A New Middle Landscape: An Urban Neighborhood

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This thesis is an exploration of a new housing type: a middle ground between a single-family detached house of the suburbs and a high-density apartment building of the city. A block in the Shockoe Bottom district of Richmond, Virginia is the site for this medium-density living environment. The building is a multi-use complex consisting of forty-six homes, a large central courtyard, and thirteen commercial spaces on its ground floor. The building’s massing evolved from a series of studies that took into account interior volumes of space, generous balcony square footage, as well as light and ventilation considerations. These massing studies, along with a strict organization of parts and uses, resulted in a multifaceted orthogonal form.
to Mom and Dad, for everything
I would like to thank my committee, Scott Gartner, Kay Edge, and Bill Galloway as well as Steve Thompson, for all their time, direction, and clarification. I am also very thankful to the following faculty members, past and present, that have guided me through my many years at Virginia Tech: Katrina Choi, Bill Green, Matt Lutz, Kristin Maki, Hans Rott, Mark Schneider, Heiner Schnoedl, Greg Tew, Frank Weiner and Brad Whitney. Also, I would like to thank my classmates for their opinions, ideas, friendship and support.
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On cool fall and winter days, when the density was gone and you could see far up the mountain, I would wander into the woods. The locals, generally deer and rabbits, had made a path, straight for the most part, that forked after about eighty feet. Sometimes I would go left, sometimes right. When the path stopped I was on my own, although I typically took the clearest and safest route. I would collect things, sometimes simply stand around, pull on tree limbs, peer into dead and hollow logs; I wasn’t doing anything specific and didn’t even have a final destination. Going into the woods was an escape. I was far enough away from home to be alone, but not so far that I couldn’t be seen or call for help. After my exploration was finished I would typically end at my outdoor base camp: the swing set. It was in the middle of the yard, wooden, a simple platform for a slide to the left and a single blue swing to the right. I could take my woodland findings up to the platform and connect them together, or lay them out in a diagrammatic order, or maybe even pull them apart to see what was inside. The swing set for me was a good place to rest. I was still outside, the platform and swing kept me up off the dirt, and it was right beside the house; if I needed a civilized amenity such as a bathroom, it was only a few steps away. It was my perfect middle ground.

I didn’t think of the swing set as a middle ground at the time, it simply fulfilled my want to be outside of the populated house and yet not too far into the wilderness. This practice wasn’t something I was imitating or had read about; it was a pattern subconsciously developed during childhood due to my surroundings. My innate desire to have a connection to nature, the woods, drove one side of this pattern and the other was steered by my needs of safety and belonging, the house. This duality of needs and wants has driven human activity since its beginning. The wilderness gives food, water and materials, and a cleared settlement gives protection and a stage for interaction. I had been taking part in a pattern established long before the invention of swings.
Introduction

In the United States, in the late nineteenth and early twentieth century, another type of middle ground was established. There had been two distinct places to reside: the city and the country. If you were a farmer and needed vast expanses of land to grow crops or raise cattle, you lived in the country. If you were an industrialist or tradesman, where people, machines and buildings were necessary for your livelihood, you lived in the city. Due to a growing middle class, however, there was now a desire to live between the two. This new housing type needed to include land for gardening and privacy, but still be close enough to the city to commute to and from work with ease. Thus, the middle landscape was born. This middle landscape, or the suburbs, provided families an escape from the congestion and pollution of the city while connecting them to the surrounding wilderness and farmland.

Over the years, the suburbs’ popularity has skyrocketed. Many would include owning a home in the middle landscape as part of the American dream; the suburban home is now an American icon. However, despite its early intentions and accomplishments, the suburbs have developed into an entity that, over the past few decades, has led to urban degradation and a dependency on automobiles due to the massive expanse of land use in its design. The suburbs now demand their own commercial and entertainment centers. They have become, in essence, small cities surrounding one larger, more dense, city. Commuting has either been shortened, because jobs have moved to the suburbs, or lengthened due to the growing distance from the city. Both cases lead to an increasingly abandoned urban center.

There have been many urban renewal movements in the past decade to attempt a revitalization of city centers. People are increasingly warming to the idea of living in an urban environment. Commuting time and cost is significantly cut back due to public transportation and shorter distances; and there are more diverse commercial and entertainment options. You can easily walk to a nearby coffee shop a block or two away instead of having to drive a few miles. One’s choice to live in either an urban or suburban setting is of course determined by his or her own needs and wants, whichever lifestyle is most fitting. But, what if there was an option that could link the two? What if you were given the choice to live in the city but still have many of the amenities found in the suburbs? What if there was a new middle landscape?

