I, Wade A Hart, hereby submit this original work as part of the requirements for the degree of Master of Architecture in Architecture (Master of).

It is entitled:
Compact Urban Dwellings

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Compact Urban Dwellings

A thesis submitted to the Graduate School of the University of Cincinnati in partial fulfillment of the requirements for the degree of

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by

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Abstract

The suburban development pattern has displaced urbanism in the United States resulting in sprawl and a number of negative environmental, financial, health and social consequences; however, an emerging restructuring of the national demographic and economic profile suggest the need for a return to urbanism. In architectural discourse, urbanists have thoroughly documented the consequences of the suburban present and envisioned an urban future. This urban future is largely based on the analysis of precedent, i.e. historic urban neighborhoods; yet, less than adequate attention has been devoted to the design of appropriate dwellings for this urban future.

This thesis identifies the attributes and characteristics of certain archetypal urban dwellings useful to the design of new urban dwellings, such as the private gardens of ancient courtyard houses and the built-in furnishings of early American homes. These design principles are then applied to the design of an apartment building to be located on the site of the recently demolished Schiel School in Corryville, Cincinnati. The design seeks to fulfill an emerging market demand for compact and dense residential rental properties in vibrant urban districts. This demand originates with the young professionals and active retirees whose lifestyle is no longer compatible with the suburban paradigm.
In Memoriam
James E. Hart
June 19, 2010
My appreciation to John Hancock, Jeff Tilman and Bob Burnham for their invaluable assistance with this thesis. And to my friends for their constant comic relief during all the late nights in studio.
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Chapter 1: Urbanism And Typology

A Brief Critique of Sprawl

Since World War II, the United States has experimented with and embraced a radical and revolutionary land use and lifestyle paradigm: the suburb. The suburb, originally open only to the very wealthy as an enclave or escape from the effects of industrialization, became available to the middle class with the ascendancy of the automobile. The suburban development pattern is generally characterized by low density and single use zones – housing subdivisions, office parks and shopping centers. And its ubiquity is responsible for sprawl. Recently, however, there is increasing concern for the environmental, financial, health and social consequences of this paradigm. Recent demographic transitions suggest this development pattern is increasingly less compatible and desirable to the contemporary household. In architectural discourse, urbanists have thoroughly documented the consequences of the suburban present and envisioned an urban future. This urban future is largely based on the analysis of precedent, i.e. historic urban neighborhoods; yet, less than adequate attention has been devoted to the design of appropriate dwellings for this urban future.

Social

Suburban sprawl is characterized by low-density and single use zones that are connected by arterials and expressways. The zones can typically be categorized as housing subdivisions, office parks, and shopping centers. The typical housing subdivision consists of large-lot single family homes arranged on a dendritic and hierarchical network of streets. These homes are mass-produced for narrow market segments, encouraging segregation by household income and structure. The zones are built in isolation and connected only by arterials and expressways. This remoteness makes automobile travel necessary and congestion inevitable. The zones are typically configured to route all trips onto these arterials and expressways, thus contributing to their congestion. Typically, public transportation is not cost effective in these lower density areas. Therefore, residents must drive to daily necessities: school, shops, and work. At these destinations, parking consumes a large percentage of the site. The common configuration is the office park or shopping center located behind expansive parking lots, thus divorcing these buildings from the street and eliminating pedestrian activity. In these areas, the public realm is completely absent. Without the armature of the public realm, there is no place for residents to meet and therefore less community cohesion and solidarity. Rather, the suburban paradigm filters most social interaction through the television screen or the windshield. For those unable to drive, this development pattern is inaccessible. The lack of places for social interaction often leads to isolation resulting in depression in children and the elderly, i.e. those too young or too old to drive. Automobile accidents have become the leading cause of death in teens, and teen suicide – a phenomenon rarely observed prior to the proliferation of suburban development – follows closely. The suburban paradigm consists mainly of “places not worth caring about.” Sprawl is a placeless landscape – repetitive and unremarkable – because it was built according an industrial paradigm.

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1 Peter Calthorpe, Urbanism in the Age of Climate Change (Washington DC: Island Press, 2011)
2 Andres Duany, Elizabeth Plater-Zyberk and Jeff Speck, Suburban Nation (New York: North Point Press, 2000)
Suburban development typically occurs on previously undisturbed agricultural and natural sites thus interrupting existing natural processes. For example, suburban development causes an increase in impervious area, i.e. buildings and parking lots, and these surfaces cause an increase in the quantity of storm water run off. Development’s disruption of surface drainage also contributes to soil erosion and subsequently to the sedimentation of receiving waterways: lakes, ponds, rivers and streams. A development’s impervious surfaces gather pollution from human activities, including automobile exhaust and fluids, which storm water then carries to these receiving waterways causing considerable water pollution. The diversion of storm water to storm sewers that empty into lakes and rivers also prevents infiltration and percolation through the soil – a process that filters groundwater before it recharges the aquifers that are a common source of water for human use. With water an increasingly scarce resource, any disruption of this hydrological cycle requires the use of more chemicals and energy to provide water for human use. Further, the abundance of impervious surfaces also contributes to the urban heat island effect – in which developed areas are, on average, several degrees warmer than undeveloped areas – because these impervious surfaces, particularly asphalt and concrete, absorb and store solar radiation rather than reflecting it.\(^5\)

The low density of suburban development means that more agricultural and natural land must be developed, which results in the destruction of prime farmland and wildlife habitat. This undermines both food security and biodiversity. Further, the loss of these areas diminishes the planet’s capacity to sequester carbon emissions from human activities. The single use development pattern means destinations are more remote, thus necessitating longer and more vehicle trips traveled. This automobile use translates to more air pollution and more traffic congestion. This traffic congestion exacerbates the air pollution problem by unnecessarily lengthening trips, which wastes fuel and time thereby decreasing total productivity. Traffic increases the frequency of automobile accidents. It can cause unhealthy stress and it reduces the commuter’s quality of life by consuming free time. Attempts to reduce traffic by increasing road capacity inevitably fail because the motorists’ previously deferred trips fill the added lanes. Automobile dependency also contributes to a sedentary lifestyle and its associated consequences to human health, namely obesity. Moreover, automobile emissions are a leading contributor to climate change through their greenhouse gas content.\(^6\)

Financial

Sprawl stretches financial resources by requiring that municipalities build and maintain far-flung infrastructure to provide utilities to low density subdivisions. The property tax revenue from these low density developments rarely covers the cost of this infrastructure. Further, the fragmentation of political jurisdictions in the suburbs leads to unnecessary waste due to the duplication of public services, such as education, fire and police. Thus, sprawl is largely responsible for the current municipal budget crisis. Sprawl also causes competition among neighboring municipalities for supplementary tax revenue from commercial and industrial land uses thus undermining rare attempts at coordinated regional planning.

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\(^6\) Ibid.
The relocation of businesses and households to the suburbs is responsible for many central cities inability to provide adequate services to their residents.\(^7\)

Financiers and investors require that new developments conform to existing standards to reduce risk exposure. This creates inertia behind the entire development paradigm; however, fewer and fewer households are able to afford the suburban lifestyle and its distinct development pattern. Large detached dwellings require more natural resources to build and more fossil fuels to maintain and operate, increasing their lifecycle cost. Considered together, housing and transportation costs have risen to approximately sixty percent of total household expenses. Many homebuyers fail to consider the cost of transportation, in both monetary and temporal terms, when purchasing a suburban home. This overvaluation of suburban homes partially explains the recent collapse of the real estate market. Thus, the suburban lifestyle has already demonstrated that it is entirely unsustainable in environmental, financial, health and social terms.\(^8\) This leads one critic to describe the suburban experiment as “the greatest misallocation of resources in the history of the planet.”\(^9\)

**A Brief History of Sprawl**

Suburbanization began during the Industrial Revolution as a result of the wealthy and middle classes fleeing the rapidly deteriorating conditions of cities. Unprecedented population growth, generated by the emerging factories’ demand for workers, led to overcrowding and overwhelmed these cities’ ability to provide services. Inadequate access to daylight, sanitation and ventilation combined with poor nutrition and recreation contributed to an increase in crime, disease and unrest. The first generation of suburbs, i.e. those built prior to World War II, were fundamentally different from their post-war counterparts, whose characteristics were described above. Although the single family home dominated these developments, these early suburbs were designed to function as communities, thus they were planned from inception to provide a public realm with a mix of land uses including schools and shops. The automobile was relatively rare and, therefore, local trips were made on foot and regional trips were made on public transportation – typically, railroad or streetcar.\(^10\) This period became a golden age of neighborhood planning, with noted designers translating the principles of good urban form to this new development pattern. Many social reformers, recognizing the plight of urban workers, advocated these suburban communities replace all cities. Cincinnati’s Glendale, Greenhills and Mariemont communities are distinguished examples dating from this social reform movement.

After the war, government policy enthusiastically subsidized this lifestyle to an increasing percentage of the population, resulting in a considerable increase in the standard of living. However, these second generation suburbs rarely adhered to the pre-war neighborhood planning principles and have therefore resulted in an inferior landscape. The post-war development pattern represents the codification and bastardization of an idealized land use and lifestyle coupling: the American Dream. This system depends on a now deeply entrenched policy and regulatory framework that ensures its perpetuation. The pre-war suburban neighborhoods were designed to minimize the intrusion of the automobile, then

\(^7\) Duany, Op. cit.
considered an annoyance. In contrast, the post-war suburban neighborhoods were designed to readily accommodate the automobile, by then considered a necessity; these alterations often came at the cost of other aspects of community design. The federal government encouraged automobile ownership through its policies; specifically, the construction of the interstate highways. These highways facilitated sprawl by opening affordable and previously remote agricultural and natural sites at the urban periphery for development. Currently, fuel taxes do not fully fund highway construction and maintenance; the remaining balance is socialized through other taxes levied against all households regardless of their automobile use. Thus, the motorist does not pay the full cost of his automobile use, but rather passes many of the costs associated with automobile use to society in general, creating an economic externality. The federal government guaranteed mortgages with standardized terms in order to provide home financing to a greater percentage of the population; the tax code encouraged the use of this credit. Government publications advocated the amenities and benefits of the suburban paradigm and developers utilized industrial methods of mass production and standardization, perfected in the war effort, to fulfill public demand.

Professional specialization divided the built environment into discrete components of study and the modernist mantra advocated the rationalization of these now independent systems. This specialization and rationalization disregarded the humanist roots of design professions and resulted in ignored interactions and trade-offs among these separate systems. For example, the civil engineers optimized their traffic control device manuals and the urban planners optimized their land use control regulations in isolation without consideration of the interactions. The architect, a supposed humanist and generalist, was evidently derelict in his duties, embracing modernist form-giving tendencies apart from urban spatial understanding. The various codes enacted by these independent professionals in the interest of public health, safety, and welfare made it impractical to vary significantly from the established norms of the model; indeed, many pre-war neighborhoods that continue to work well violate these subsequent regulations. Despite all its regulatory controls, the suburban paradigm does not function as intended.

