. There also needs to be plenty of space to allow students to spread out with their didactic materials and research projects. Circles are used within the classrooms to define meeting places. For children at the primary level (ages 3 to 6), all of their needs are brought to them. They work primarily in their classroom, but may also visit other parts of the school with adult supervision. Children at the elementary level (ages 6 to 12), have more freedom and are permitted to go anywhere in the school as their studies dictate. The school

should also reinforce Montessori principles such as auto-education, independence, discipline, simplicity, order, preparation for life, and mastering basic concepts before attempting to learn abstract ones. Other ideals for the school were the use of natural light and providing views to the outdoors wherever possible.

The parti diagram for the school sets the directress' office and the library as anchors at either end of the school, connected by a spine to which the classrooms are attached. Primary spaces such as the administrative suite, classrooms and library are all defined by masonry shells. Steel and glass are the filaments that tie the shells together and define the in-between spaces such as the entry hall, corridors and multi-purpose space.

The building began as two stories; the primary classrooms on the lower level and the elementary classrooms on the upper level. All classrooms had views to both the street and park. As the design progressed, the two levels start to pull apart, creating terraces, though still stacked vertically. The primary classrooms were left in a cave-like space and were cut off from the rest of the school. Given that the directress should be able to see and have direct access to all of her students, creating a line of sight between the administration suite and the classrooms emerged as a priority. The two levels were pulled even further apart and set on grade. Though the site is relatively flat, there is a four foot drop from the sidewalk along P Street. In order to accommodate this grade change, three levels were created with stairs as retaining walls. The upper level was placed flush with P Street and the lower level was placed flush with the playground area, the middle level was centered between the



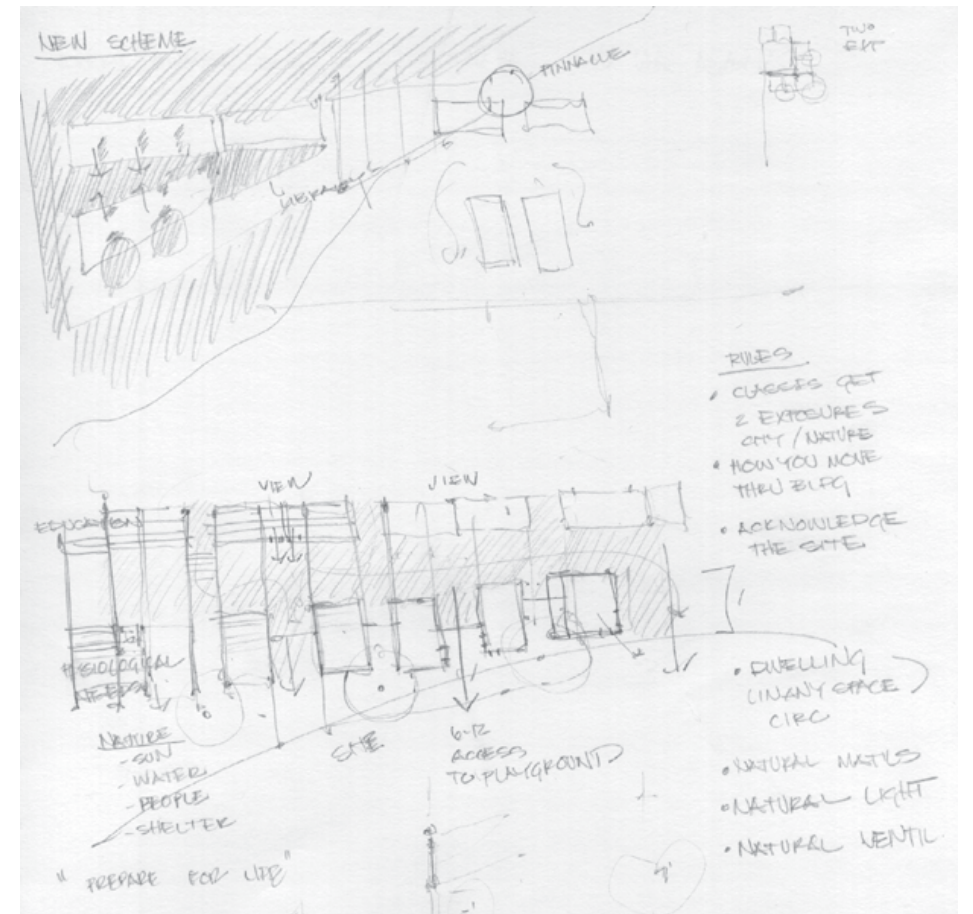
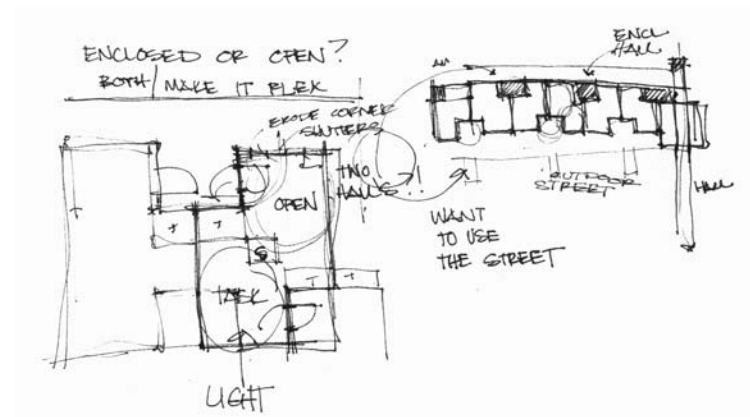
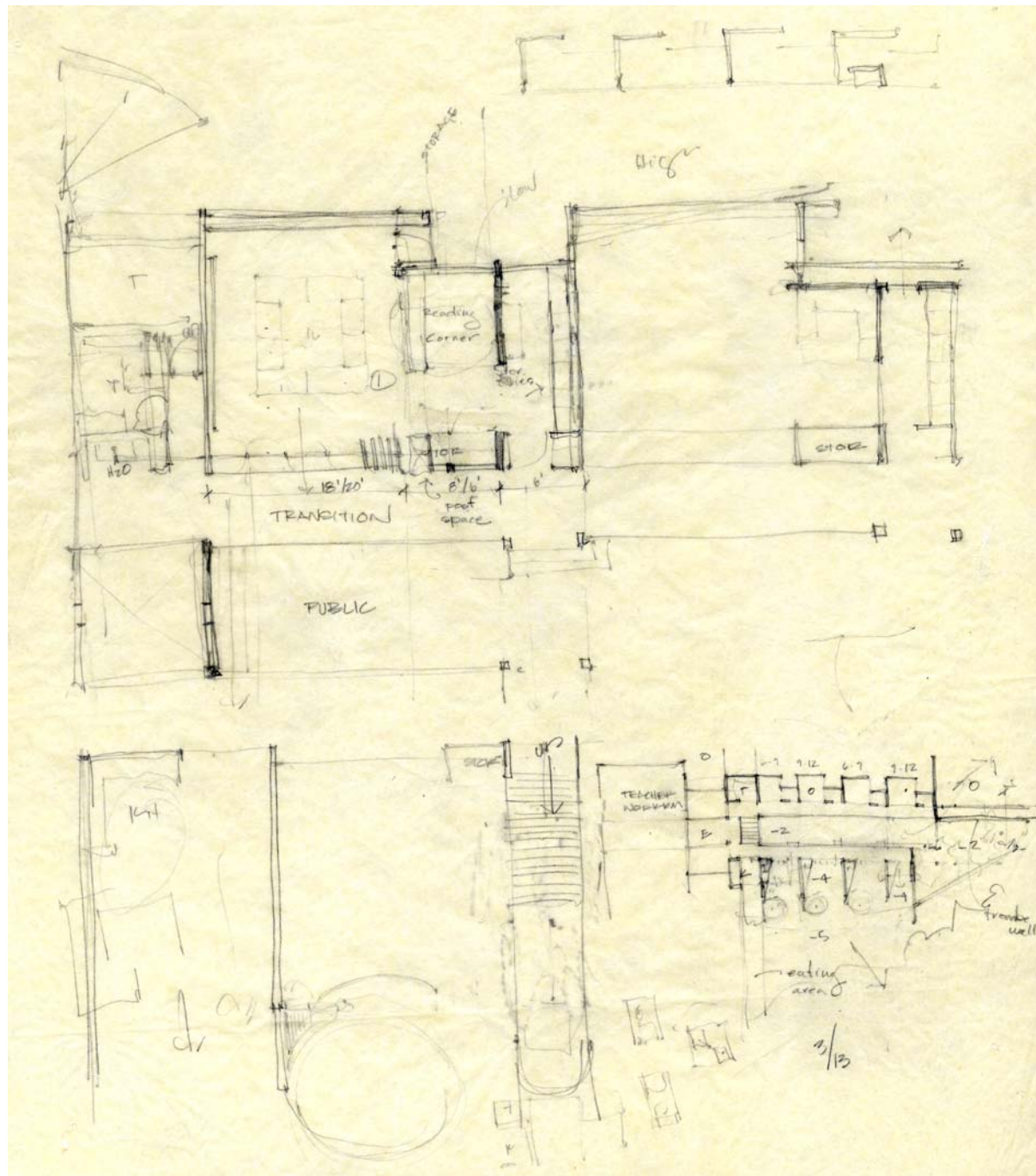
two. At the west end of the school, entrances were provided at each of these levels; off P Street at the upper level, off 26th Street at the middle level and from the parking and drop-off area at the lower level. All three entrances converge into a main entry hall. The middle level became a wide corridor connecting all the various spaces of the school. The elementary classrooms were placed along P Street at the upper level, symbolic of the older students' explorations into the world outside. A narrow corridor connects the elementary classrooms and main entrance like a side aisle off the main corridor. The library emerged as an extension of this upper side aisle, providing direct access for the students who will use it most frequently. The primary classrooms were placed in a protective position on the lower level adjacent to the park. They are also connected by a narrow corridor linking them with the main entrance and a large multi-purpose space. Wide continuous steps connect the three

levels allowing students an infinite number of paths through the school. The main corridor extends outside to the east, ending in a series of curved terraces at the edge of the hillside.

The administrative suite is wrapped in a masonry shell on the street elevations, but is open to the corridor and entry hall. The directress' office is located in the far northwest corner. There is also an open conference room and nurse's office along the north wall. In the center is a large open workspace for the administrative staff. Separate restrooms are also provided for the staff.

At the convergence of the north-south entries and the main corridor running east-west is the main entry hall. The challenge for this space was to resolve the various level changes and entry points in a way that felt like a single unified

space. Along the west edge of the entry hall is a ramp for accessibility, which takes inspiration from the Montessori materials which show gradations in size. The wall defining the outer edge of the wall is a consistent height for the length of the ramp. Because the top of the wall remains constant, the person becomes aware of the level change in a graphic way. The inner wall slopes with the ramp in order to maintain openness with the rest of the entry hall and to contrast with the outer wall. Terminating the stairs between the three levels was resolved by using both the Montessori concept of circle as meeting place and the graduated cylinders. Between the upper and middle levels, the stairs wrap around a column before dying into the ramp wall creating an intimate gathering space. Between the middle and lower levels, the stairs bow out on axis with the lower entry, creating a vantage point to spot arriving friends and parents.