This thesis explores these questions through the design of a new housing type. Just as a geographical middle ground was found between the city and the country a century ago, there is now a need to find a new architectural middle ground between the typical single-family detached house of the suburbs and a compact urban apartment building. This new middle ground is a medium density living environment, set within the diverse urban fabric of a city, that provides the freedom and comforts of the suburbs. Essentially this housing type is a new middle landscape: an urban neighborhood.
A City

The site is located in the historic Shockoe Bottom district of Richmond, Virginia. The city, founded in 1737, begins at the north shore of the James River and expands mostly northward. Richmond has long been an important transportation hub, starting with the tobacco industry’s use of the James for shipping. The city boasts an expansive railroad system and encompasses the intersection of two major interstates. Richmond is also the capital of Virginia, therefore an attractive headquarters for many law, finance and government businesses and ventures. A number of districts divide the city. Their uses are broad and often mixed; two major historic and residential districts to the northeast, several government, commercial and office districts make up the center, two major college campus districts lie to the northwest and northeast of downtown, and there are many mixed use districts around the perimeter.

Shockoe Bottom is a mixed use district just east of downtown Richmond. Many large interstate and railroad overpasses separate the area from the city’s center. The district is home to Richmond’s first roads and buildings. Tobacco Row, which extends the entire length of Shockoe Bottom along the river, is a series of old warehouses that are now being adaptively reused for commercial, office and residential purposes. The character of the district, derived from this mix of uses and its historic urban fabric, has led to a revitalization of the area in the past decade.

The site itself is a block located at the end of Tobacco Row closest to the city center. East Main, East Cary, South 18th and South 19th streets form its border. Its location within the district is advantageous to those looking for a truly urban living environment. The historic Main Street Station, a still functioning train station, is only two blocks west on Main. Walking to the station you pass by one of Richmond’s largest outdoor market, the 17th Street Farmer’s Market. A newly developed Canal Walk, only a short stroll southwest, takes you along what was once an industrial shipping canal all the way to the end of Tobacco Row. A large number of cafes, restaurants, shops and businesses line the streets surrounding the site; many more are only a few blocks further towards downtown. A public bus route also stops at the site on Main Street. There are also many bars, clubs, and entertainment options, such as museums, in the Shockoe Bottom district. Views from the site include the larger historic and modern buildings from downtown, a diverse mix of the surrounding historical warehouses and shops, and the James River, along with the wooded areas that line its shore.
view of Shockoe Bottom, from Main Street Station

view of Main Street Station and the 17th Street Farmer’s Market, near project site
view of City Center district, from project site

view of City Center, Central Office and Shockoe Slip district, as well as interstate and railroad overpasses, from project site
A Block

Space is needed when designing a medium-density living environment, and a lot of it. The objective is to fit as many people in an area as possible, but still give each unit plenty of interior and exterior space. Therefore the project needed to fill the entire city block, from street to street. A few other reasons drove this decision: filling the block would add to the urban fabric of the area while giving density and life back to the once active district. Designing a block in a typical American gridded city, like Richmond, meant that the project could be a prototype for other cities. Also, around Richmond’s residential districts, many blocks are developed with up to forty townhomes each. The design challenge was to match, if not surpass, that density while also providing equivalent amenities, such as a large outdoor space, for each home.

The goal of the project was to use standard materials, in standard ways, to form livable and inventive volumes of space. Therefore, correctly massing this large area was key to the project’s success. Too much density would crowd the residents, too little would fail to utilize the block’s potential. Throughout the massing studies a list of needs, for both the units individually and the building overall, was considered. Each unit should have a large outdoor space, the ability to look up and see sky, views in multiple directions, a narrow cross section to increase natural light and ventilation, and minimum contact with its neighboring unit to reduce noise and heat gain. The building overall should be designed to incorporate a large central courtyard for all residents, ground floor commercial and office spaces, a large parking structure for residents, business owners and guests, and be designed so that all units, as well as the courtyard, are exposed to southern light for as much of the day as possible, giving each resident the potential of growing their own plants and vegetables.