Urbanism and Typology as Alternative

The future appears increasingly urban; recently, for the first time in history, the majority of the world population lives in cities. This demographic shift is simultaneously encouraging and troublesome. Cities have historically been catalysts for humanity’s artistic and scientific pursuits and city dwellers possess a smaller ecological footprint on average. However, current projections predict the global human population will reach ten billion by the middle of the current century with most of this population growth occurring in the developing world. Nevertheless, the United States is predicted to add another one hundred million people to total more than four hundred million residents. Globally, more people enjoy a higher standard of living, consuming more energy and resources per capita. Ultimately, an increasing population with an increasing standard of living is unsustainable; moreover, it is estimated that aggregate human consumption already surpasses the planet’s natural restorative capacity. This statistic includes not only nonrenewable resources, which can never be replaced, such as fossil fuels, but also renewable resources, like fisheries and woodlands, which are being

12 Ibid.
consumed at a pace greater than their natural rate of regeneration. This condition is unsustainable and if continued will ultimately lead to the exhaustion and eradication of entire ecosystems and to the collapse of the human economic and social structures that depend on them.\textsuperscript{15}

To prevent global environmental, financial, health and social disaster, society must learn to do more with less; urbanism represents a significant step in this direction.\textsuperscript{16} Defined as “the characteristic way of life of city dwellers”,\textsuperscript{17} urbanism’s central principle is a more robust public realm and a more modest private realm.\textsuperscript{18} Many authors have reexamined humanity’s shared urban heritage in an effort to understand how to produce works of great civic design in preparation for an urban future. The next step is to reexamine our built heritage as it relates to the individual urban dwelling. The study of archetypal urban dwellings provides a foundation for the design of new urban dwellings that can maintain the contemporary standard of living while reestablishing a sustainable balance between human consumption and ecological regeneration. The next section discusses contemporary discourse on urbanism and typology in the design professions and the following section traces the development of western urbanism and typology through history.

**Urbanism and Typology in Discourse**

Recent literature from the architecture and urban design professions provides a thorough critique and history of the present suburban paradigm, sprawl and its environmental, financial, health and social consequences; these conditions and consequences are summarized above. This section discusses those texts that propose alternatives to the status quo and distills their authors’ arguments into actionable design principles; for example, Andres Duany, Elizabeth Plater-Zyberk and Jeff Speck’s *Suburban Nation* argues for neo-traditional neighborhood planning and contributes many design principles for pedestrian streets. Also considered and summarized here are those texts that emphasize or explain the importance of urbanism and the individual dwelling, including Peter Calthorpe’s *Urbanism in the Age of Climate Change* and Witold Rybczynski’s *Home: A Short History of an Idea*. Interest then turns to certain seminal theory texts defending the proposed methodology of design for new urban dwellings, including Aldo Rossi’s *The Architecture of the City*, which ended modern architecture’s ignorance towards urban spatial composition; Amos Rapoport’s *House Form and Culture*, which introduced buildings other than monuments, such as dwellings, as a serious topic of interest for architects; and Alan Colquhoun’s “Typology and Design Method”, which answered critics of the precedent based design process.

**Design Principles**

Andres Duany, Elizabeth Plater-Zyberk and Jeff Speck promote a neo-traditional neighborhood planning strategy. In their *Suburban Nation* of 2001, they argue that, “unlike the traditional neighborhood model, which evolved organically as a response to human needs, suburban sprawl is an idealized artificial system.” Analyzing several successful historic neighborhoods as precedents, they propose six neighborhood design principles. First, every neighborhood needs a clear center that supports a variety of activities, i.e. mixed uses. Second, no home should be located more than a five

\textsuperscript{15} Calthorpe, Op. cit.
\textsuperscript{16} Ibid.
\textsuperscript{17} Merriam-Webster Online, “Urbanism” (Merriam-Webster, 2012)
\textsuperscript{18} Calthorpe, Op. cit.
minute walk from the neighborhood center containing the household's basic daily needs: school, shops, work. Third, the street pattern must be continuous and connective – cartesian (gridded) not dendritic (branching) – to disperse not concentrate automobile traffic and provide connectivity for pedestrian activity. Forth, streets must be narrow to slow traffic and versatile to accommodate multiple modes of travel, i.e. bicycles, pedestrians and motor vehicles, safely. Fifth, blocks must be small and contain a mix of uses including a variety of dwelling types. Consistent proportioning and typology allow mixing of uses without disrupting the urban fabric. Sixth, special buildings, including civic and public institutions, must receive privileged sites.19

They also present three principles of urban design to encourage pedestrian activity. First, streets must be safe both in actuality and as perceived by their users. Here, safety refers to two factors: the prevention of automobile collisions and protection from crime. Narrower streets calm traffic because they signal motorists to slow down, and objects such as parallel-parked cars and street trees provide a protective buffer between the street and sidewalk. Doors and windows facing onto the street express the occupant’s presence and therefore deter criminal activity. Second, the street must be comfortable in terms of human scale and spatial enclosure. Spatial enclosure of the street typically means the ratio of the width of the street to the height of the buildings is one to one and that street trees are provided to form an overhead canopy. Third, the streets must be interesting with a variety of storefronts and most parking limited to rear alleys and lots. Their research shows that neighborhoods planned according to these principles have consistently and considerably higher real estate values, signaling that homebuyers treasure this traditional land use and lifestyle paradigm. They state, “the most significant amenity that the city can offer potential residents is a public realm, with the vibrant street life that phrase implies.” The most important observation they make is that, once begun, sprawl becomes a self-reinforcing cycle. Households relocate to the suburbs to avoid urban density, but as they become surrounded by new development they will relocate further from the city. In summary, they believe, “the design of new places should be modeled on old places that work. Invention is welcome, but must be laid upon the foundation of precedent.”20

Peter Calthorpe argues that urbanism directly affects the two most energy intensive sectors of the national economy – buildings and transportation – and therefore is responsible for the majority of greenhouse gas emissions in the United States. Urbanism, he explains in Urbanism in the Age of Climate Change of 2011, unlike other sustainable strategies, like alternative energy and carbon sequestration, actually costs less than the status quo but can provide approximately half of the required reductions in greenhouse gas emissions to prevent catastrophic climate change. More importantly, he explains the complex interactions and interdependencies among the environmental, financial, health, and social systems that are dependent on our development pattern and describes how urbanism can provide many ancillary benefits.21

The intersection of lifestyle and conservation is urbanism […] perhaps just as important as greenhouse gas reductions and oil savings is the fact that urbanism generates a fortuitous web of co-benefits – it is our most potent weapon against climate change because it does so much more. Urbanism’s compact forms lead to less land consumed and more farmland, parks, habitat, and open space preserved. A smaller urban footprint results in less development costs and fewer miles of roads, utilities, and services to build and maintain, which then leads to fewer impervious surfaces, less polluted storm runoff, and more water directed back into aquifers.

20 Ibid.
More compact development leads to lower housing costs as lower land and infrastructure costs affect sales prices and taxes. Urban development means a different mix of housing types [...] but in the end provides more housing choices for a more diverse population. It means less private space but more shared community places – more efficient and less expensive overall. Urbanism is more suited to an aging population, for whom driving and yard maintenance are a growing burden, and for working families seeking lower utility bills and less time spent commuting.

Urbanism leads to fewer miles driven, which then leads to less gas consumed and less dependence on foreign oil supplies, less air pollution, less carbon emissions. Fewer miles also leads to less congestion, [...] lower road construction and maintenance costs, and fewer auto accidents. This then leads to lower health costs because of fewer accidents and cleaner air, which is reinforced by more walking, bicycling, and exercising, which in turn contributes to lower obesity rates. And more walking leads to more people on the streets, safer neighborhoods and perhaps stronger communities.

The feedback loops go on. More urban development means more compact buildings – less energy needed to heat and cool, lower utility bills, less irrigation water, and, once again, less carbon in the atmosphere. This then leads to lower demands on electric utilities and fewer new power plants, which again results in less carbon and fewer costs. As Bucky Fuller exhorted us, urbanism is inherently, ‘doing more with less.’ Or as Mies van der Rohe famously asserted, ‘less is more.’

Calthorpe summarizes, “the more comprehensive we make systems the more sustainable they are.” Thus, he argues the importance designing for sustainable neighborhoods and regions rather than buildings. He describes environmental sustainability as consisting of three components: lifestyle, conservation, and clean energy. Lifestyle refers to the energy and resources consumed as a result of our way of life. Conservation refers to the efficiency of equipment and to the stewardship of resources. Clean energy refers to advanced technologies for fusion, geothermal, solar, tidal and wind power. Developing these alternative energy sources is presently emphasized. However, lifestyle is the most actionable in terms of design because it depends largely on the configuration of communities, for example, how much one drives and how large one’s home is. He argues that traditional urbanism is, in effect, the best conservation strategy and terms this approach passive urbanism. He characterizes traditional urbanism as consisting of diverse activities and population, rich public institutions and spaces, and human scaled buildings and streets. He reiterates the importance of the public realm: “a big part of making cities and towns meaningful places rather than merely machines for shelter and commerce has to do with how we shape our commons. Ultimately, urbanism depends on the notion that the public domain must become richer and the private domain more frugal [...] it is this sense of commons that makes places real, that turns ‘housing’ into dwellings, ‘zones’ into neighborhoods, ‘municipalities’ into communities.” He reminds the designer, “we will never treasure our cities and towns just because they are low carbon, energy efficient, or even economically abundant; we will treasure them only when we come to love them as places – as vessels of our cultural identities, stages for our social interaction, and landscapes for our personal narratives.” Most importantly, he demonstrates that demographic and economic transitions currently occurring will push the real estate development industry to create real urban places.

Witold Rybczynski writes in his Home: A Short History of an Idea of 1987 that nostalgia for the past typically represents disapproval of the present. He believes that the use of historic styles in contemporary houses represents dissatisfaction with the neighborhoods and dwellings built per the modernist philosophy. Commodification and mechanization have
resulted in housing that no longer fulfills the household’s most basic needs: comfort and privacy. In fact, he argues the amenities developers utilize to market their product, such as open plans with multi-story living spaces, contradicts the desire for comfort and privacy. These open plans leave the homeowner with the impression that the interior is bright and spacious; however, the homeowner will find that there is no acoustic or visual separation between public and private spaces. Rybczynski explains how privacy emerged as an important domestic attribute during the renaissance when the home and workplace became separated. Thus, the home became the exclusive domain of the family and intimacy became a defining feature ultimately resulting in a deep attachment to the home as a physical manifestation of the family. Comfort became an important domestic characteristic beginning with the industrial revolution. Mechanical ventilation was the first technology applied to the home and was soon followed by electric light and several others. In the United States, the household typically did not employ domestic help and electrification provided the opportunity for the introduction of convenience appliances. Thus, the modern bathroom and kitchen emerged. However, the introduction of these technologies began the rationalization of the home, which later became codified in the modern movement as the machine for living. Rybczynski criticizes this movement stating it was not “a response to a changing world, but an attempt to change the way we live.” He reiterates, “domestic well-being is a fundamental human need that is deeply rooted in us, and that must be satisfied. If this need is not met in the present it is not unnatural to look for comfort in tradition. In doing so, however, we should not confuse the idea of comfort with decor – the appearance of rooms – nor with behavior – how these rooms were used […] all the modern devices that contribute to our domestic comfort – central heating, indoor plumbing, running hot and cold water, electric light and power, and elevators – were unavailable before 1890 and were well known by 1920. We live, like it or not, on the far side of a great technological gap […] the idea of comfort has changed.”

Theory Texts

Aldo Rossi, in his *The Architecture of the City* of 1966, describes the city as composed of permanent monuments that provide the structural datum about which residential districts emerge. Individual dwellings may change but the districts persist due to the permanence of streets and other urban artifacts. Rossi observes that building types are permanent despite changes of function. He explains, “type developed according to both needs and aspirations to beauty; a particular type was associated with a form and a way of life […] the concept of type thus became the basis of architecture, a fact attested to both by practice and by the treatises.” He observes, “housing types have not changed from antiquity up to today, but this is not to say that the actual way of living has not changed, nor that new ways of living are not always possible.” Historic types have been utilized in various forms throughout history in response to various external constraints. He repeats the importance of dwelling typology: “the city has always been characterized largely by the individual dwelling […] one cannot argue either by historical analysis or description of actual sites that the dwelling is something amorphous or easily and quickly transformable. The form in which residential building types are realized, the typological aspects that characterize them, is closely bound up with the urban form, and the house, which materially represents a people’s way of life, the precise manifestation of a culture, is slow to change.”