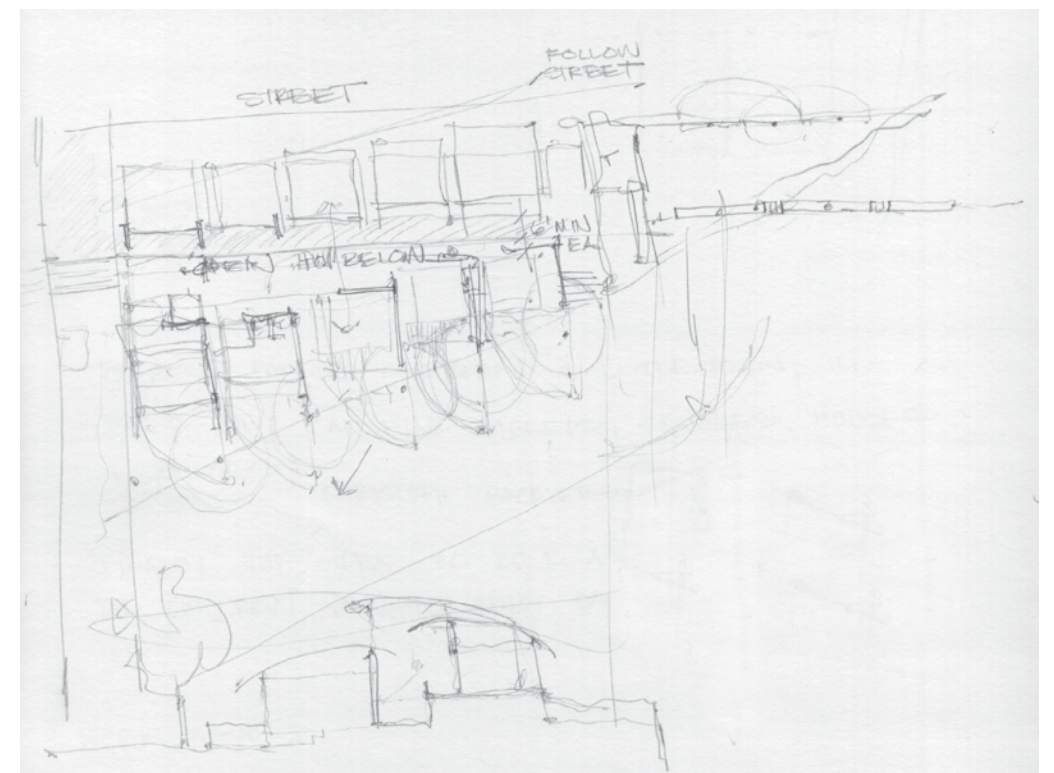
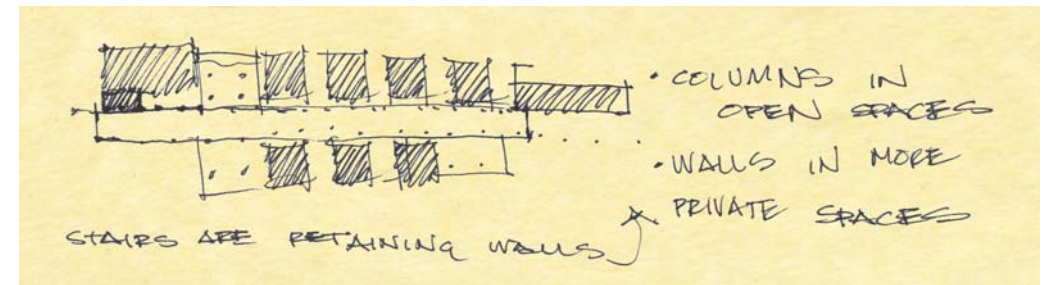
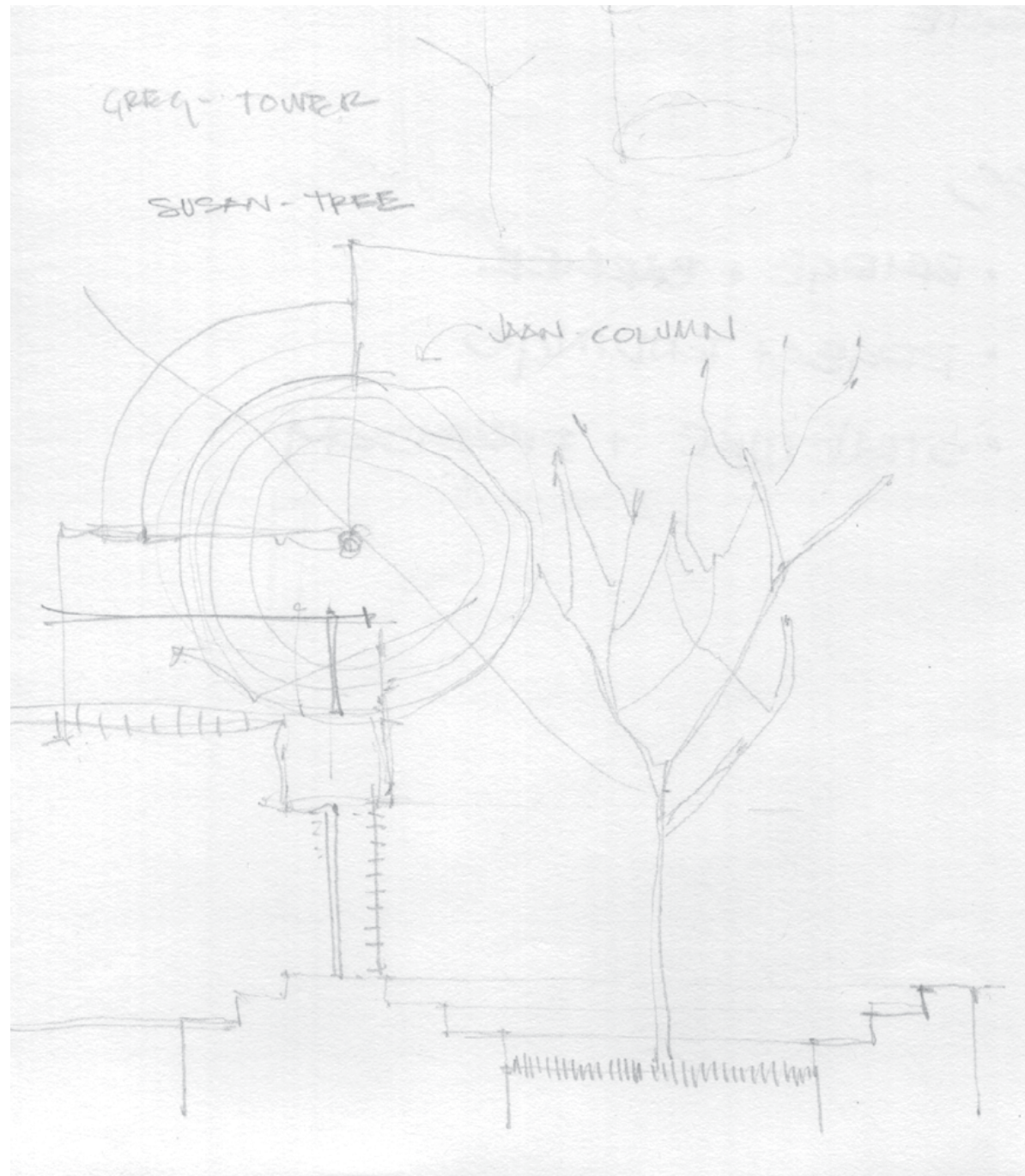
The lower set of stairs continues outdoors on the other side of the ramp, curves concentrically around an existing tree and dies into the street beyond.

The parti of the elementary level classroom is two thick shells nested together and connected by permeable membranes. These shells separate the classrooms from the outside world and each other, but through the gaps still allow access to the students to move freely between the spaces. At the street elevation, a narrow outdoor space is created between the outer shell and the glass wall that encloses the classroom. Punched openings in the outer shell scaled for children allow views of the street beyond. Light reflects off the shell wall bringing indirect daylight into the north facing classroom. The wall dividing the classroom from the corridor has a series of operable panels that can be configured in a number of ways allowing the room to expand into the corridor

as needed or to bring additional daylight into the space. There is also a small solid portion of wall with a standard side hinge door for use when the operable panels are closed. Along the east wall is a row of cubbies for the student's belongings with a fixed bench nearby for changing shoes and such. There is also a small platform the use of which can be customized by the students; it could be designated as a seating area or a stage for performances and presentations. Between the doors in the glass wall is the only other built-in feature in the room, a low wall with shelves carved out. It can be used for the storage of books or other materials. The deep sills provide a place to grow small potted plants.

The parti of the primary level classroom is almost a mirror image of elementary classroom, except for how it interfaces with the outdoors. The primary students

are given their own outdoor space consisting of a ring of steps centered around a tree which notches into the classroom space and creates a visual connection between indoors and out. A low wide wall wraps around the sunken garden and separates it from the rest of the playground. Between the classroom and the corridor are the same operable panels and hinged door. The primary students can also use the corridor beyond as an extension of their classroom; however the ascending stairs serve as a barrier to them traveling any further. Both the corridor and garden steps can be used as chairs and/or desks if the students choose. Toilet rooms and a common sink are provided within the classroom. Though they are in their own microcosm, the primary students have views to other parts of the school. They can observe what the older students are doing and get a preview of where they are headed.