The following is a series of images from these massing studies. Organized chronologically, they are snapshots of the project’s progression at key intervals that end at its final design.
These initial studies alternated interior spaces and exterior balconies in a simple orthogonal pattern. An 'L' shaped plan was used for each unit which can vary in size and be stepped back; this allowed more light to reach the balconies and interiors.
Weaving the units diagonally was another option explored. This method was beneficial in stacking the units higher without adding unwanted depth but was not, however, efficient in utilizing space horizontally.
This block massing study incorporated the orthogonal alternating pattern with corridors along the exterior on every level.
An alternative stacking pattern was utilized to reduce the number of corridors to every other level.
Incorporating many smaller stairwells, along with the corridors, allowed more flexibility in the design. The units could be repeated more often without having to rely on, and be organized around, large corner stairwells.
These studies represent an important shift in the design process from a corridor-based organization to a cluster-based organization. Utilizing multiple stairwells for main and emergency circulation freed the exterior facades to give more views from each unit.
The clusters of units were then divided into two sections; a taller section to the north with two-story units, and single-story unit clusters to the south. To utilize more square footage, a third side was added with two large corner sections as connectors.
In these later studies, particular uses (residential, commercial and parking) became more defined using alternating main and emergency stairwells as their organizational dividers. This alternating pattern, along with size constraints, eventually dictated that one side of the building be shorter than the other.
These images show the block’s final massing with colors used to illustrate program divisions. The shortest side, in both height and length, lies along the southeast edge of the block which maximizes sun exposure to all units as well as the courtyard.
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4 bedroom
3 bath
2-story unit

3 bedroom
2.5 bath
2-story unit

roof level
ground level residential entrance - residential courtyard entrance

ground level residential entrance at southeast corner

general building storage and mechanical rooms - two levels - below ground

residential entrances from parking level (not visible in diagram)
corner commercial space - three levels starting at ground

single level commercial space

two level commercial space
one-car personal garage on parking level 1 (two shown)

two-car personal garage on parking level 2

main stairwell with elevator

emergency stairwell
These sun and shadow studies illustrate the lighting conditions found at four different times of year, winter, spring, summer and fall, and at four different times of day, early morning, midday, afternoon and evening. It is important to note that during peak planting seasons, spring and summer, all units, particularly their large courtyard-side balconies, are exposed to sufficient sunlight for growing.
A Building

The building itself is divided into five different uses: parking, circulation, commercial, residential units, and outdoor spaces.

Three levels of parking occupy a large portion of the building’s center: one at ground level and two below. There are 223 parking spaces, twelve two-car personal garages on the lowest level and twenty-four one-car personal garages on the middle level. The two-car garages belong to the larger residential units, the four-bedroom two-story units and the one-bedroom one-story units. The remaining residential units, with the exception of the corner studios, each have a one-car garage.

The circulation throughout the building is contained within fifteen individual stairwells. Seven main stairwells serve the residents as their everyday means of entrance and exit, each with an elevator. The two lower parking levels have a small entrance hall on both sides of each main stairwell for residential use only. A larger lobby, on the ground level, serves as a residential pedestrian entrance and is to the right of each main stairwell. There is also a door at the back of the lobby for residential entrance from that level of parking. Eight smaller stairwells, without elevators, are intended for emergency-only circulation. Each unit and commercial space has an access door to one of these emergency stairwells.

Fourteen commercial spaces wrap around the base of the building facing one of three streets. There are five one-story spaces with a glazed street front and an access door to the ground floor parking level. This door allows direct access to employee parking and a more suitable option for larger deliveries. Along with the large front windows and access door, the seven two-story units also have a line of clerestory windows on the second floor. These windows bring in natural light while blocking views into the courtyard, maintaining privacy for the residents. The two corners facing Main Street each contain a three-story commercial space which gains light from clerestory windows facing the courtyard.

The forty-six residential units are capable of housing a 160-person community. There are twenty-four two-story units (eight two-bedroom, eight three-bedroom and eight four-bedroom), and twenty-two one-story units (eighteen studios and four one-bedroom). The units, together with the commercial spaces, personal garages, entry spaces, storage and mechanical rooms bring the total interior square footage to 170,000 square feet.