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Amos Rapoport, in his *House Form and Culture* of 1969, explains the cultural and social origins of building types. In primitive cultures or societies, the family is responsible for constructing its own dwelling. The family has a perfect understanding of its own requirements and will design to respond to these needs. Subsequent dwellings are modeled after these previous precedents and some of its elements or forms persist over very long periods of time and are gradually refined in response to climate, construction and culture. These become a model, or building type, that is utilized universally, and he writes “in a primitive society all the dwellings are basically identical.” Later, craftsmen are used for the construction of dwellings; however, all members of the culture or society are familiar with the established norms—the building type. The craftsmen have a specialized knowledge of construction and can adapt the building type according to the specific requirements, such as the available materials and site. Individual dwellings will vary but the model or type is preserved. Rapoport writes, “the model itself is the result of the collaboration of many people over many generations as well as the collaboration of makers and users of buildings and other artifacts [...] since knowledge of the model is shared by all, there is no need for drawings or designers [...] the craftsman is called in only because he has more detailed knowledge of these rules [...] tradition has the force of law [...] there is a shared image of life, an accepted model of buildings, a small number of building types, and finally, an accepted hierarchy and hence an accepted settlement pattern. As long as tradition is alive, this shared and accepted image operates.” He notes that tradition has been supplanted in contemporary culture. Design professions emerged in response to the increasing complexity of construction technology and the variety of building types. He observes that society has lost the shared value system that earlier cultures and societies depended on to motivate cooperation in the construction of their communities. A semblance of such cooperation now has to be ensured by additional regulations and rules to maintain order, thus building and zoning codes become necessary.26

Alan Colquhoun’s essay *Typology and Design Method* of 1969 responds to critics of the utilization of typology in the design professions. Generally, orthodox modernist opponents to this design methodology argue that it is an intuitive process incapable of responding to the increasing complexity of construction and function. Yet, in practice, designers typically depend on previous solutions when confronted with similar new problems. Colquhoun believes this design methodology is appropriate, as building types become iconic representations of social structures. Individuals become dependent on these iconic representations to navigate through and orient themselves in the built environment. He writes, “our sense of place and relationship in, say, an urban environment, or in a building, are not dependent on any objective fact that is measurable; they are phenomenal.” To paraphrase, there is an iconic significance attributed to the form of buildings. In the context of rapid technological change, it is increasingly important to investigate the received tradition—solutions to past problems. The modernist philosophy, however, contends that form must be derived from the objective study of the processes and systems utilized. This methodology purports to be purely rational or scientific; however, its supporters ignore the fact that, “the designer is always faced with making voluntary decisions, and that the configuration which he arrives at must be the result of intention, and not merely the result of a deterministic process.” It is not possible to exhaustively list the parameters of a design problem nor are all parameters statable in quantitative terms. Additionally, there are an infinite number of conceivable configurations and every configuration poses certain trade offs. Faced with imperfect knowledge of the problem to be solved, it is best to defer to past solutions and adapt

these solutions to any changes; thus, precedent and type, ignored in the modernist philosophy, remain crucial to the
design process as formulated by Colquhoun.27

This section briefly summarized those texts central to the main argument of this thesis: through analysis of archetypal
urban dwellings one discovers principles for the design of new urban dwellings appropriate for and attractive to certain
demographics in a position to drive demand for vibrant urban districts and that increasing urbanism in this manner is a
significant step toward a sustainable society. The next section will explore the history of the urban dwelling with an
emphasis on typological evolution, beginning with the first cities and concluding with the first suburbs. As previously
discussed, later suburbs, i.e. those built after World War II, broke with the inherited typological and urban tradition,
thus becoming contributors to sprawl and its environmental, financial, health and social consequences.

Urbanism and Typology in History

Prehistoric Origins

Urbanization is a relatively recent phenomenon in human history that dates to the development of agriculture during
the neolithic revolution approximately ten thousand years ago; the process can occur only when a society produces an
agricultural surplus. Production of an agricultural surplus is a milestone marker in socio-economic development that
enables specialization and trade. Socio-economic development begins with nomadic hunter/gatherers and progresses
to migratory slash-and-burn farming and then to sedentary subsistence cultivation. With each stage of this process, the
fundamental social unit becomes smaller because the number of laborers required for food production decreases. The
community is replaced by the extended family and the extended family is replaced by the nuclear family; with a family’s
multi-generational care for its fields and livestock, the concept of private property emerges. Also, the family’s multi-
generational habitation of one dwelling encourages the improvement of this dwelling. The permanent rectilinear hut
replaces the temporary round hut because of its expandability. Masonry construction replaces timber construction for
its durability. And the rural cottage emerges as a dwelling type. Architecture originated with the building of these early
modest dwellings. Conceptually, the round hut is intuitive whereas the rectilinear hut is rational. In the round hut, the
roof and wall form a continuous surface and its openings are both door and window. However, in the rectilinear hut
the roof and walls become articulated as surfaces and the openings become specialized doors and windows. This
articulation and specialization suggests a degree of craftsmanship and forethought. With a stabilized supply of food,
comfort replaces survival as the primary motivator. Under the correct conditions, subsistence can become surplus
triggering fundamental socio-economic change.28

Ancient Civilizations

This agricultural surplus first occurred in China, Egypt, India and Mesopotamia during the eighth to sixth millennia BC.
In these regions, a favorable climate and fertile soil greatly increased agricultural yield while the adjacent deserts and

28 Norbert Schoenauer, 6,000 Years of Housing (New York Norton, 2003), 11-93.
mountain ranges reduced the threat of attack. The first urban dwellings were adaptations of familiar rural dwelling types. In the cities of these ancient civilizations, the courtyard house was typical; however, this parallel development does not suggest contact between these ancient civilizations. Instead, this typological similarity establishes that similar generative forces result in similar architectural forms. Conceptually, the courtyard is an internalization of the farmyard. This courtyard serves several important functions. First, it provides a private and secure outdoor space for the family’s work. Second, the courtyard type allows shared walls on three sides thus achieving very high density, which was crucial given the extensive undertaking involved in the construction of city walls. Third, the courtyard creates a protected microclimate. Fourth, the courtyard corresponds to the garden-like paradise present in many ancient religions.29

Image 1: Plans of typical ancient courtyard houses in Ur, Mesopotamia; Mohenjo-Daro, India; and Kahun, Egypt (left to right). The gray hatches mark the courtyards and arrows mark the entry sequences with their characteristic right angle turns for privacy. [Source: Schoenauer, Op. cit., 97.]

Image 2: Plans of typical residential districts in Ur, Mesopotamia; Mohenjo-Daro, India; and Kahun, Egypt (left to right). Streets exhibit a regular and rectilinear layout; dwelling entries are located on side streets and all dwellings feature a courtyard. [Source: Schoenauer, Op. cit., 103-116.]

Early cities typically had a somewhat regular and rectilinear layout. The entrances to individual dwellings were located on side streets rather than main streets. In these courtyard dwellings, the entry hall often contained a right angle turn

29 Ibid, 95-122.
to block views from the street. The rooms typically opened onto the courtyard and the street elevation was typically not embellished or fenestrated. Individual houses varied but a typical internal arrangement was a reception room and kitchen on the ground floor with a stair providing access to the family’s private rooms on the second floor. In arid climates, the flat roof was accessible and provided additional living space. In China, however, second floors were not common. Despite variations in climate and culture the courtyard type was overwhelmingly preferred throughout the ancient world. In warmer climates, the main house was located to the south of the courtyard to shade it from the sun; in colder climates, the main house was located to the north of the courtyard to shelter it from wind. Since these early dwellings were inwardly focused, there was greater mixing of poor and rich households.\(^{30}\)

**Classical Civilizations**

The Greeks also developed the courtyard type but did so independently by converting their rural megaron into the urban peristyle. The peristyle house had a large central courtyard typically adjoined on one or more sides by a covered colonnade. The courtyard functioned as a private outdoor workspace for the family and it was typically situated in the southern part of the house to maximize the house’s solar exposure. The family organized its routine functions around the courtyard with daytime activities in the rooms to its south and nighttime activities in the rooms to its north. The courtyard was invariably screened from the street and the house rarely had windows onto the street. A covered entry was often provided to shelter visitors waiting for admittance to the house.\(^{31}\)

![Image 3: Plans of typical peristyle dwellings in Athens and Olynthos and a residential district in Priene dating to the Hellenistic era of ancient Greece (left to right). The courtyard divides rooms intended for male and female or day and night use. [Source: Schoenauer, Op. cit., 132-135.]]

The size of these cities was severely limited by nutrient deficient soils. Therefore, an increase in population triggered the organization of a new colony. In their colonies, the Greeks employed a strictly regular and rectilinear street layout despite the organic pattern of their older cities. The Greek Empire introduced their version of the courtyard type and urban form throughout the ancient Mediterranean and Near East regions and it became the prototype of later Arabian and Indian dwellings. Here, the courtyard type persisted for its inherent utility in mitigating the heat of the desert and

\(^{30}\) Ibid., 100-122.
\(^{31}\) Ibid., 123-144.
tropical climates and for the privacy it affords for the household. However, the rectilinear city planning was gradually replaced in Arabian and Indian cities with a more cellular structure of autonomous residential wards partitioned along familial or tribal relationships.32

The Roman domus represents a combination of the urban dwellings of the Etruscans and of the Greeks. It typically had two courtyards; the smaller and more public courtyard was called the atrium and the larger and more private courtyard was called the peristyle. The domus had a strictly axial internal layout, eliminating the right angle turn at the entry typical in China, Egypt, India and Mesopotamia. The atrium and peristyle were surrounded with rooms for various household activities and functions. Between the atrium and peristyle was the main reception room or tablinum. The peristyle was typically colonnaded and functioned as a pleasure garden rather than a workspace. The domus was typically one story and the street elevation had limited fenestration, although the entrance was typically embellished. The domus was very advanced in its climate control and plumbing technologies; however, most Romans resided in apartment or tenement buildings called insula. These buildings could reach eight stories in height although six was more typical. The ground floor was often occupied by small shops. This marks the beginning of the separation of the wealthy and the poor in the city.33

Image 4: Plan and section of typical domus dwellings in Pompeii. Note there are two courtyards the more public atrium for receiving guests and the more private peristyle. Only the wealthiest of households resided in these elaborate dwellings. [Source: Schoenauer, Op. cit., 137-140.]