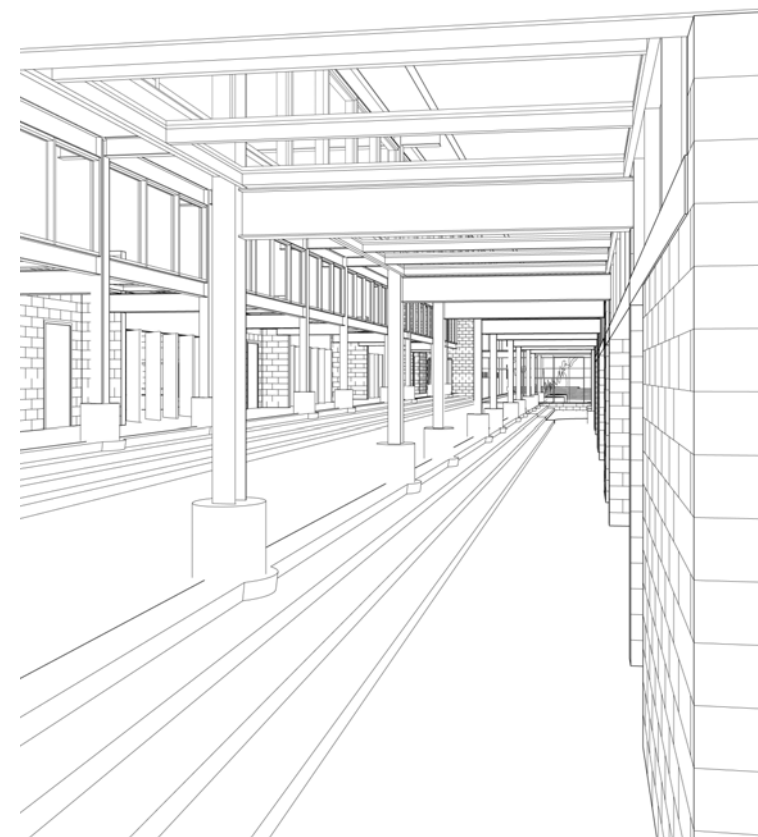
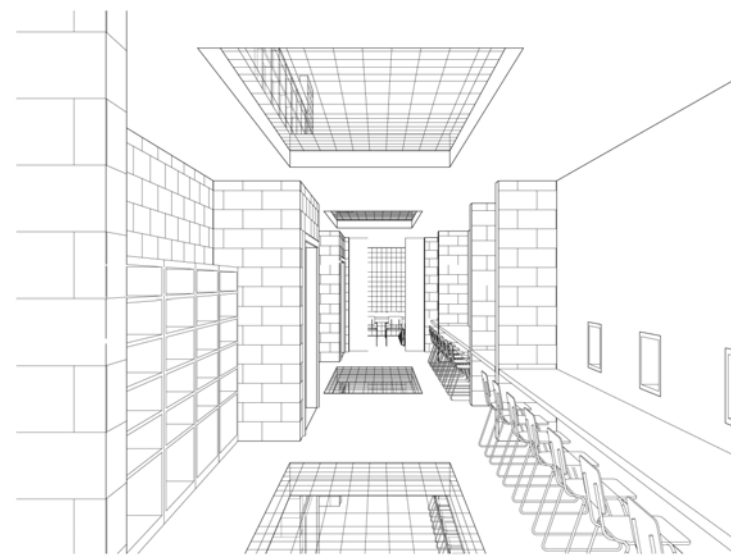
The library is monastic in nature and separate from the rest of the school. The space is long and narrow with desks lining the south wall and books lining the north. The south wall is a thick, cast-in-place concrete wall with small punched openings that splay out toward the interior. They are primarily to provide views, but also bring in light and show the movement of the sun. Beyond the north wall are stairs to access the second floor of the library and the roof. Unlike the rest of the library, the stair is enclosed in a glass wall allowing views to the north and east. Most of the daylight to the library interior comes from above. Large skylights in the roof and corresponding glass at the second floor level filter light throughout the space. At the east terminus of the library are group study rooms which can be closed behind sliding doors. The east walls of these rooms are glass block, which let in light and give a sense of the

the park beyond, but filter out distractions. Outdoors, the existing trees on the site were preserved and incorporated into the design. Near the south entry where the main corridor extends outside, the steps curve acknowledging a large existing tree. The narrow library element passes by three existing trees to the north. The entrance to the parking area is an extension of O Street in order to simplify vehicular access during peak traffic times. Immediately after the entrance, the roadway splits into parking playground. The parking and queuing lanes rejoin and exit at the midpoint of the block. The existing sidewalk along P Street is maintained. Along 26th Street a sidewalk connecting the intersection at P Street with the west entrance to was added; it was not extended further in order to preserve existing site trees.



"(The sidewalk) was one of the nineteenth century's triumphs, and it always manipulated the scale of the town in favor of the individual. It personalized the street, gives release from traffic flow and a place for loitering, provides a hierarchy of spaces and a multiplicity of uses in what would otherwise be a passage."

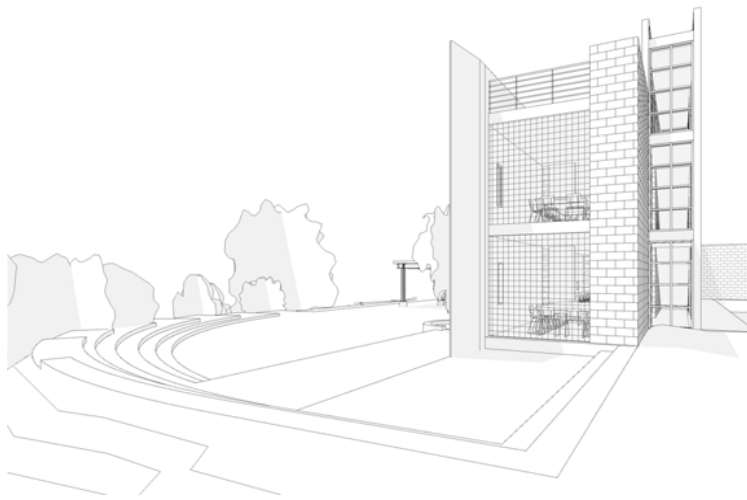
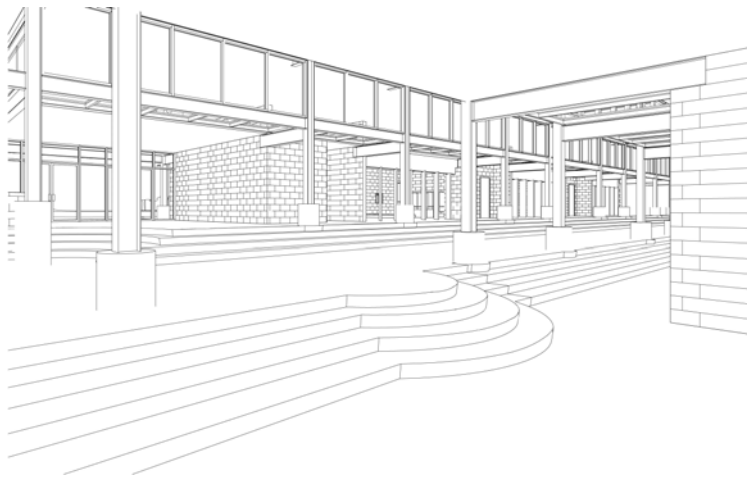
Vincent Scully
American Architecture & Urbanism



THE STREET



The main corridor serves as a metaphor for the street in this "city within a city" and provides hierarchy to the various spaces. The central corridor is the "street" and is the most public, the side aisles are the "sidewalks" and serve as buffers, and the classrooms are the houses and are the most private. The central corridor is the highest of the spaces and has clerestory windows on either side which flood the space with natural light. At either end, glass walls allow vistas continuing outside the school to the city and park beyond. The side aisles are separated from the main corridor by a row of columns and four steps. The columns give a tree-like cadence to the corridor and its translucent skylights filter light as if through the leaves of trees. The sidewalks also connect the classrooms to other destinations within the "city"; the directress' office, the entry hall, the library, and the outdoor spaces.



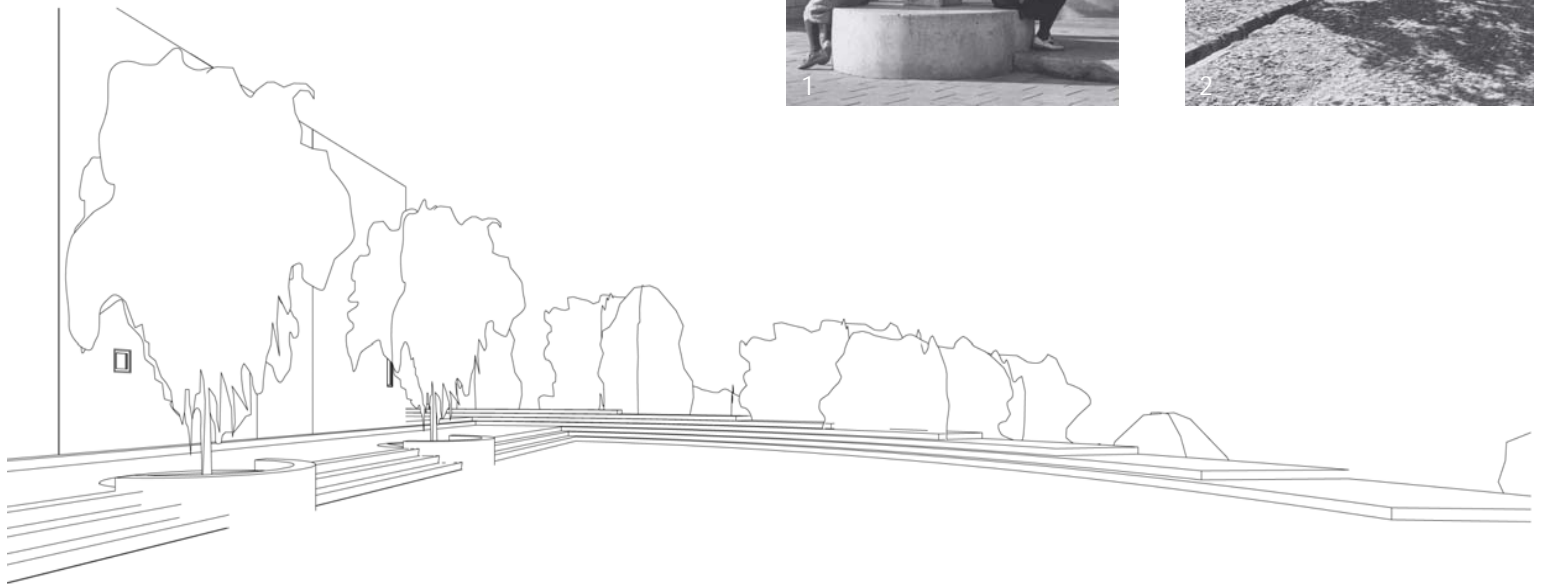
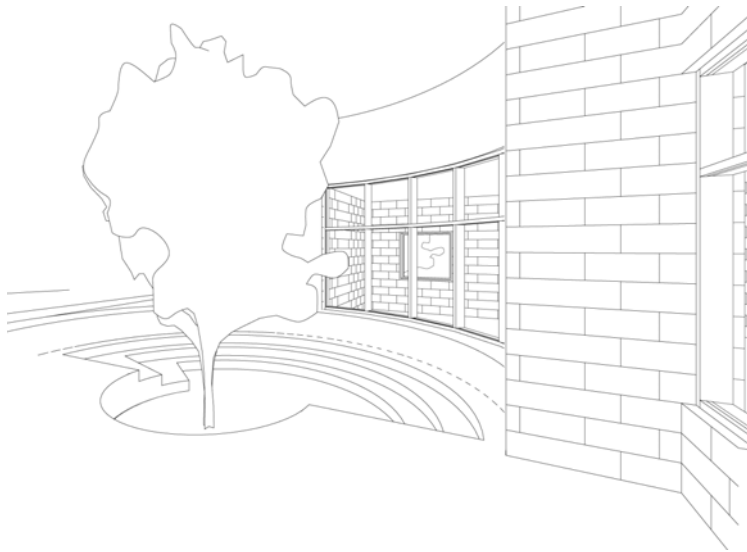
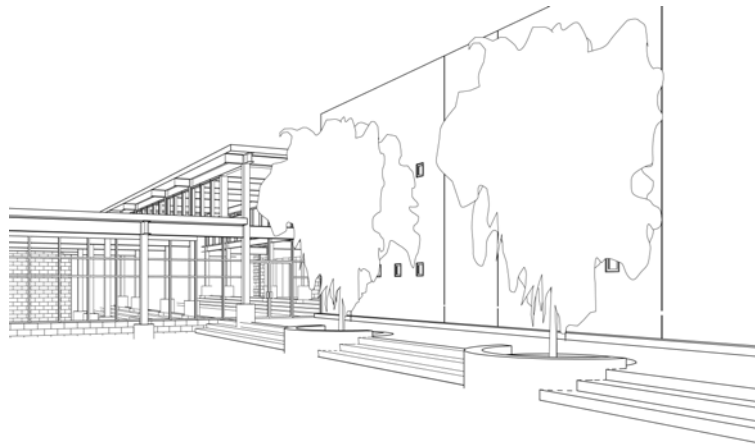
"Wherever there is action in a place, the spots which are the most inviting, are those high enough to give people a vantage point, and low enough to put them in the action."