The 40,000 square-foot central courtyard, in combination with ninety individual balconies, make up another 70,000 square feet of outdoor living space. All units, with the exception of the lowest studios in each corner, have a balcony to both the street-side and the courtyard-side of the building. For the side units, the balconies on the courtyard-side are much larger than the street-side balconies whereas the street-side balconies for the corner studios are larger.
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<th>Floorplan Key</th>
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<tr>
<td>corner roof level</td>
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<td>large studio - 1 bath</td>
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<td>2 bedroom - 2.5 bath - 2-story unit</td>
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<td>4 bedroom - 3 bath - 2-story unit</td>
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<td>roof level</td>
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<td>small studio - 1 bath</td>
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<td>studio - 1 bath</td>
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Southwest-Northeast Section
A Cluster

The building’s overall organization is based on a repetitive series of smaller massing groups, or clusters. A cluster, for the purposes of this project, is two vertical stacks of residential units, on either side of a main stairwell, flanked by two emergency stairwells. Two adjacent clusters share one emergency stairwell. The cluster also includes the commercial spaces, entry lobby, garages and entry halls that lie directly below the units.

There are three types of clusters in this building: one for two-story units, one for single-story units, and one for each corner, the northern corner and the western corner. There are three full, and two half, two-story clusters, two single clusters, and two corner clusters. Each two-story cluster contains six units and is repeated on the northeast and northwest sides of the building. Two single-story clusters lie along the southwest side of the building and also contain six units each. The two corner units are mostly identical, varying slightly in size and turned to face different streets. Both include five studio units.

Dividing a large number of residential units into smaller groups is beneficial in a number of ways. Centering a group of units around one main stairwell assists in directing each resident’s entrance and exit. If entering by car, the resident can go to their own garage and from there walk to their adjacent entrance hall, then on to their own main stairwell. If entering on foot, the resident walks into the ground level lobby that is also adjacent to their own stairwell. Therefore, a cluster organization greatly minimizes the distance between the building entrance and your own front door. Clusters also generate a more intimate and safer environment for the residents. Each entrance lobby serves a maximum of eight units as opposed to one large lobby that would serve forty-six. This minimizes the number of people going in and out and fosters a higher level of acquaintance with fewer neighbors. This could be compared to a suburban environment where a family lives in a larger neighborhood, but is more acquainted with the people living closest to them. Stacking the units vertically also aids in the overall massing of the building. Given this vertical division, a shift upward was introduced on one side of each cluster. This added an extra story to every other commercial space while giving each two-story unit a private entrance level.

The structure of the building is also based on this cluster organization. Each part of the cluster belongs to either a masonry structure or a steel-frame structure. Each stairwell acts as a large masonry column. The commercial spaces, personal garages, entrance lobby and entrance halls are all also masonry construction and therefore structurally link the stairwells. All units, with the exception of those in the corner, are based on a steel-frame structure. Four large I-beams bridge two stairwells on every other floor and create a volume to support the first floor of each two-story unit. The single-story units are also constructed using this method. The second floor of each two-story unit is a large moment-connected box truss, turned at a ninety degree angle from, and counterbalanced over, the bridging I-beams. The floors and roofs are a standard composite of small triangle steel trusses with steel decking and poured concrete. A metal panel system was employed to clad the units. This system is based on a series of rectangular panels that can be sized to fit any particular need and can have an irregular grid pattern, a benefit given each unit’s facades are also irregular to the next. This system also has the capability of wrapping around an entire volume creating a tight insulation envelope.
two story unit cluster - view from street

two story unit cluster - view from courtyard
northern corner cluster - view from street
northern corner cluster - view from courtyard
A Home

In a cluster, repeated throughout a building, contained by a block within a city, lies a home. A home is not only where you live, it represents how you live. It’s an extension of your personality - a physical place in which you can identify yourself.

Standing in the courtyard, one can quickly recognize his or her home by its color. One courtyard front facade of each unit uses color as a personal identifier. The colors added are a combination of different hues and tones. The highlighted facades not only visually pinpoint each unit, but also supports another goal of the project - to differentiate the interior courtyard facades from the exterior street facades. It was important to design a building that gave one appearance to the city and another to the residents. The street facades are mostly grey tones with orange details, the balcony railings are an extension of the cladding system, to add privacy, and the canti-levers are much shorter to slightly decrease the depth. Color, greenery from the courtyard, plant life on personal balconies and layered depth from the units, create a dynamic atmosphere full of life and visual interest on the courtyard facades.

This project grew from a home, from the goal to design a series of urban homes. These are homes that mesh the benefits of living in a suburb, a private yard, a garage, a neighborhood park, a two-story house with gabled ceilings, close neighbors in a community, with the benefits of living in a city, shorter commutes, public transportation, history, shopping, entertainment and food right outside your door. A home that lies somewhere in between preconceived notions of the city and the suburb - a new middle.
References


All drawings, models, renderings and photos shown in this book were created by the author.