Medieval and Renaissance Periods

After the collapse of the Roman Empire, urbanization in Western Europe entered a period of decline brought about by barbarians and plague. Cities shrank or vanished. Urban survivors took up residence in the ruins of public buildings and converted them into self-contained villages; urban refugees established new villages in isolated areas, such as islands and marshes. Most of the surviving urban population simply returned to rural life, but the agricultural surplus needed to sustain urbanization was no longer guaranteed. In time, stability returned and urbanization resumed; however, the continuous development of ancient typologies was lost. Norbert Schoenauer characterizes this schism as the eastern dwelling remaining inwardly focused and the western dwelling becoming outwardly focused. Even so, the courtyard typology survived in the flourishing Arabian, Chinese, Japanese and Indian cultures. In Western Europe, the courtyard

32 Ibid., 123-192.
33 Ibid., 123-144.
typology was adapted to religious architecture in the form of the cloister. The cloistered monasteries and subsequent cloistered universities appropriated the courtyard type as dormitory housing with multiple units and communal spaces configured about a shared courtyard. The Arabs later reintroduced the single family courtyard type to Europe through their conquest of Spain. And the Spanish then introduced the courtyard dwelling to the Americas as the rural hacienda and the urban patio types.\textsuperscript{34}

In medieval towns throughout Europe, two new dwelling types emerged. The tower dwelling was motivated primarily by defense and the gable dwelling was a translation of the rural farmhouse. The gable dwelling typically consisted of two floors with two or three rooms per floor. There were no hallways and stairs were often located on the exterior. The rooms led directly from one to another and lacked dedicated functions; there was no privacy as a large number of people – both related and unrelated – shared these few rooms. The ground floor contained a shop, workshop, stables and storage; and the upper floor contained the household's kitchen and living spaces. These wooden dwellings were typically detached to prevent the spread of fire and to emphasize the individuality of each dwelling. There was often an enclosed exterior space at the rear, but this yard was not the pleasure garden of previous cultures; instead, it served as a service area containing the privy and stables. Dwellings became outwardly focused with large windows opening to the streets. Households began to embellish and ornament their dwellings to signify their status and wealth. Extensive and expensive fortifications were necessary in medieval towns and therefore cities had clearly defined perimeters with very high density inside. The transition to masonry construction allowed attached dwellings without increasing the risk of fire. Fortresses and monasteries evolved into the nuclei of new towns by attracting craftsmen and merchants, thus urbanization was reestablished.\textsuperscript{35}

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Image 5: Typical early medieval dwellings – tower dwellings (left) and gable dwellings (right). These types were the first urban dwellings to feature windows opening to the street and thus break from the development of the courtyard types. [Source: Schoenauer, Op. cit., 214-215.]

In these cities, lots were generally deep but narrow to limit the building's street frontage. The hall type dwelling had a multi-storey living space at its center. Private rooms were located on upper floors and were accessed by a gallery and stair in the hall. Shops were located below the private rooms adjacent to the hall. This type often had a rear yard and

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\textsuperscript{34} Ibid., 209-233.
\textsuperscript{35} Ibid., 209-266.
workshop accessed by a narrow passage. The merchant house was a variation on this type, generally with wider street frontage and the entire ground floor dedicated to shops and workshops. It was not uncommon for the upper floors to project beyond the shops to create an arcade to shelter the street below. Merchant houses fronted the main streets and hall type houses fronted the side streets. Privacy was generally unavailable because a household often shared its quarters with its apprentices, employees and servants; one’s home was synonymous with one’s place of employment. In these medieval houses, rooms were typically multi-purpose and furniture was reconfigured throughout the day to accommodate various activities and functions. European settlers brought their familiar rural and urban dwelling types to their colonies in the new world. However, extensive modifications were often necessary due to the difficult climate and this often led to the evolution of distinct types. For example, English settlers in New England began building the Hall and Parlor houses typical of their contemporaries in the old world; however, the colder and wetter winters of the new world necessitated the addition of insulating clapboard and wainscoting as well as the centralization and expansion of the hearth, thus creating the cape cod houses typical of New England. The Cape Code type evolved into the larger Saltbox type as the settlers grew wealthier; and during the westward expansion, the Saltbox evolved into the I-House typical of the Midwest in response to the desirability of phasing construction over a period of time.

In the Renaissance, defense became an even greater concern with the introduction of gunpowder. This required more extensive defenses and led to an increase in urban density, as a city could not afford to repeatedly rebuild its ramparts. The founding of new cities decreased but the existing cities grew and many were renovated with straight avenues and grand squares. Home and work became separate places and the separation of classes became a greater concern. The wealthy built residential squares and crescents, such as the Place Royal in Paris and the Royal Crescent in Bath. These early townhouses had uniform street elevations to create the illusion of a single palatial dwelling and they were planned around a stately square. If a shared square was not provided then private gardens adjoined each unit at the rear. The townhouse is an adaptation of attached medieval dwellings but generally eliminated commercial functions. They were typically three window bays wide and four stories tall. Developers often built these townhouses speculatively. The

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Image 6: Plan and elevation of typical merchant house (left) and typical hall dwellings (right). Note that the courtyard persists in the hall type but has become place for the stable and privy not the pleasure gardens on the ancient courtyard houses. [Source: Schoenauer, Op. cit., 260-264.]

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36 Ibid., 217-266.
37 Ibid., 87-89.
The popularity of this living arrangement spread to the United States and residential squares became features of new cities, including Philadelphia and Savannah.\textsuperscript{38}

Image 7: View and plan of the Royal Crescent in Bath, England (left). European settlers brought their dwelling types and urban spatial composition strategies such as the residential square to the new world cities as evidenced by Savannah (right). [Source: Schoenauer, Op. cit., 273-282.]

Industrial and Modern Periods

It should be noted that in the previously discussed urban civilizations, the urban population was a small percentage of the total population. The majority of the population resided in rural areas producing the food needed to support the cities. This would remain true through the Industrial Revolution and only very recently did the global urban population exceed the global rural population. Abundant energy, free trade and political stability contributed to the genesis of the Industrial Revolution, which triggered a sudden increase in the rate of urbanization. The rural population migrated to cities seeking employment in the new factories. Urban conditions deteriorated and public health was threatened by diseases from crowding and the lack of sanitation. Initially, the demand for worker housing was satisfied by modifying familiar rural cottages into rows of terraced housing. Later, the townhouse became a model for the tenement. The tenement was a deep but narrow building typically containing two-room apartments. Daylight and ventilation were uncommon at first but building codes soon required the inclusion of air- and light-shafts in these tenement buildings.\textsuperscript{39}

Industrial technologies greatly improved the dwellings of the wealthy and middle classes. For example, previous dwellings were dimly lit by candle or rudimentary gas- or oil-lamps. However, electric lighting became common late in the 1800s. Artificial ventilation also became possible with the electrification of the home and was heavily exploited during this period, since stagnant or stale air was thought to be the cause of many health problems. Central heating and air condition were introduced, as was central hot and cold running water. However, the modern bathroom with permanent fixtures did not yet exist. Industrially produced products began to enter the home. The mechanization and modernization of the home would eventually evolve into the modernist paradigm of the “machine for living in” and the mass construction of “housing units” rather than dwellings as distinct from these gradually evolved dwelling types.\textsuperscript{40}

\textsuperscript{38} Ibid., 267-288.
\textsuperscript{39} Ibid., 289-343.
\textsuperscript{40} Witold Rybczynski, Op. Cit.
The crime, crowding, disease and pollution of the industrial city encouraged wealthy families to flee to the countryside. This retreat required a personal means of transportation for the family, whose livelihood remained tied to the city’s economic activity. However, public transportation — the omnibus and streetcar — opened this option to the middle class. In the United Kingdom, the suburban villa became fashionable with the wealthy and middle class. This paradigm also became influential in the United States, where these households generally lacked servants and the household was responsible for its own cleaning and cooking. Intimate knowledge of the household chores led to an increase in the use of convenience equipment and to the formation of the contemporary bathroom and kitchen. The American house was smaller than its European counterpart and built-in furniture was more common because it did not require cleaning behind or under it. This period also represents a golden age of town planning as the suburbs of the 1890s through the 1930s were not yet designed for primarily automobile traffic. Architects and landscape architects focused on limiting the intrusion of the automobile and creating true towns with neighborhood shops and schools. However, after World War II, the suburban villa became the dominant type and the automobile replaced public transportation as the mode of travel. The automobile-oriented suburb was a fundamentally different type of development.

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41 Ibid.
Chapter 2: Client

Market Conditions

After World War II, the residential suburb came to dominate the residential real estate development industry. Today, however, a significant demographic and economic shift suggests the need for a new paradigm. Aging retirees will need smaller houses that are easier to maintain; young professionals will want affordable houses that are nearer to amenities. Over the past forty years, the average household income has remained constant when adjusted for inflation; however, the average number of automobiles per household doubled and the average size of newly constructed homes also doubled. Over the past forty years, the portion of household income spent on transportation and housing combined increased from approximately forty percent to approximately sixty percent; this increase has created an unsustainable financial situation for many households. The underlying socioeconomic assumptions that contributed to the success of the suburban paradigm in the past are now changing. Peter Calthorpe summarizes, “we outgrew the ‘one size fits all’ housing market some time ago.” In the future, the housing market will naturally trend toward smaller units and urban sites.\(^{42}\) Developers will inevitably adapt to satisfy this demand.

Indeed, the first real estate developments emerging from the recent recession already reflect this shift toward smaller units and urban sites. Writing for the multifamily real estate developer’s trade publication, \textit{Multifamily Executive}, Chris Wood observes that new apartment and condominium buildings are focusing on the next generation of renters whose demands and expectations are very different. Through interviews with architects and developers currently working on multifamily buildings, he establishes that this next generation of renters is unique in its lifestyle, particularly in their use of technology, spending far more time at the computer and on the internet. They grew up with social media and thus show less concern for their privacy and are not generally concerned with their guests seeing their sleeping area or dirty dishes and laundry. As such, developers are moving away from providing defined rooms and moving toward open plans. Further, television shows about interior design have shaped their expectations regarding materials and finishes thus they demand a higher quality space and are willing to accept a lower quantity of space as a tradeoff. Average unit size has dramatically decreased and the ratio of studio and one bedroom apartments to two bedroom units has increased. Many developers are experimenting with so called micro-units with less than four hundred square feet; however, six to eight hundred square feet is more common – still much smaller than the one thousand square foot units from just before the recession. Young renters readily accept these smaller units especially when community amenities are provided; some examples of these amenities include café lounges, gaming areas, fitness centers, pet accommodations, and screening rooms. Wood summarizes: “small, dense, urban and cool are ruling the day – even outside core downtown markets.” Thus, this thesis’s interest in passive urbanism is supported by the economic reality of the emerging real estate development industry and any progressive developer interested in further exploration of the implications and the potential of this market trend would serve as an appropriate client for this design project.\(^{43}\)

\(^{43}\) Chris Wood. “New Design DNA.” \textit{Multifamily Executive} (2012)
An exemplary client for this project would be an organization comparable to the Cincinnati Center City Development Corporation. This developer leverages private funds raised from major corporations to finance new development in downtown neighborhoods. The corporations are interested in creating vibrant urban districts near their headquarters to attract and retain talented employees. As Richard Florida explains, “place still matters in the modern economy – and the competitive advantage of the world’s most successful city-regions seems to be growing, not shrinking.” In Cincinnati, this describes not only the downtown central business district but also, the uptown neighborhoods, which are the region’s second largest employer due to their educational and healthcare institutions. These local institutions are interested in competing with similarly situated institutions regionally, nationally and internationally; one strategy for competing is to create vibrant urban districts in their immediate vicinity to attract top faculty, researchers and students.

**Political Considerations**

In the United States, public policy contributed to the proliferation of suburban development. The interstate highway system externalized the cost of automobile travel and opened cheap but distant land for development. Government publications and standards encouraged developers to construct these suburban houses. And federal mortgages and the tax code encouraged families to purchase these suburban dwellings. Meanwhile, the poor were left behind in the center city, whose decreasing tax base made the provision of even basic human services difficult. Urban renewal failed to improve urban conditions. In fact, these interventions often exacerbated conditions by adopting the mentality of the “machine for living” in from the modern paradigm and completely disrupting the way of life of the residents. In time, the new development model became codified in building and zoning codes. Thus, the condition of the built environment is a political issue. The aforementioned trend toward smaller houses on urban sites will require a reversal of public policy. In many places, the traditional settlement pattern of mixed incomes and mixed uses is now simply illegal. These policies must be reversed if the inertia of the prevailing paradigm is to be overcome.