Christopher Alexander
A Pattern Language

STAIRS



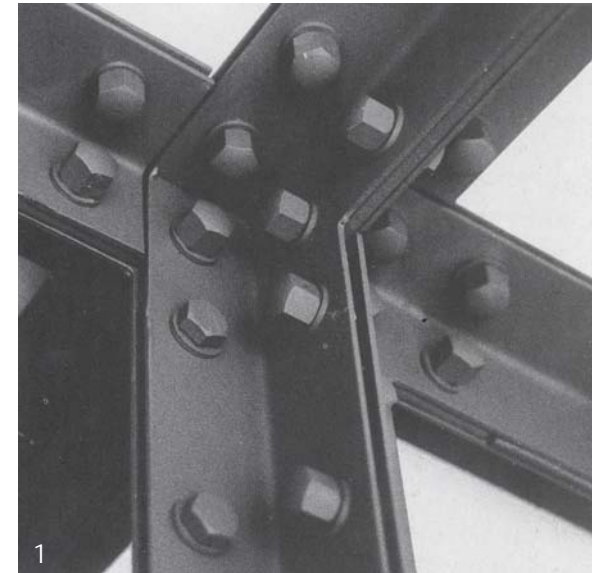
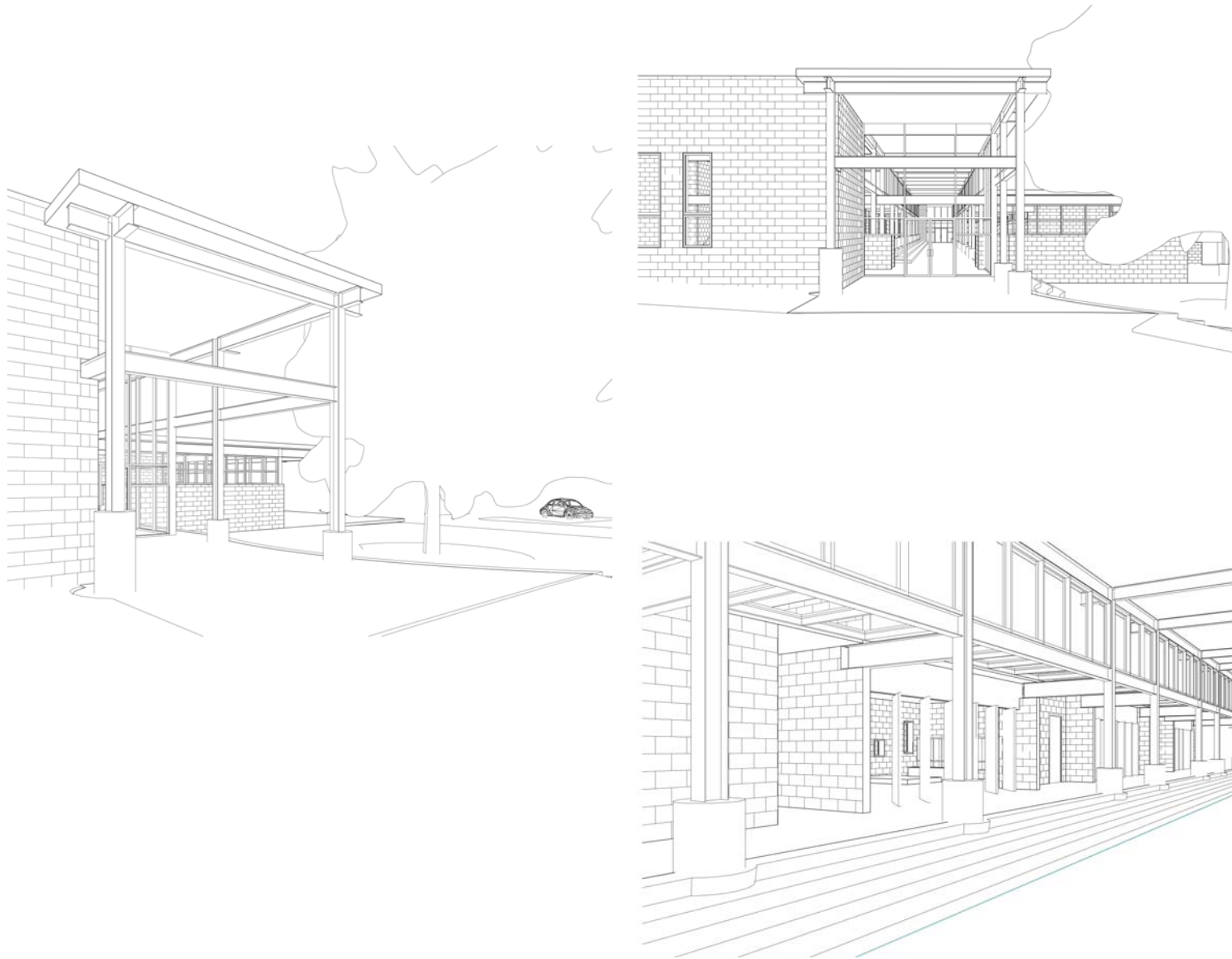
The stairs are one of the major elements of the school; they create places for congregation, mediate the elevation changes on the site and define boundaries. The stairs run continuously from one end of the building to the other, turning at columns or trees, like a ripple effect, to create meeting places. When classrooms are extended into the side aisles, the steps can serve as desks and chair or tiered seating. The upper set of stairs extends out of the building to the east; turn in an arc at the edge of the site enclosing the paved playground area. The lower stairs terminate in a large multi-purpose space.



CIRCLE



In the Montessori classroom, the circle denotes a meeting place. Throughout the school, circles are used in subtle ways to create gathering spots. Concave rings of stairs, such as those in the upper main entry, the primary classrooms and the playground, carve out a space within a space and are inwardly focused. Convex rings of stairs or low walls create vantage points with views, such as around the lower main entry and the trees at the south library wall. Circles are also used when one element intersects with another, such as where steps meet columns or trees. In addition to creating meeting places, rings of concentric stairs also reinforce lessons from the didactic toys, such as the graduated cylinders.



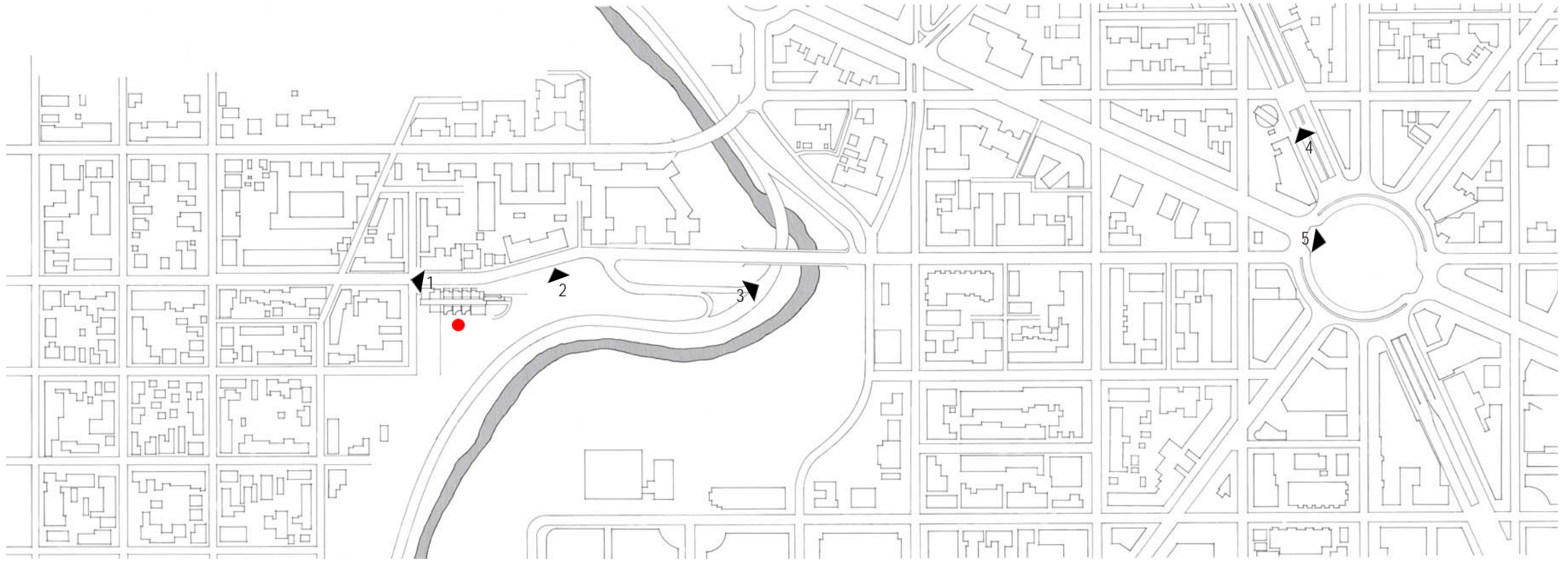
"By showing how things work, and so by bringing them to the surface, the world around us can be read, can be decoded, as it were; architecture must explain, unveil."

Herman Hertzberger
Lessons for Students in Architecture

STRUCTURE



Masonry structure is used to create shells and define spaces such as the classrooms, offices and the library. Steel beams and columns create "connective tissue" between those shells and lightly define the public spaces such as the main entry, corridors, side aisles and multi-purpose space. The beams also define thresholds between the classrooms along the corridor. Columns are used as focal points, like a tree marking a gathering place. The exposed structure provides a learning opportunity, showing the way the beams, columns and walls are connected to one another. The more intricate details are in the public spaces, while the simple masonry walls in the classrooms are less distracting. The columns and beams also create a constantly changing rhythm of light and shadow.