This challenge takes on greater importance in light of the need for environmental sustainability outlined in the previous chapter. To summarize, the suburban development pattern has doubled the size of homes and the amount of vehicle trips; however, the environmental footprint remained constant due to the counterbalancing effect of increased energy efficiency. Nevertheless, the population has doubled meaning the total environmental footprint has also doubled. The experts believe the planet has the capacity to support only twelve percent of current greenhouse gas emissions. In the United States, buildings and transportation, which are directly linked to urbanism, represent the majority of greenhouse gas emissions. In short, public policy encouraging urban development is the most cost effective solution for averting further environmental degradation. Peter Calthorpe calls this strategy “passive urbanism,” referring to the distinction drawn between active and passive strategies and systems in sustainable design terminology.
Chapter 3: Site

Context

Corryville was initially an independent village located on a hilltop above the basin and riverfront of Cincinnati. The village was named for William Corry, who owned the land. After his death, his estate was divided for development. The first residents built small dairy and vegetable farms but were soon followed by artisans and craftsmen – German immigrants – who built modest but sturdy homes in the growing village. Circa 1870, an extension of the incline and streetcar services connected Cincinnati and Corryville. The village became primarily residential with a business district located on Vine Street. The business district thrived because the streetcar system channeled commuters from various uptown communities through it en route to the basin and riverfront. The city annexed the village and moved several major institutions to the neighborhood. The University of Cincinnati and Cincinnati General Hospital grew quickly and would ultimately consume over five hundred homes in the neighborhood. This institutionalization contributed to the neighborhood’s decreasing population and demographic transition. Also, the introduction of the automobile caused residents to convert the neighborhood’s characteristic gardens into parking lots. In 1960, the city instituted an urban renewal plan that targeted the neighborhood for extensive intervention. A portion of Vine Street was closed to allow the construction of a shopping center. St Clair Street was converted to an arterial and renamed Martin Luther King Drive. The Environmental Protection Agency took over several blocks of houses and the area’s other institutions began to attract development. The original middle-class households largely left the neighborhood and the remaining historic houses were converted into rental units for students with many deteriorating rapidly. The Vine Street business district responded by transitioning to student-oriented merchants, such as bars and concert venues. The continued growth of the university’s prominence and its resulting concern for public perception of its adjoining neighborhoods has resulted in the institution exerting influence over the direction of development in the vicinity through coalitions with private developers and financiers. This trend corresponds to the hypothetical client discussed in the previous chapter.

Today, despite its decline, Corryville remains one of the city’s only walkable neighborhoods with a full complement of basic services, such as grocery and laundry facilities. Thus, the neighborhood provides appropriate sites for this thesis. The institutions that destroyed much of its urban fabric now have a vested interest in improving it. The city plans to reintroduce streetcar service in the future – the proposed extension will follow Vine Street through the neighborhood before looping back along Jefferson Avenue. Already, there are substantial new developments proposed for Corryville, including the reconfiguration of the aforementioned shopping center, streetscape improvements to the Vine Street business district and a number of new student housing projects. These student housing projects, however, have not been designed to reverse the overall institutional focus of the neighborhood and are almost universally treated with a vernacular pastiche: contrived colonial, italianate and tudor ornament. These inappropriate post-modern references are more ironic given the university’s distinguished collection of contemporary architecture and the target renter’s predisposition toward the contemporary aesthetic as noted in the previous chapter. Further, expanding the target market segment beyond college students to include young professionals and active retirees moves towards the restoration of population diversity that is a crucial characteristic of traditional urbanism.
Site Summary

The specific site selected for this thesis is one block adjoining the intersection of University Avenue and Vine Street; this block was previously occupied by the Schiel School, which was recently demolished for the construction of new student rental housing. The school was designed by the esteemed local architect Samuel Hannaford. The Corryville branch of the United States Post Office and the University of Cincinnati central utility plant, designed by Cambridge Seven Associates, occupy the block directly to the north; directly to the east is the neighborhood public library – a donation to the city from Andrew Carnegie. The post office is a single story concrete block building with extensive parking lots and is an appropriate site for future redevelopment so as to increase the intensity of the land use. The remainder of the built context is a mixture of three or four story historic italianate row houses typical of the city and more recent single story commercial infill buildings, which are also appropriate sites for redevelopment as the degree of urbanism increases. The intersection of University Avenue and Vine Street occupies the local high point and the natural terrain gently slopes across the site to the southwest. The block is currently artificially leveled due to existing retaining walls and plans for future development call for utilizing the natural elevation change to conceal a parking deck below grade with street access from the low point at the intersection of Daniels Street and Glendora Avenue. There is presumed access to all public utilities at the street.

Image 9: Historic photograph of the recently demolished Schiel School viewed from the intersection of Vine Street and University Avenue. [Source: Cincinnati Museum Center]

The institutionalization of the neighborhood has created a juxtaposition of fine and course urban fabrics – the finer historic fabric responds to human scale while the courser recent fabric responds to automobile scale. Recreating the historic pattern limits the site capacity to approximately twenty-five typical row houses; however, utilizing the modern development pattern allows for far more units. This project must begin to transition between the institutional and residential scales. Contextual buildings will maintain the pattern of deep but narrow buildings facing the street with a regular rhythm of door and window openings; the ground floor will be storefronts to encourage pedestrian activity.
These should contain a combination of basic services to support the neighborhood as a pedestrian community and entertainment venues to support the neighborhood as a destination. Vine Street must be improved to encourage pedestrian activity. The current configuration is four travel lanes with two parking lanes, which is excessive given that the street is no longer contiguous and cannot accommodate through traffic. An appropriate site design solution is to model Vine Street after other Cincinnati business districts, notably the historic configuration of Fountain Square, Hyde Park Square, Mount Lookout Square or the Oakley Promenade. The center travel lanes can be converted to a median and planted with trees to provide public space and calm traffic. The neighborhood's historic street pattern provides a high degree of connectivity due to its gridded layout. This pattern disperses traffic rather than concentrating it; Euclid Avenue, Highland Avenue and Vine Street are the primary north-south streets. University Avenue is the only totally continuous east-west street; its intersection with Vine Street will help to define a focal point for the project and for the neighborhood. The neighborhood's perceptual boundaries are clearly defined by arterials: Martin Luther King Drive to the north; Burnet Avenue to the east; William Howard Taft Road to the south; and Jefferson Avenue to the west. The medical and academic campuses form hard edges to the north and west, respectively; thus, the neighborhood is rather insular and isolated from other uptown communities. Therefore, creating a local focal point at University Avenue and Vine Street is critical. As the degree of urbanism increases, Vine Street can develop into an entertainment destination and the restoration of streetcar service will facilitate this transition to vibrant urban district status. The realignment of Vine Street as it climbs the hill to the uptown neighborhoods from the downtown riverfront and basin correspond to the natural ridgeline; as such, the selected site will have desirable views especially from its upper floors. Noteworthy views are the northwest corner overlooking the university’s campus green and the southwest corner overlooking out the bell tower and copula of the university’s historic buildings, which are approximately on axis with Daniels Street.

Image 10: Aerial photograph identifying the site in relationship to nearby major institutions. Vine Street and University Avenue are the principal local streets; the proposed streetcar route is identified and connects to the downtown central business district. [Source: http://maps.google.com]
Climate and Ecology

The regional climate is relatively severe with hot humid summers and cold dry winters due to the distance from the moderating effects of the ocean. Summer is hot and humid with the predominant wind from the southwest and the winter is cold and dry with predominant wind from the northwest. The region is too hot for human thermal comfort approximately thirty-five percent of the year and too cold for human thermal comfort approximately fifty-five percent of the year. According to Lechner, the appropriate climatic responses, in order of descending priority, are: keeping the heat in and the cold out during the winter; letting in solar radiation during winter; using natural ventilation for cooling in the summer; protecting from cold winter wind exposure; protecting from summer sun exposure; and dehumidifying in the summer. However, the harsh summers and winters will require conventional cooling and heating equipment; these passive design strategies can only extend the brief period of pleasant weather in the spring and fall. The hilltop location suggests a particularly windy microclimate, which will be beneficial to natural ventilation and passive cooling during the summer months but detrimental in the winter. The disparity between summer and winter weather conditions suggests a high degree of adaptability, i.e. occupant operability, will be necessary for any climate responsive design elements.

The block is oriented with its long side north to south and its short side east to west. Historically, houses were built with narrow street elevations on deep parcels meaning this configuration maximized southern exposure; however, larger buildings, such as apartments and condominiums will have less southern exposure. The courtyard typology is one site design strategy to increase the southern exposure of the larger building types. The sun path diagram for this latitude shows that the sun will rise thirty degrees north of east and set thirty degrees north of west in the summer. These azimuth angles indicate that there will be considerable solar gain on the southern and western elevations in the summer. The sun will rise thirty degrees south of east and set thirty degrees south of west in the winter. The summer sun reaches an elevation angle of seventy-five degrees and the winter sun reaches an elevation angle of thirty-five degrees. These zenith angles will govern the design of any shading features.

Stormwater management is perhaps the greatest environmental concern locally due to the city’s obsolete combined storm and sanitary sewer system, which frequently reaches capacity and must discharge pollution into the Ohio River during significant rainfall events. The local government provides incentives for retaining or detaining stormwater on site, through the use of storage basins, green roofs and other best management practices. There are approximately forty-two inches of precipitation annually; the rain and snowfall is spread somewhat evenly throughout the year with approximately three to four inches of precipitation each month.

There is very limited ecology on this site. The street trees on Vine Street are young Chinese Elms and the street trees on University Avenue are young Shingle Oaks. These trees will take many years to reach their mature size and begin providing shade. The Chinese Elm is not a native species but is not generally considered an invasive species and was introduced to the built landscape after the decimation of the American Elm by Dutch Elm Disease. The tree is valued for its characteristic ornamental bark, which exfoliates to reveals orange undertones, and for its very small leaves that produce little leaf litter in the fall thus requiring little site maintenance. The Shingle Oak is a native species and is not particularly ornamental. Future plantings will need to balance the desire for uniformity with the need for biodiversity.
Chapter 4: Program

Descriptive Program

‘Home’ is defined as “the place where one lives permanently” and ‘live’ is defined as “to spend one’s life in a particular way or under particular circumstances” (c.f. ‘urbanism’ is defined as “the characteristic way of life of city dwellers”). Alternatively, Charles Moore describes ‘home’ as the center of the owner’s existence. As such, it is unwarranted to prepare an exhaustive list of household activities; however, the following narratives illustrate the type of activities and functions associated with an urban dwelling:

It is a spring morning. The soft sunlight and brisk breeze drive the dew from the emerging yellow-green foliage of the neighborhood’s lawns and trees. An older couple awakes; he pulls on his pants and shoes to walk down to the corner café to buy coffee, danishes and a newspaper while she steps into the shower. When he returns, she is waiting on the terrace and the two enjoy their breakfast together while the city stirs. She must run to catch the streetcar downtown to her office, so he clears the table and gathers her discarded clothes and towels for the wash. He retired a few years ago and has no particular plans for the day but decides to enjoy a morning at the zoo.