VICINITY PLAN



1 | Shops on P Street



2 | Townhouses on P Street



3 | P Street Bridge over Parkway

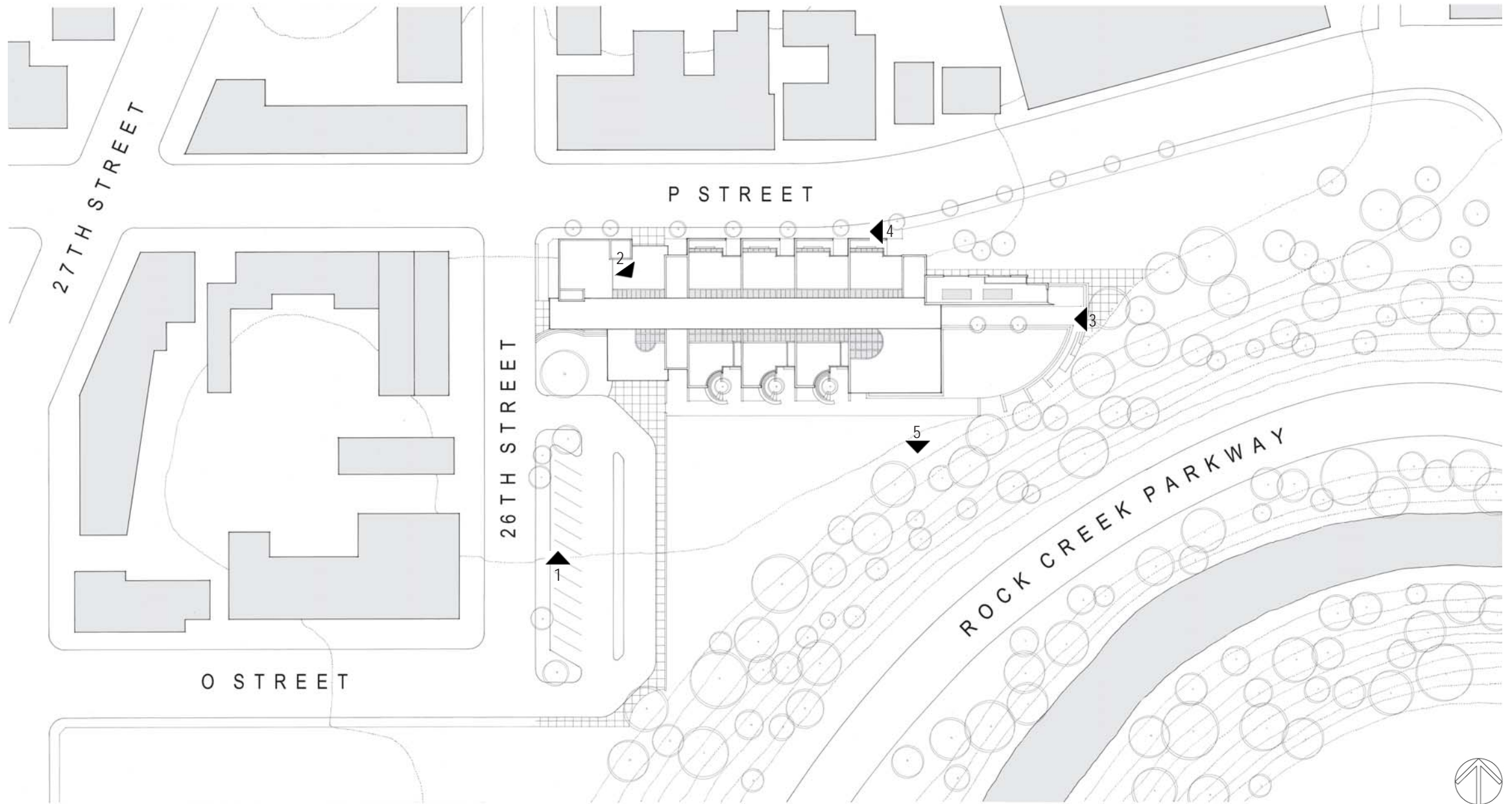


4 | View north on Connecticut Avenue



5 | Dupont Circle

DRAWINGS



Scale: 1" = 80'

SITE PLAN



1 | View north along 26th Street



2 | View southeast towards D.C.



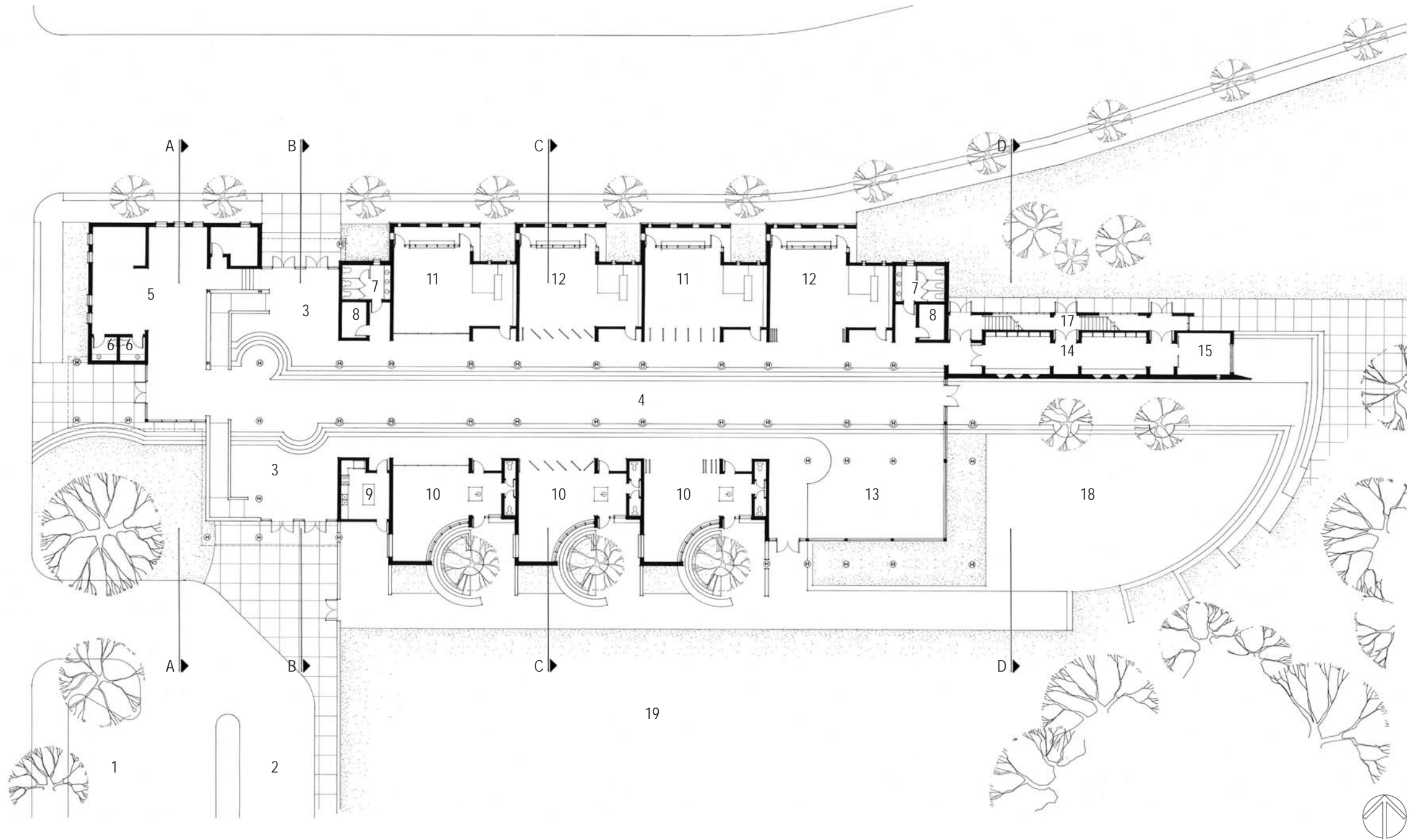
3 | View west across the site



4 | View west along P Street



5 | Rock Creek Parkway from the site

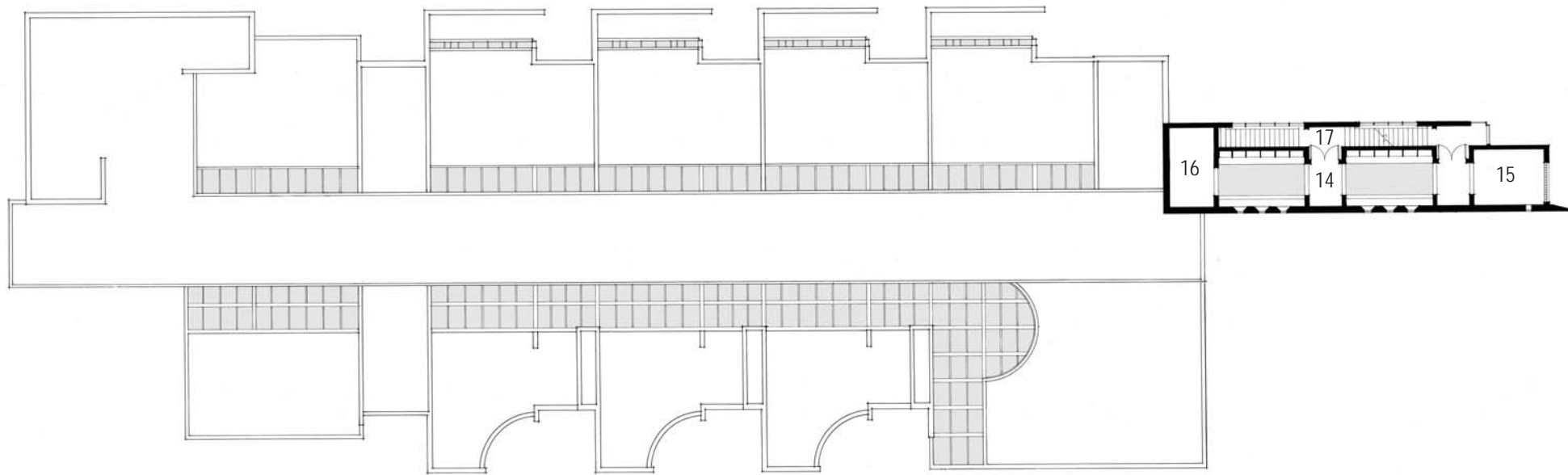


Scale: 1/32" = 1'-0"

GROUND FLOOR PLAN

LEGEND

- | | | | |
|----|-----------------------|----|---------------------------|
| 1 | Parking | 11 | Classroom (Ages 6-9) |
| 2 | Vehicular Queuing | 12 | Classroom (Ages 9-12) |
| 3 | Entry Hall | 13 | Multi-Purpose Space |
| 4 | Central Hall | 14 | Library |
| 5 | Administration | 15 | Group Study |
| 6 | Staff Restroom | 16 | Reading Room |
| 7 | Student Restroom | 17 | Stairs |
| 8 | Mechanical/Electrical | 18 | Playground - Hard Surface |
| 9 | Kitchen | 19 | Playground - Lawn |
| 10 | Kindergarten | | |

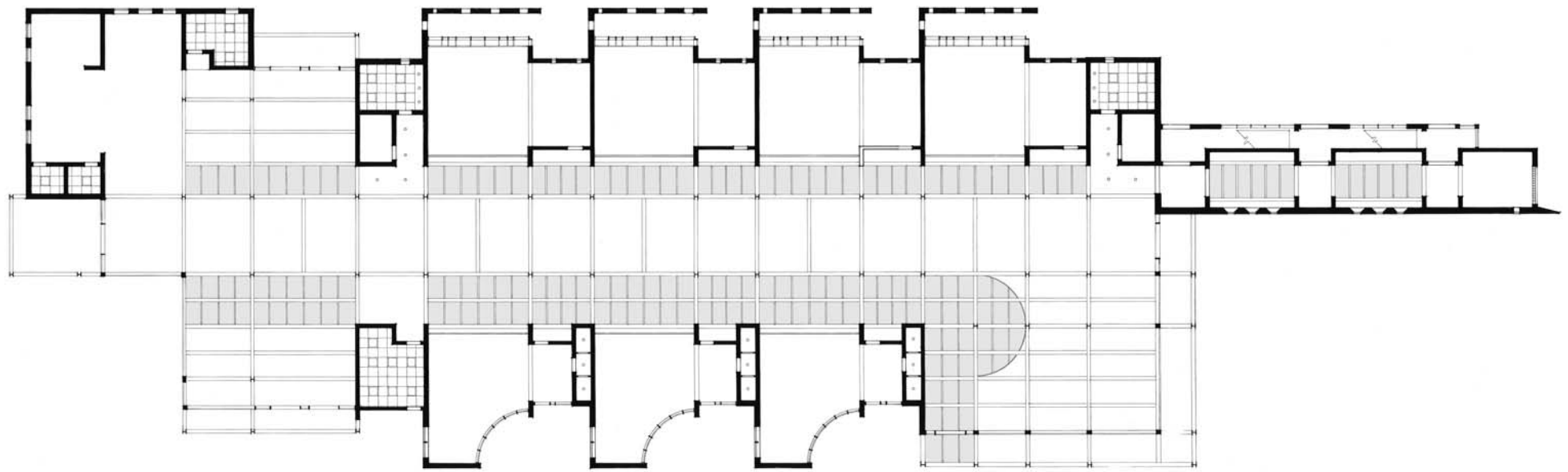


Scale: 1/32" = 1'-0"

SECOND FLOOR/ROOF PLAN

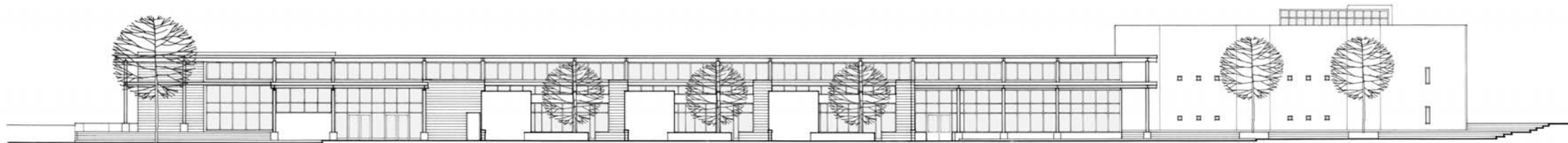
LEGEND

- | | | | |
|----|-----------------------|----|---------------------------|
| 1 | Parking | 11 | Classroom (Ages 6-9) |
| 2 | Vehicular Queuing | 12 | Classroom (Ages 9-12) |
| 3 | Entry Hall | 13 | Multi-Purpose Space |
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| 8 | Mechanical/Electrical | 18 | Playground - Hard Surface |
| 9 | Kitchen | 19 | Playground - Lawn |
| 10 | Kindergarten | | |



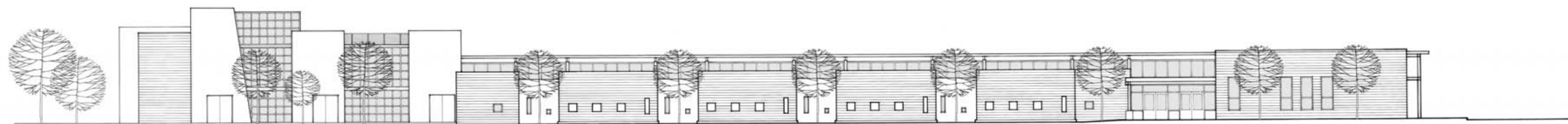
Scale: 1/32" = 1'-0"

REFLECTED CEILING PLAN



SCALE: 1/32" = 1'-0"

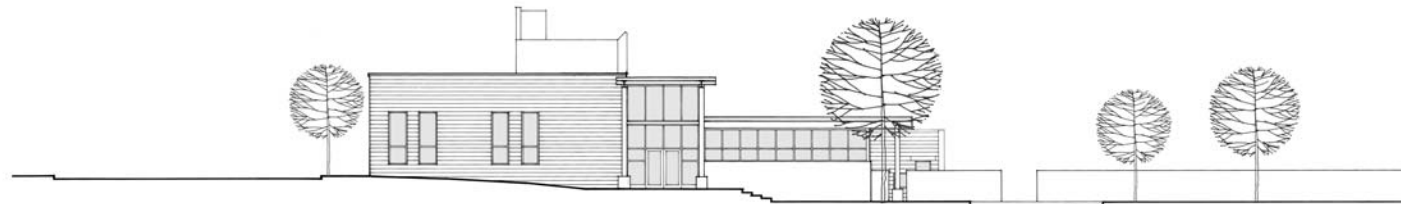
SOUTH ELEVATION



SCALE: 1/32" = 1'-0"

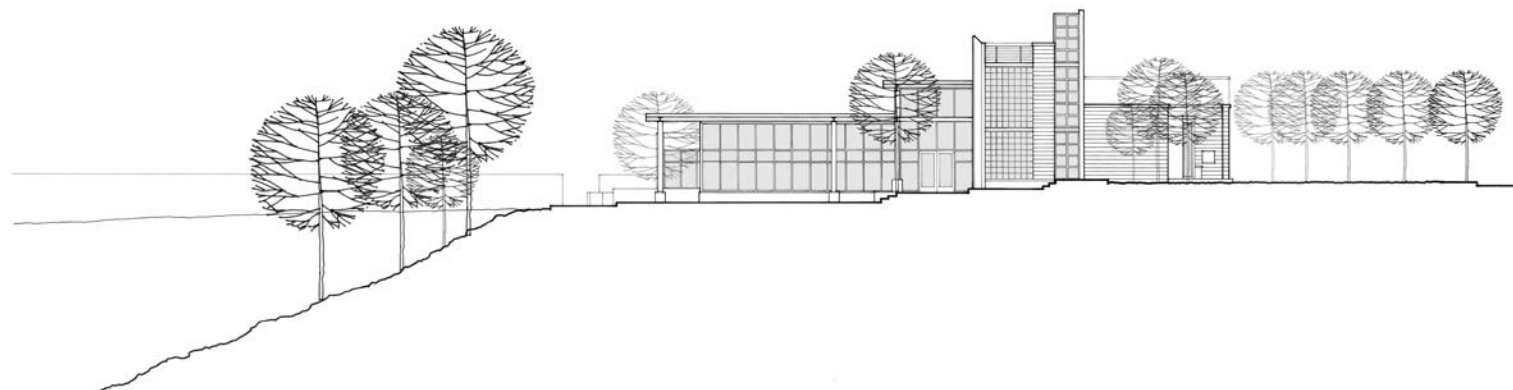
NORTH ELEVATION





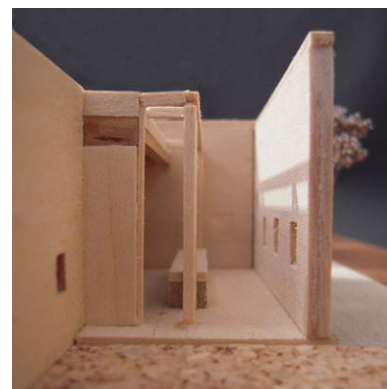
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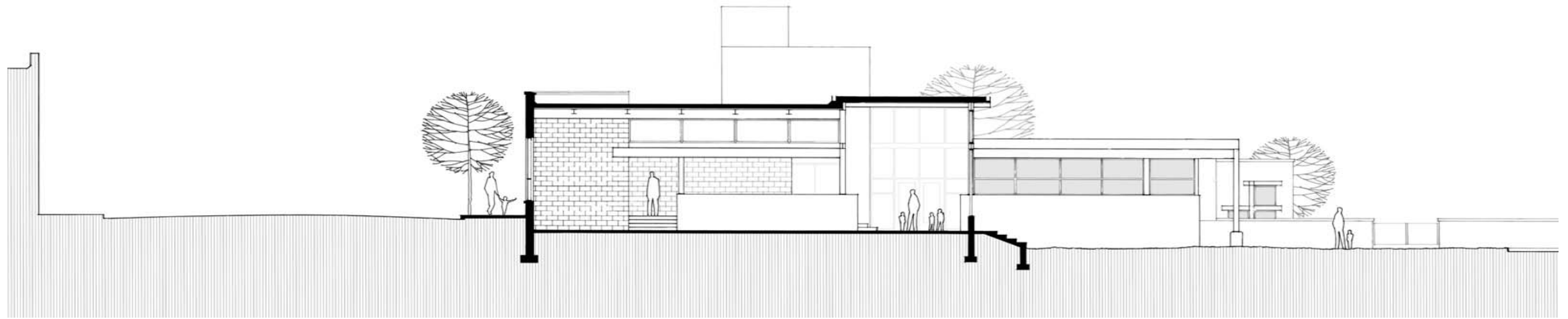
WEST ELEVATION



SCALE: 1/32" = 1'-0"

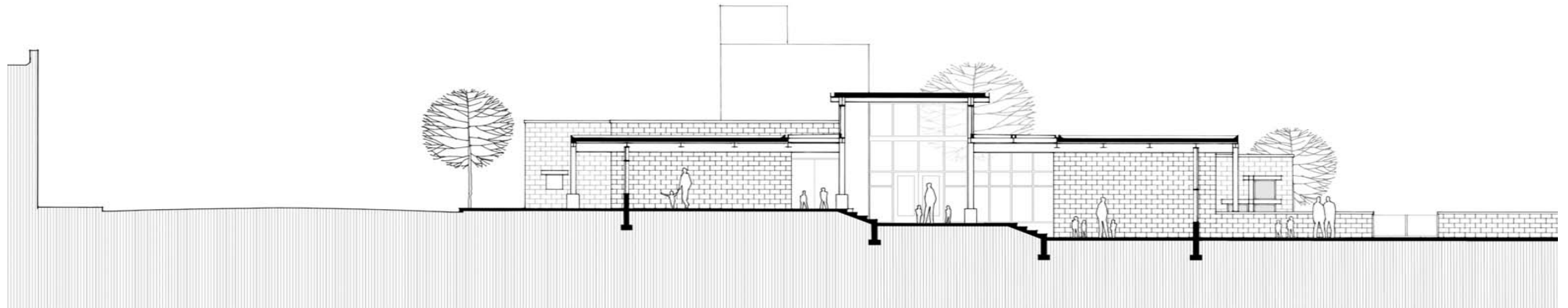
EAST ELEVATION





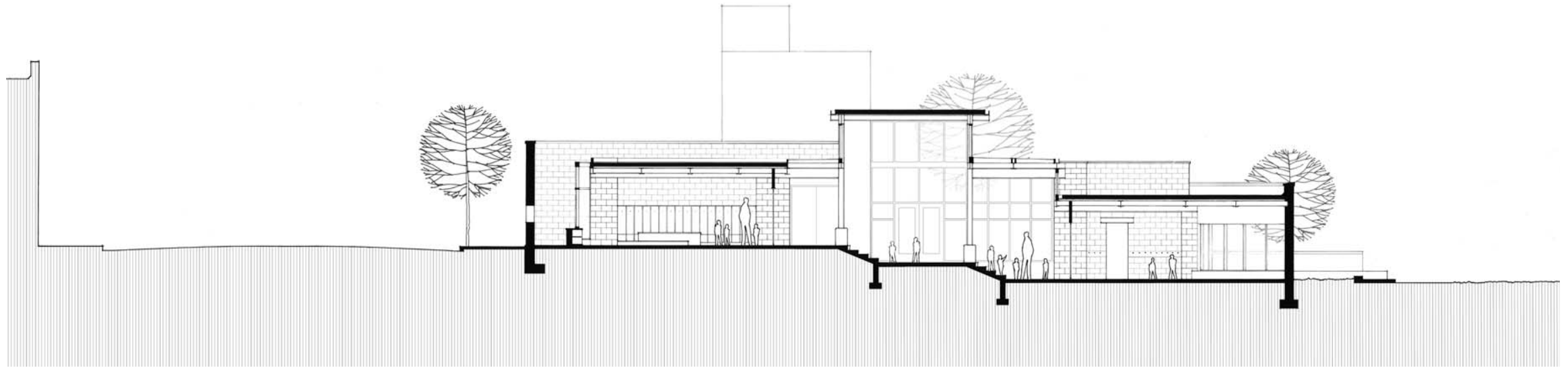
SCALE: 1/16" = 1'-0"