It is a summer midday. The clouds darken and a heavy rain begins to fall as lightning cracks and thunder booms. She sits at the computer in her study and concentrates on her task. Looking up from the completed design, she laughs at the people dashing between awnings in the street, but then her dog approaches, with its leash in tow. She rummages through her closet looking for her boots and umbrella then takes the dog to the park. Returning home, she places a kettle of tea and pot of soup on the stove and sits back down in front of the computer to check her email and pay her bills. The kettle whistles and she rises only to find muddy paw prints tracked across the floor.

It is an autumn afternoon. The brilliant red, orange and yellow leaves rustle as squirrels rush about to complete their preparations. He walks home from the university and stops at the grocery to buy produce as he plans to surprise his new wife with a romantic meal. Entering, he sits his bags and books down by the door and listens to the messages to learn that she must work late. Disappointed, he places the food in the refrigerator for later and grabs his books. He sits in his favorite chair, pulls the lamp near and continues contemplating his thesis before drifting off. She arrives home bearing her favorite take-out to find him asleep at a candle-lit table setting and the pair enjoy their romantic evening.

It is a winter evening. The snowy sidewalks are filled with holiday shoppers gazing at storefront displays and standing in line at the hot cider and hot cocoa stands. He steps off the streetcar and onto the crowded sidewalk glad to put the workweek behind him. Before going home, he walks down the street to the gym and on the way home he stops at the pub for a drink with his friends. He invites them home to order pizza and play poker. After they depart, he takes out the trash and suddenly realizes he must prepare the guest room for his parents who arrive the next morning at the airport. He prepares the guest room and calls the car rental service before laying down for bed.

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47 Merriam-Webster Online, “Home,” “Live” and “Urbanism” (Merriam-Webster, 2012)  
The basic household activities portrayed here include: bathing, cleaning, cooking, dressing, eating, entertaining, playing, procreating, recreating, relaxing, sleeping, storing, and working. These activities are traditionally grouped into rooms — described eloquently by Charles Moore as, “unspecified spaces, empty stages for human action, where we perform the rituals and improvisations of living.” These rooms are the kitchen, dining room, living room, bedroom and bathroom. The kitchen and bath present the most restrictions while the other rooms are typically rather nebulous in their form and function. Alternatively, the modern movement introduced the open plan, which eliminates partitions and rooms. Witold Rybczynski critiques these spaces as lacking the comfort and privacy necessary in domestic architecture. Moore offers a compromise suggesting rooms be clearly defined but visually linked as in the work of Frank Lloyd Wright. The room and configuration of rooms plays an important role in typology and will therefore be utilized; the following lists their basic requirements.\footnote{Ibid.}

\textbf{Prescriptive Program}

\textbf{Bathroom}

The bath contains equipment for eliminating and bathing – a generally undesirable grouping of activities. Conventional three fixture baths contain a lavatory, shower and toilet; the minimum dimension of a bath containing the three fixtures and sufficient space for their use is 5'-0" x 8'-0" (40 SF). However, it is generally preferable to separate equipment for eliminating and washing into separate compartments. The suggested configuration is a compartment with lavatory and toilet opposite a compartment with lavatory and shower and an intervening passage. The minimum dimensions for the preferred configuration are 6'-0" x 12'-0" (72 SF). Building codes require mechanical or natural ventilation of the bath. All materials should be humidity and moisture resistant. The bath benefits from proximity to storage for clothing and towels and itself must contain storage for grooming and healthcare items. A second bath is sometimes desirable for the use of guests and may contain only a lavatory and a toilet. The two fixtures may be configured on opposite walls for a minimum dimension of 2'-6" x 6'-3" (16 SF) or side by side for a minimum dimension of 4'-0" x 4'-6" (18 SF). Door swings must not intersect any bath fixture; pocket doors may be desirable.\footnote{Ibid.}

\textbf{Kitchen}

The kitchen contains equipment for cooking and washing. It often contains furnishings for eating. Kitchens are often described in terms of the work triangle: the washing zone, the preparation zone and the cooking zone. The washing zone is a functional group consisting of the sink, dishwasher and waste receptacle; the preparation zone is a functional group consisting of the refrigerator, pantry and countertop; and the cooking zone is functional group consisting of the stove and oven. The total distance between the three zones should be between twelve and twenty-two feet. These three zones are generally configured along a single wall, along opposing walls (galley plan), along two adjacent walls (I-plan) or along three adjacent walls (u-plan). An island may be included to provide additional workspace or for serving\footnote{Chris Grimley, Color, Space and Style (Gloucester, MA: Rockport, 2007) 104-105.}
drinks and food. The galley plans require a 4'-0" minimum aisle between countertops and the u-plan requires a 5'-0" minimum aisle between countertops. The building code states that kitchens must have a minimum area of 50 SF and requires mechanical ventilation of exhaust gases. It is recommended that a storage equal to eighteen square feet plus six square feet per person be provided.\textsuperscript{52}

Kitchen equipment is highly modularized. Base cabinets are nominally 36" high by 24" deep and are available in single-door, double-door and stacked drawer configurations of various widths. Single-door units vary from 12" to 24" wide in 3" increments; double-door units vary from 27" to 48" wide in 3" increments; and stacked drawer units vary from 15" to 24" wide in 3" increments. Wall units are nominally 12" deep by 24" to 48" wide in 3" increments by 12" to 48" high in 3" increments. Nominal dimensions account for the thickness of the countertop material and wall cabinets should be located 18" above the countertop. Equipment typically follows this module; for example, dishwashers are 24" wide, ranges are 21" to 40" wide, refrigerators are 27" to 36" wide, and sinks are 18" to 36" wide. Continuous countertop space is preferable to discontinuous countertop space for convenience of cleaning.\textsuperscript{53}

**Dining Room**

Eating may occur in the kitchen or a dedicated space, such as a dining room. The size of the eating space is a factor of the size of the table. A typical place setting is 24" wide by 15" deep; therefore, a table for two is 24" square minimum (30" square preferred) and a table for four is 36" square minimum. The table requires 36" minimum clearance on all sides and 48" minimum clearance with kitchen equipment. If other furniture, such bars and buffets are to be included, 48" minimum clearance is recommended. Thus, standard dining areas require 60 SF to 90 SF; or approximately 120 SF minimum if a separate room. Alternatively, the meal may be eaten in a booth or at a counter. A booth is typically 60" to 74" wide with the depth determined by the number of place settings; therefore a booth seating two requires 12 SF minimum and a booth for four requires 24 SF minimum. Typical counters vary from 18" to 30" deep and require 24" width per person. Tables are typically 30" high with 18" high seats and counters are typically 42" to 45" high with 30" to 33" high seats. A dining counter may overlap a cooking counter.\textsuperscript{54}

**Bedrooms**

The bedroom is used for sleeping and storing personal effects. The building code requires bedrooms be at least 70 SF and contain at least one operable window. Standard bed sizes are: twin (40" by 75"), full (54" by 75"), queen (60" by 84"), and king (76" by 84"). The bed requires 24" to 36" minimum clearance on both sides or 30" to 42" suggested clearance if other furniture is provided, such as armoires, dressers, wardrobes and vanities. Nightstands with drawers typically flank the bed for storage of personal effects. In total, the sleeping space of an individual requires a minimum approximate area of 80 SF and the sleeping space for a couple requires a minimum approximate area of 100 SF. The contemporary bedroom is often much larger to provide additional storage or workspace; however, these activities are

\textsuperscript{52} Ibid., 92-95. \\
better suited for dressing rooms and studies. The typical closet is 24” to 30” deep with a recommended minimum of 72” width of hanging storage per person.55

Living Room

The living room is the most vaguely defined of rooms discussed here and is generally used for entertaining and relaxing. The building code requires the living room be no less than 120 SF. Lounge chairs are typically 30” wide by 30” deep and sofas are typically 60” to 90” wide by 30” deep. For conversation, furniture groupings should not be more than approximately 8’-0” to 12’-0” square.56 Most living rooms will contain media equipment, such as radio and television, which requires furniture for their display and storage.

Ancillary Spaces

Each unit requires a dedicated and defined entry space. Christopher Alexander suggests this space contain benches and shelves for putting on or taking off shoes and temporarily sitting down groceries and letters. The occupant must be able to observe the hall or street from the entry without being observed.57 A coat closet should be located near the entry space. Each unit requires approximately twenty percent of its area be dedicated to storage of the occupant’s belongings, according to Alexander.58 Thick walls with built-in cupboards, drawers, and shelves are desirable.59 Witold Rybczynski suggests this strategy speeds the cleaning of the unit; additionally, this strategy provides acoustic isolation and thermal insulation by deploying these unoccupied spaces as buffers between the conditioned and unconditioned spaces. Each unit requires laundry and mechanical spaces. Laundry equipment housed in a separate room requires a space measuring 5’-6” by 5’-6” (30 SF) minimum or 5’6” by 7’-6” preferred (40 SF). Stacking equipment can reduce this requirement by half or more.60 The required mechanical equipment, such as furnace and water heater, should be located near the center of their runs to minimize energy loss. These systems, such as plumbing and mechanical, should be consolidated into as few locations as possible to further reduce construction cost; this is commonly accomplished by stacking fixtures in multi-story units or configuring back-to-back fixtures in single-story units.61

Outdoor Spaces

Each unit requires a private outdoor space. If this space is a balcony or terrace it must be no less than six feet deep to provide sufficient space for a table and chairs. This space should be partially engaged to and sheltered by the building; and, ideally, it is enclosable or partially enclosable during the winter months as a conservatory.62 If so, this sunspace can collect and store solar thermal energy to heat the building. This required private outdoor space can also be configured as a courtyard or roof garden. It may be acceptable for multiple units to share an outdoor space provided it is secured

55 Ibid., 102-103.
56 Ibid., 99-101.
57 Christopher Alexander et al., A Pattern Language (New York: Oxford University Press, 1977)
58 Ibid.
59 Ibid.
60 Moore, Op. cit
61 Ibid.
against criminals and vandals. Each unit requires one parking stall. This requirement recognizes that most households are not yet willing to live independent from the automobile. The parking areas must be secure against criminals and vandals. The parking areas should be hidden from the street so as not to disrupt the continuity of the urban fabric. A typical parking stall measures 9'-6” by 18'-0” (110 SF).

Preliminary Program

Applying these dimensional and functional requirements to the households briefly introduced in the narratives above, the following preliminary program emerges:

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry</td>
<td>30 SF</td>
<td>20 SF</td>
<td>30 SF</td>
<td>20 SF</td>
</tr>
<tr>
<td>Living Area</td>
<td>300 SF</td>
<td>100 SF</td>
<td>300 SF</td>
<td>200 SF</td>
</tr>
<tr>
<td>Powder</td>
<td>20 SF</td>
<td>20 SF</td>
<td>20 SF</td>
<td>20 SF</td>
</tr>
<tr>
<td>Kitchen</td>
<td>100 SF</td>
<td>50 SF</td>
<td>125 SF</td>
<td>75 SF</td>
</tr>
<tr>
<td>Dining Area</td>
<td>75 SF</td>
<td>15 SF</td>
<td>175 SF</td>
<td>25 SF</td>
</tr>
<tr>
<td>Bedroom 1</td>
<td>150 SF</td>
<td>100 SF</td>
<td>150 SF</td>
<td>125 SF</td>
</tr>
<tr>
<td>Bedroom 2</td>
<td>125 SF</td>
<td>125 SF</td>
<td>100 SF</td>
<td>100 SF</td>
</tr>
<tr>
<td>Bedroom 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work Space</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bath Room</td>
<td>10 SF</td>
<td></td>
<td>100 SF</td>
<td>100 SF</td>
</tr>
<tr>
<td>Laundry</td>
<td>75 SF</td>
<td>50 SF</td>
<td>100 SF</td>
<td>75 SF</td>
</tr>
<tr>
<td>Storage</td>
<td>40 SF</td>
<td>45 SF</td>
<td>175 SF</td>
<td>80 SF</td>
</tr>
<tr>
<td>Total</td>
<td>1000 SF</td>
<td>500 SF</td>
<td>1500 SF</td>
<td>750 SF</td>
</tr>
</tbody>
</table>

Additionally, it is helpful to consider the necessary flows: water, air, electricity, food, clothing, utensils, media and dirt when composing these spaces. For example, the bath and kitchen have a natural affinity from their shared use of the water supply. However, the kitchen also requires proximity to the dining area to allow the dispensing of cooked food and return of soiled utensils. The typical solution to composing these spaces is to create two conceptual zones: the public and the private or, less commonly, the served and the servant. Finally, when composing units, the designer must remember that multi-family buildings will require a lobby and mailroom – most likely a single central facility for security – and janitor’s closets and trash and recycling rooms on each floor.

Aesthetic and Experiential Qualities

This program describes what Moore calls the “order of rooms” and “order of machines;” however, fails to define the qualitative attributes or “order of dreams.” Architectonically speaking, Moore describes the room as, “fixed in space by

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boundaries, it is animated by light, organized by focus, and then liberated by outlook. This final consideration asks if there is an urban character that the architecture must demonstrate. Indeed, the designer must anticipate that potential occupants for new urban dwellings are more amenable to an urban aesthetic; however, the qualitative attributes of this urban aesthetic are elusive. Appropriate operations include contrast, layering and juxtaposition as these processes are reflected in the urban environment. Like its urban context, the architecture must be both ordered, i.e. structured, and playful, i.e. animated. The designer can achieve this dichotomy by establishing regulating rhythms and data, but then breaking these to establish variations on the theme. In interiors, the loft conversion aesthetic currently prevails with its characteristic post-industrial contrast between the rough and the refined and its distinctively urban layering of the new and the old. These interiors are particularly desirable because of their historic architectural elements – high ceilings, large windows, quality materials, and open spaces. These qualities can be elicited in new construction while achieving greater integration of building systems so as to prevent exposed ductwork, plumbing or wiring and to create an overall more logical composition. Exposing the mechanical systems is one strategy for their expression; however, more careful integration is more appropriate to new construction situations as society values this forethought as evidenced by the success of highly integrated industrial design products, such as portable electronic devices. Nevertheless, the dramatic factor of this aesthetic must remain because it is very marketable to those who are predisposed to an urban aesthetic. As quoted previously, “small, dense, urban and cool are ruling the day.”

Access to ample natural daylight and natural ventilation is required for all habitable rooms. High ceilings and lighter materials, in both color and texture, amplify this effect where it is appropriate, e.g. the daytime and public spaces. To contrast, the nighttime or private spaces reinforce a sense of comfort and privacy. Each unit requires a connection to urban life on the street and also to the natural world – either real or symbolic. Although the client is generalized, it is important to consider how the prospective occupant will use the rooms. Privileged places for displaying the occupant’s personal possessions should be provided. In compact units, most possessions should be stored out of sight to maintain the minimalist aesthetic and to ensure the space appears orderly and uncluttered to visitors. The designer can plan for some customization by including reconfigurable elements such as concealable furnishings and moving partitions. These are particularly desirable in compact spaces where dedicated spaces for infrequently occurring activities are inefficient.

At the urban scale, the street serves as a promenade, what Alexander describes as “the magic of the city.” This requires activating destinations but once established becomes a destination unto itself – a place to meet friends and neighbors, full of choices and what urban sociologist Ray Oldenburg terms third places, i.e. centers of social interaction such as bars and cafes, distinguished from the house (first place) and work (second place). During the day, various services and shops generate pedestrian activity and at night a variety of entertainment venues, including movie theaters, restaurants, bars, ice-cream parlors, cafes, nightclubs, bowling alleys, and concert halls maintain this activity at sufficient levels to deter criminals. The design of the streetscape therefore must be inviting and safe. To this end, all buildings will provide ground floor storefronts facing the street.

65 Ibid.
68 Ibid.
Chapter 5: Precedent

The previously discussed archetypal urban dwellings illustrate the emphasis placed on household privacy throughout history and the consistent need for private outdoor spaces, such as a courtyards, when residing in high density areas. Rossi’s writings suggest that dwelling types are slow to change and therefore these attributes remain desirable in new urban dwellings; however, Rybczynski notes, “we live, like it or not, on the far side of a great technological gap,” thus it is inappropriate to reproduce these historic types. The industrial revolution introduced a variety of new comfort and convenience devices to the home that the historic types cannot accommodate. Further, the modern movement rightly eliminated superfluous decoration from architecture in favor of articulating the act and art of construction. Moreover, the reality of contemporary building codes and construction methods prevents strict adherence to these historic types. Finally, ancient cities were extremely dense in terms of households per acre; however, with contemporary households requiring far more square feet for fewer individuals, new urban dwellings must provide far more built square foot per acre making many types impractical. Therefore, this section summarizes several recent projects that are noteworthy precedents, either for either their formal or functional contributions to the design project.

Formal Precedents

Mashrabiya House

This small apartment building is a contemporary reinterpretation of the traditional dwellings of its region. The designer has created a double envelope; the exterior layer consists of a concrete frame with most of the grids infilled with small stone blocks randomly spaced to create small opening to the cavity between the exterior and interior envelopes. The pattern recalls the traditional Islamic dwelling’s mashrabiya – ornamental screens over windows that ensure the privacy of the residents while allowing access to the breeze and daylight as well as the visual monitoring of the street outside. The interior envelope is concrete or glass depending on the function of the interior space. The exterior skin shades the building from the desert sun, thus allowing more glazing without excessive heat gain; further, the cavity between the two layers varies in depth to create enclosed outdoor spaces with a pleasant microclimate like the courtyards and...
gardens of traditional Islamic houses. These elements derived from the local vernacular vocabulary of single family dwellings have been successfully adapted to the density and scale of multifamily dwellings. This design project will similarly seek to translate the characteristics of archetypal urban dwellings to the contemporary urban context.

Silver Spring Civic Building

A dramatic flat arch defines the edge of a public plaza, marks the entry to the civic building, and provides a transition space between outside and inside. The exterior surfaces of the arch are clad in one material and the interior surfaces are treated in another material to emphasize this transition. This freestanding form is quite powerful as a work of civic design and a similar strategy could successfully define the public plaza at the intersection of Vine Street and University Avenue and potentially create a retail arcade or transit shelter. This form establishes an architectural vocabulary of frames; the language of framing complements the programmatic requirement for thick walls by defining an interior served space and creating a buffer or perimeter servant space, which is architecturally reflected in the massing.

Jose Perez Apartment Building

Image 12: Silver Spring Civic Building by Machado-Silvetti Associates located in Silver Spring, Maryland. [Source: http://www.machado-silvetti.com]

Image 13: Jose Perez Apartment Building by Carlos Ferrater located in Madrid, Spain. [Source: http://www.ferrater.com/]
This apartment building expands on the idea of framing established in the previous precedent by occasionally breaking the datum by shifting an alignment or turning the corner. These variations result in a dynamic rather than a static form. Here, the frame is created with a change in material rather than a change of plane, i.e. the plaster frames are kept flush with the metal infill panels. This material change is duplicated at all incisions, such as the egress stairs. The frame is not treated as an absolute since ribbon windows have been allowed; however, the proportion of solid to void ensures the frame still reads as a dominant and solid element.

Water Villas


These dwellings feature cantilevered volumes, serving both formal and functional purposes. Formally, the cantilevered massing is a bold compositional gesture that activates the profile between the building and the sky; functionally, these cantilevered masses provide shelter to the outdoor living spaces located beneath them. Providing some shelter to the outdoor living spaces extends their seasonal usefulness in climates with intense sun or frequent rain.

Novartis Headquarters Courtyard

![Novartis Headquarters Courtyard by Peter Walker located in Basel, Switzerland. (Source: http://www.pwpla.com)](Image 15: Novartis Headquarters Courtyard by Peter Walker located in Basel, Switzerland. [Source: http://www.pwpla.com] )
This minimalist courtyard demonstrates the spatial quality desired in the outdoor spaces of the design project, namely repose or tranquility – a rest from the intensity of the urban street. Geometrically arranged trees provide shade and define the ceiling plane. A shallow pool provides a compositional center and the water generates dynamic sounds and reflections. The space is furnished with scattered tables and chairs to encourage building occupants to use the space.

**Functional Precedents**

**Domestic Transformer Project**

![Image 16: Domestic Transformer Project by Gary Chang located in Hong Kong, China. [Source: http://www.nytimes.com]](image)

This compact condominium contains walls of built in storage and services suspended from tracks in the ceiling that permits the space to be configured or divided into twenty-four separate rooms; when these mobile walls are pushed to the exterior walls the kitchen, bath, and sleeping spaces are concealed and the room becomes a large living space.

**Habitat 825**

![Image 17: Habitat 825 by LOHA Architects located in Los Angeles, California. [Source: http://www.lohaarchitects.com]](image)
This condominium building features a central courtyard surrounded by overlooking walkways allowing the residents to monitor and secure the shared space; and the presence of people on multiple levels activates the space. The building's massing was generated in response to several site forces, including solar exposure and views to ensure the courtyard is an attractive space for residents to use; residents move from the street to their unit via the courtyard, thus it provides a spatial transition between the public and private realms. This circulatory function also ensures its regular use.

Funen Blok K

Image 18: Funen Blok K by NL Architects in Amsterdam, Netherlands. [Source: http://www.nlarchitects.nl]

These townhouses feature an undulating green roof and each unit has its own roof terrace carved into the undulating form; this allows each unit visual access to a rooftop lawn and recreates in part the amenities of the detached single family home at an urban density by allowing units to be attached on three sides. The depressed roof terrace also allows daylight into the interior of the unit. At the ground level, a diagonal slash through the building functions as a circulation passage and the diagonal gesture coupled with the varying height creates units of different sizes.

Student Housing Poljane

Image 19: Student Housing Poljane by Bevk Perovic Arhitekti located in Ljubljana, Slovenia. [Source: http://www.bevkperovic.com]
The compositional strategy employed here is two parallel bar buildings joined by two connectors thus defining the four sides of a central courtyard. The multistory bar buildings contain dormitory units arranged on double loaded corridors; the single story connectors contain community spaces, such as classrooms and computer labs. Each unit features two sleeping spaces flanking the central living space. This central living space corresponds to the windows in the elevation. The sleeping spaces each have a balcony fully engaged to the building; however, the architect has provided perforated retractable screens to allow the occupant to control the level of lighting, privacy and ventilation. These screens recall the previously mentioned mashrabiya of archetypal Islamic dwellings and ensure the occupants can control the level of privacy of their outdoor space while allowing the adjoining sleeping spaces to have full height glazing without concern for privacy. Further, these large perforations create a more active surface by appearing to disintegrate, which relates to the use of layering as a design operation drawn from the urban context. The elevation constantly changes as the each resident configures the exterior envelope in response to his desire for added privacy or more daylight and ventilation.