SECTION A-A THROUGH ADMINISTRATION



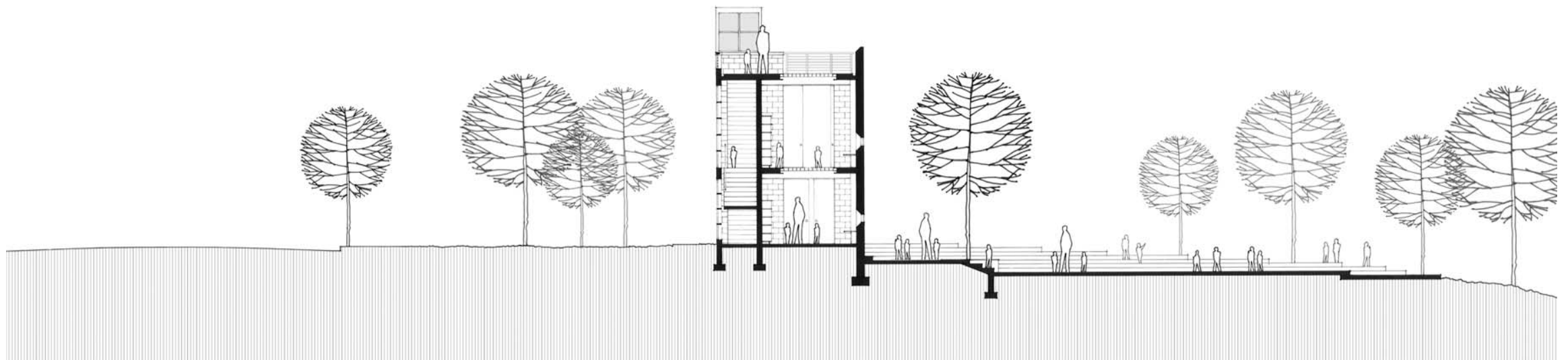
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SECTION B-B THROUGH ENTRY HALL



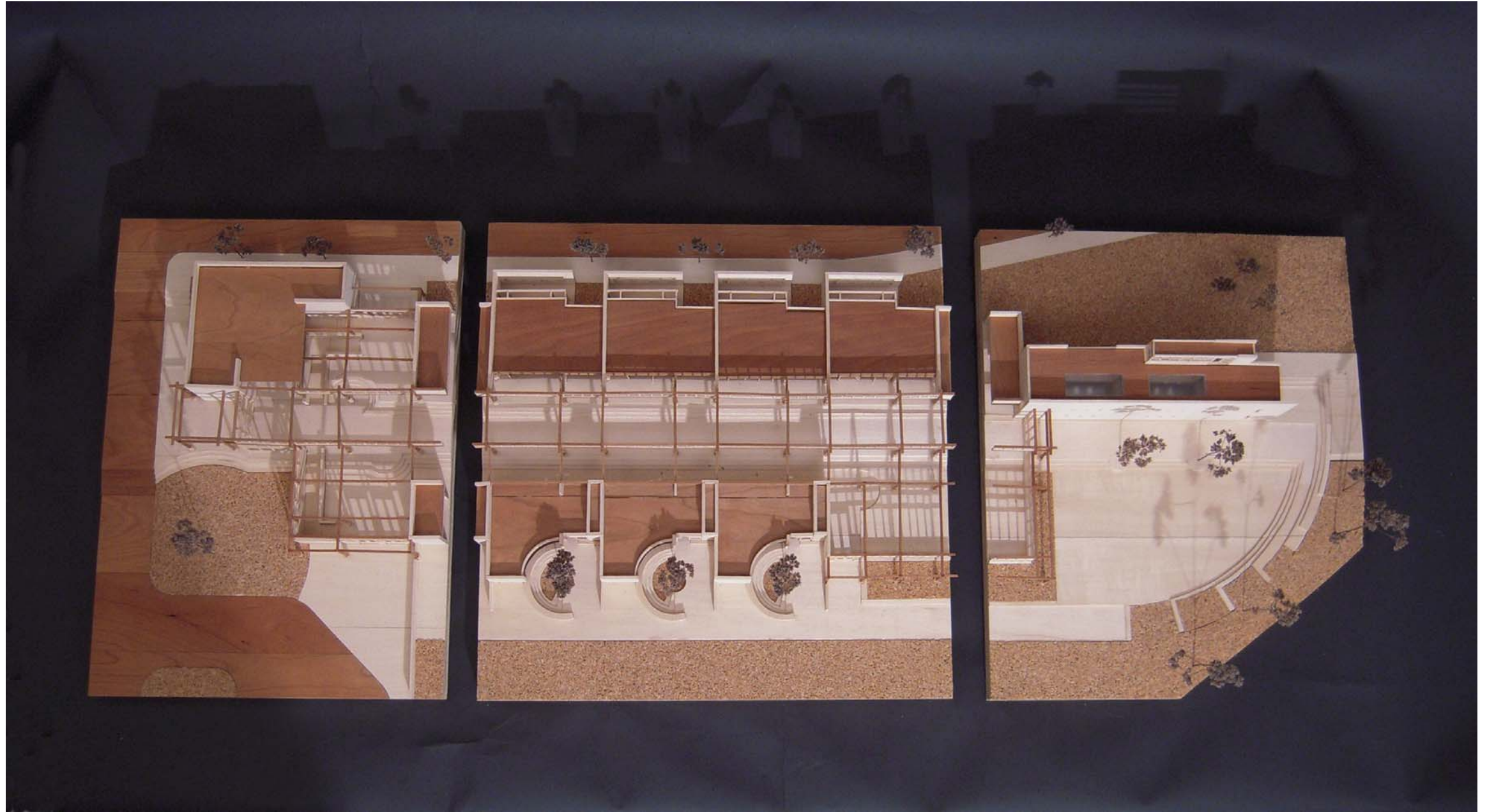
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SECTION C-C THROUGH CLASSROOMS