355 Eleventh Street

Like the previous project, this small office building utilizes perforated metal as a screening element. Here, however, the zinc scrim is a fixed facade component and the fine perforations allow filtered daylight into the building during the day while concealing the interior in shadow; at night, the interior lights show through the perforated skin allowing a ghosted view of the interior. The finer scale of the perforations on this project compared to the previous example causes the individual solids and voids to begin to coalesce and therefore the building’s skin reads as a monolithic semitranslucent surface. The windows behind the scrim screen are operable as the perforations permit natural ventilation; this function is also necessary to allow access for cleaning the exterior surface of the glass due to the metal overlay. This project is a retrofit of an existing industrial building and the use of a perforated skin allows the architect to unify the new and the old with a consistent exterior envelope. A similar skin can be used in this project to correct compositional deviations between the interior and the exterior, such as windows that are necessary for the interior space planning but are not appropriate to express on the exterior elevation.
Chapter 6: Product

In summary, the first chapter presented this thesis’s theoretical foundation by documenting the critiques and origins of the suburban paradigm and establishing urbanism as an alternative lifestyle and land use coupling to sprawl. Indeed, the literature reviewed argued that a return to urbanism is inevitable given recent demographic and economic trends and that corresponding changes in the real estate market toward smaller homes and urban sites is a cost effective strategy for achieving sustainability. There is already abundant exploration into the neighborhood, city and regional implications of the trend toward urbanism; however, there has been little investigation of individual dwellings for this urban future. This design project is an investigation of appropriate dwellings for the urban future, based on the study of archetypal urban dwellings, specifically the courtyard houses of the first urban civilizations. The preceding chapters laid out the specific context of this design project, i.e. the client, the site, and a preliminary program; the previous chapter discussed several contemporary precedents utilized during the development of the proposed design. This chapter will briefly describe the proposed design and explain the rationale behind major design decisions.

In the history of urban dwelling typologies, there have been two major interruptions of the continuous evolution and gradual refinement of types. The first break corresponds to the collapse of the Roman Empire. Norbert Schoenauer argues that this interruption represents the divergence of eastern and western dwelling types. The internally focused courtyard houses of the ancient and classical periods persisted and continued to evolve in eastern cultures, including Arabia, India, China and Japan; however, as the western world recovered from the collapse of the Roman Empire, it adopted a radically different type that looked out onto the street. These medieval merchant houses would eventually evolve into the townhouses of the late renaissance. The second break corresponds to the Industrial Revolution, when suburbanization accelerated in response to the increased crime, crowding and pollution of the central city, and to the subsequent Modern Movement, when urban renewal guided by the “machine for living in” aesthetic and social agenda decimated many of the remaining vibrant urban districts. Recently, the New Urbanists have attempted to reestablish the gradual refinement of urban dwelling types that terminated in the Industrial Revolution; however, this thesis looks further into the history of typological development and derives design principles from dwellings built before the first break in the continuity of typological development, specifically the archetypal urban courtyard house.

The residential districts of ancient and classical cities dominated by these courtyard dwellings achieved high densities by attaching each dwelling to its neighboring dwellings on three of the four sides. All the windows required for access to daylight and ventilation opened to the central courtyard to maintain the privacy of the household; therefore, only one side of the dwelling required street frontage for an entrance. This plan strategy achieves the highest density possible when using one and two story buildings; today, however, it is possible to build multi-story buildings using construction materials and technologies unavailable to these pre-industrial societies. Building up becomes necessary because the contemporary household typically contains fewer individuals and cannot justify the consumption of large amounts of high value ground floor real estate. Simply stacking the courtyard dwelling is impracticable as doing so compromises the type’s principal advantage, i.e. its private outdoor living space. The proposed design seeks to translate the defining characteristics of the urban courtyard dwelling to a vertical application appropriate to a contemporary context and capable of achieving the high density required to create and support vibrant urban districts.
The courtyard dwelling type consists of many rooms with dedicated functions surrounding a central private outdoor space with functional flexibility; however, the contemporary real estate market increasingly favors open plans rather than dedicated rooms. Thus, the typical unit in the proposed design is a single open living space, or studio. The dedicated functional spaces have been condensed and collapsed into casework built into thickened walls that define the perimeter of this open living space. The thick walls, recommended in Christopher Alexander’s *A Pattern Language*, create buffers of unoccupied space between units for acoustical privacy and between the conditioned interior and the unconditioned exterior for improved energy efficiency. The casework that lines the party wall between units contains the necessary wet functions – the bathroom, laundry and kitchen – thus consolidating plumbing risers. The studio is conceptually divided into three bays: the first bay is dedicated to eating, the second bay is dedicated to playing, and the third bay is dedicated to sleeping. Beyond the third bay, the thick walls cantilever over the sidewalk below to engage and shelter a private balcony for each unit. Operable partitions between each bay allow the resident to divide the studio into its three constituent subspaces when desired; the glass wall that separates the studio from the balcony is also operable to allow the living space to expand onto the balcony in pleasant weather.

Image 21: Typical pavilion level plan (left) showing: (a) green roofs, (b) courtyard, (c) entry sequence, and (d) public plaza. Individual pavilions are highlighted in gray. Typical studio unit plan (right) showing: (1) kitchen, (2) dining area, (3) wardrobe, (4) entertainment center, (5) bathroom, (6) bedroom, (7) balcony, and (8) storage. Source: the author.

All necessary equipment has been built into the thickened walls as casework. Thus, when the casework is closed, the studio is an uninterrupted space; as casework is opened the studio is divided into functional subspaces. In the first bay, the interior wall contains a small kitchen and the exterior wall contains a table and chairs for dining. The interior wall of the second bay contains pull out drawers and wardrobes for storing personal effects and has the necessary utility connections to accommodate a stacked washer and dryer; the exterior wall of the second bay contains a window seat that also functions as an entertainment center with a retractable projector screen and media and equipment storage built into the window seat. The interior wall of the third bay contains a small bathroom and the exterior wall of the third bay contains a fold down bed. The thick walls continue out into the balcony to provide a storage room with a
workbench for hobbies and home repairs, essentially replicating the auxiliary benefits of a suburban garage. When all casework is in the closed position, the perimeter walls read as solid planes of birch veneer plywood creating a clean or minimalist modern aesthetic. On the exterior, where the thick wall passes the balcony guardrail, the material changes to perforated brushed stainless steel and wraps the corner to become the exterior envelope material. By projecting beyond the balconies, the thick walls are expressed as frames similar to several of the precedents discussed previously.

Within these occupiable walls, there is glazing concealed behind the perforated brushed stainless steel facade. This allows the resident to control the level of daylight, privacy and ventilation; and prevents glare by introducing daylight from a second side. Similarly, a retractable birch veneer louver screen allows the occupant to control the daylight, privacy and ventilation on the balcony. These screening elements are adaptations of elements used in the above precedents but date to the mashrabiya of traditional Islamic urban dwellings. All necessary mechanical services are also condensed into the thick walls; in addition to the plumbing previously discussed, the air conditioning and heating supply and return registers have been concealed as perforations in these walls. Thus, there is clear delineation of the served and servant spaces; conceptually, the studio space corresponds to the courtyard of the archetypal courtyard dwelling. Although the studio is enclosed due to the harsher climate, it exhibits the same functional flexibility and its perimeter is defined by spaces with dedicated functions. However, these dedicated functions are condensed into casework rather than being built as separate rooms, which would be an inefficient use of space. As each casework module is opened for use, the adjoining area of the studio becomes the equivalent dedicated functional space. It is conceivable that the casework designed for this project be assembled off site in a factory for greater efficiency and precision; the contractor would then install these modular components at the project site. This strategy would greatly increase the affordability and speed of constructing new urban housing by decreasing the complexity of site staging and logistics. Further, the prototypical modules could be developed into a catalogue of components for use in future real estate development.

The proposed design includes three variations on the typical unit. For example, the units on the first floor are larger because the space between the pavilions is enclosed to create a dedicated bedroom and bathroom. Each unit on this level features a private bedroom and the bedroom casework can be repurposed to provide guest accommodations. The space behind the bedroom is a bathroom recognizing that some households would prefer a traditional bathroom to the casework module. The added bedroom is accessed through the thickened wall, which becomes a walk through closet. The arrangement of subspaces in this unit is reversed so as to place the kitchen and dining casework along the spandrel wall so that the dining area remains in close proximity to daylight. Also, the ceilings in the added rooms are lower to allow clerestory windows in the corridor. On every level, the units of the end pavilions expand to occupy the unnecessary circulation that would otherwise become a dead end corridor. This added room is a dedicated den for use as an office or for guest accommodations. Finally, the fourth floor units are slightly taller to squeeze in a loft level over the first bay that features an additional bedroom and larger bathroom and closet. On this loft level, there is no need for the corridor, thus units can expand to occupy this square footage.

These unit types are arranged into pavilions by mirroring them along both perimeters to make four units per floor of each pavilion. A central double loaded corridor bisects the pavilions to provide access to each apartment; the exterior spaces between the pavilions allow daylight into this corridor at regular intervals. The pavilion arrangement also refers
back to the massing of the historic row houses typical of the context and creates a more active profile against the sky. Functionally, this massing strategy provides daylight and natural ventilation from two sides of every unit. The pavilions are raised on a masonry plinth that contains ground floor retail and a mezzanine floor with rentable office space. The office space was included to increase foot traffic on the site in an effort to support the retail. As previously mentioned, the pavilions utilize the language of frames and infill, defined by materiality, to architecturally express the thick walls of casework; the heavy materiality of the masonry plinth contrasts against the light materiality of the metal pavilion frames and even lighter materiality of the wood pavilion infill.

The pavilions and their supporting plinths are arranged in two linear bars occupying the eastern and western thirds of the site; thus, they define a central courtyard space in the interior third. The central courtyard contains raised planters due to the underground garage. The rhythm of these planters refers back to the pavilions that cantilever overhead to provide spatial enclosure; yet, the deep reveals between the pavilions allow air and daylight into this central courtyard. The edges of the raised planters are generous steps to allow for congregating and seating. The raised planters contain a series of lawns functioning as outdoor living rooms defined by colonnades of trees. The center bay is a water feature to create ambient noise. A single story connector spans between the eastern and western plinths along the northern and southern edges. These two connectors contain the shared spaces of the apartment building: the lobby, mailroom, and social spaces. As the site’s natural slope divorces the western plinth’s ground floor from the street, thus making it inappropriate to place retail here, it is instead dedicated as a resident’s recreation center. Therefore, on three sides the courtyard is activated by resident amenities, encouraging its persistent use. Two pavilions near the intersection of Vine Street and University Avenue were subtracted to make a public plaza. The retail plinth here is dedicated to cafes and restaurants and features a frame functioning as an arcade. This arcade uses the same language and materiality as the frames of the pavilions; it becomes an urban gesture similar to that of the Silver Spring Civic Building. This gesture is appropriate given the location’s ability to develop into a neighborhood focal point and for its future role as streetcar stop. Effectively, this plaza will become the northern terminus of a rehabilitated Vine Street entertainment district anchored on the south by the planned redevelopment of the shopping center at the intersection of Vine Street and Corry Street.

Residents enter the building by means of a prolonged shallow ramp near the center of the site that leads them from the sidewalk up to the central lobby. This ramp runs alongside the public plaza and then turns to enter the connector between the eastern and western plinths. This connector contains the lobby and mailroom; the walls have full height glass to showcase the central courtyard beyond the lobby. Having a single lobby allows easy security for the building. From the lobby, the resident may enter the elevators and stairs to the left and right to move to their floor. Beyond the ramp that leads to lobby is a small lawn for the convenience of dog owners. Above this area is the short bridge that spans between the courtyard building to the plaza building so that the two buildings can share elevators and egress stairs. Beyond the bridge and out of sight is a small service area located on the rear street for dumpster access. The roofs of the single story connectors and the plaza building are green roofs to assist with storm water management and to provide a more attractive view from the balconies of the residential pavilions above them. The space between each pavilion can also be used as a roof terrace for residents.
References