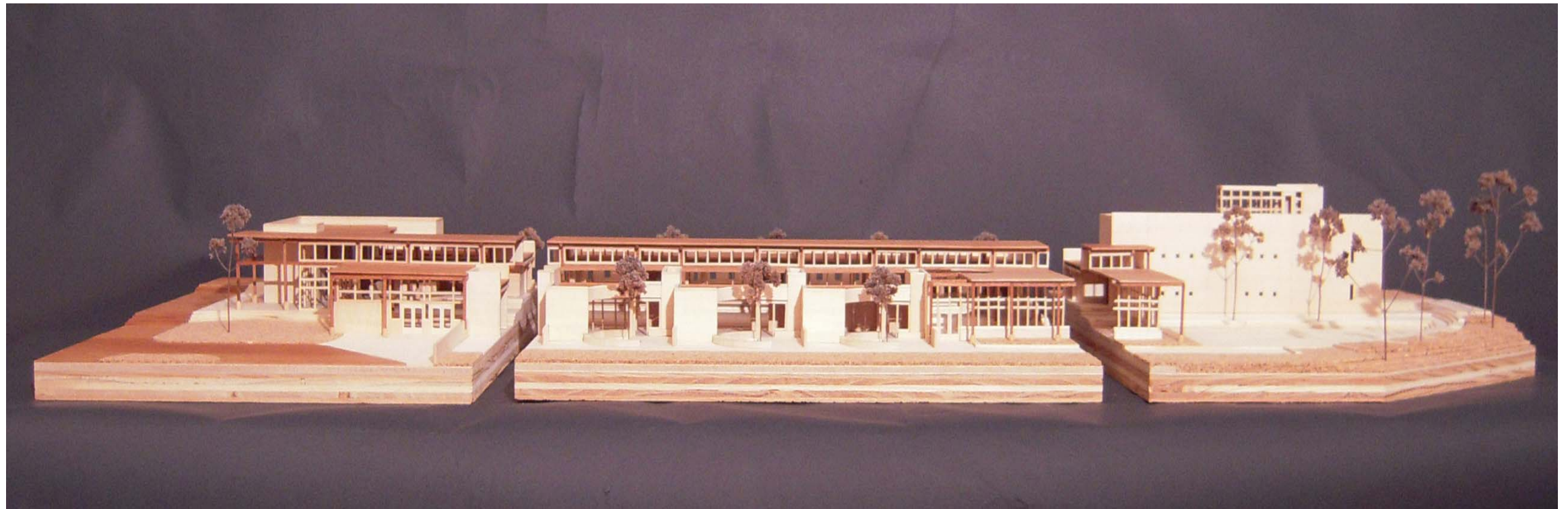


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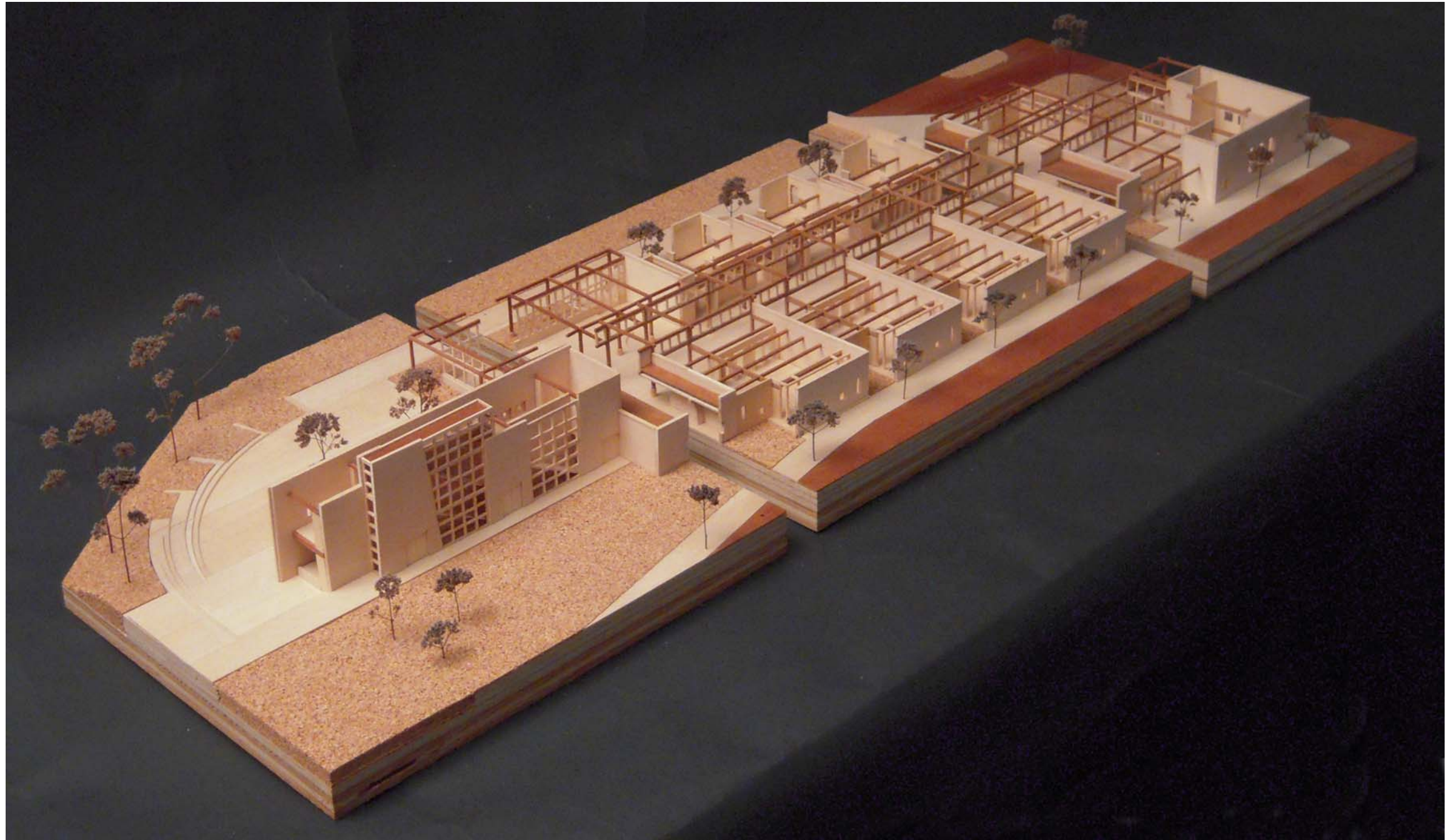
SECTION D-D THROUGH LIBRARY



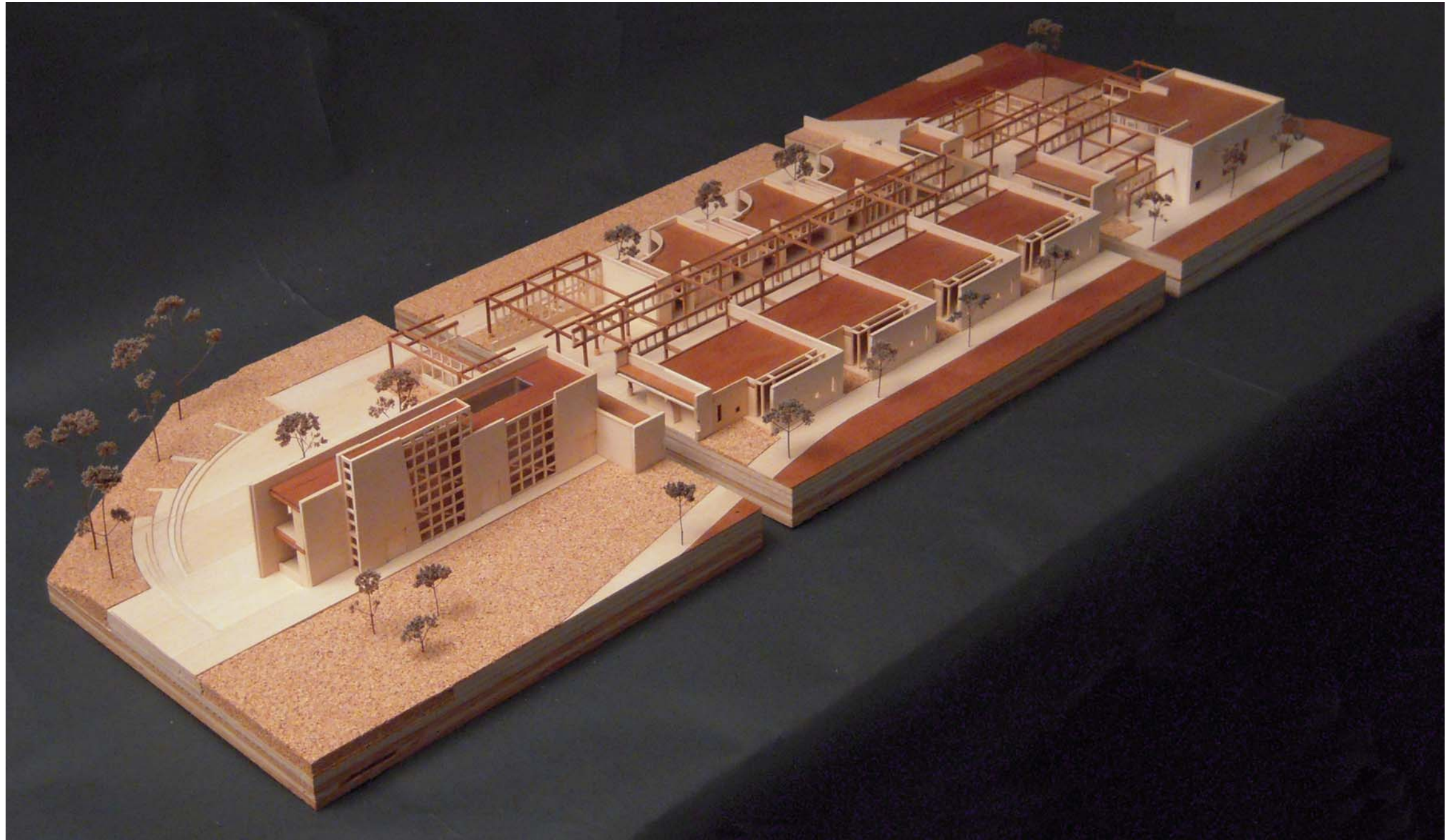
Aerial view, with roofs in place at primary spaces and removed at the connecting spaces.



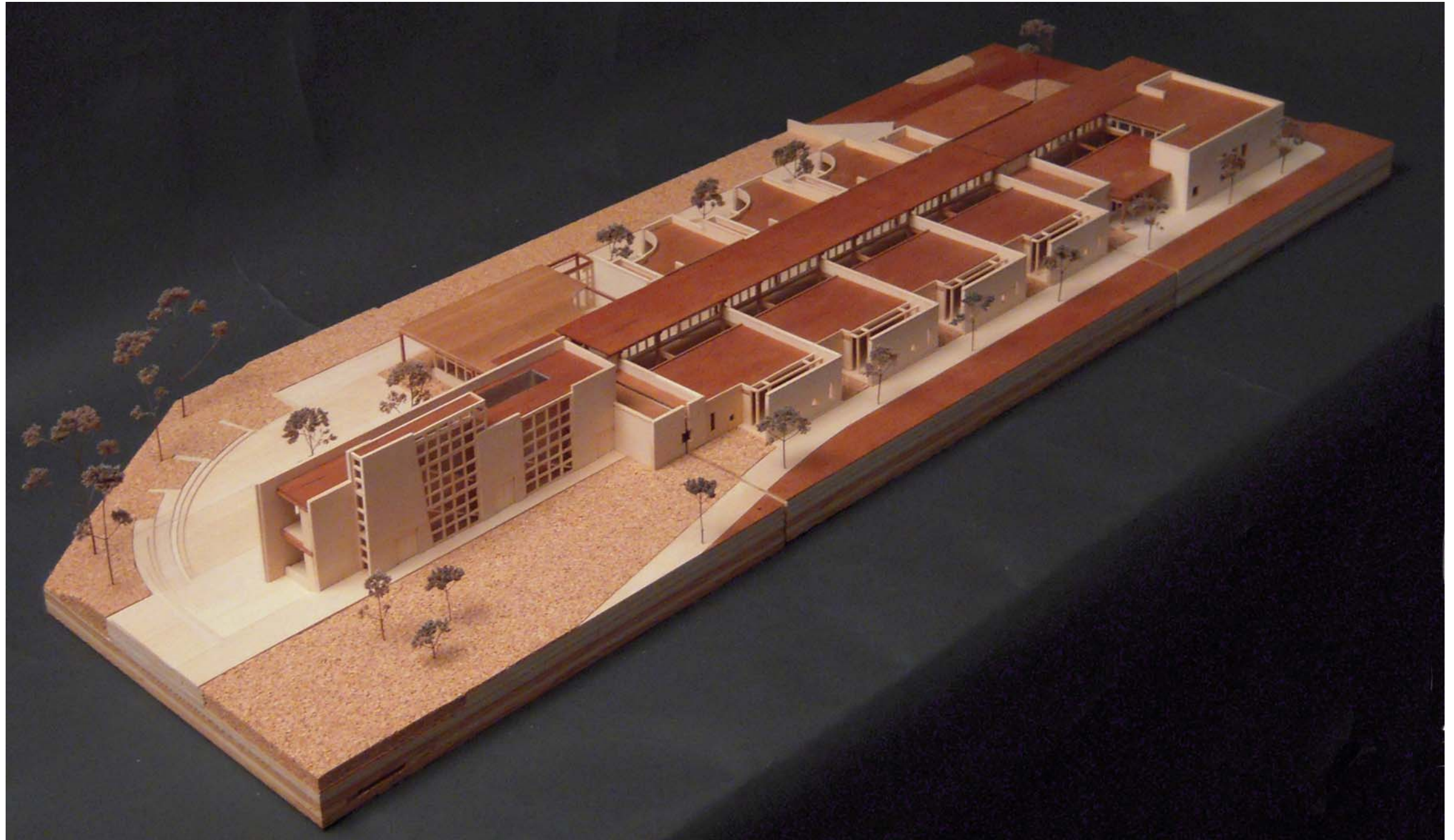
*Top: South Elevation
Bottom: North Elevation*



As viewed from the northeast, with all roofs removed exposing the structure beneath.



As viewed from the northeast, with roofs in place at primary spaces and removed at the connecting spaces.



As viewed from the northeast, with all roofs in place.

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Map: L'Enfant's Plan for the Federal City (Newell, 12)

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1. Mt. Zion United Methodist Church (Miller & Gillette, page 45)
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Map of Georgetown: Drawn by Albert Boschke and engraved by David McClelland in 1861. (Werner, 42)

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