

ABSTRACT

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Human behavior, of any given individual or group of individuals, occurs within varying ranges of ability. Related to the differences in ability among humans are differences in lifestyle. Built environments that are designed for those of a specific ability range and those that engage in specific lifestyles prevent or limit the activity of others which exist outside of the targeted group of inhabitants. An inclusive, or “barrier-free,” built environment is here proposed, one which promotes universal accessibility and accommodation. This thesis will explore the implications of barrier-free design as it is applied to a multi-family residence which takes the form of a housing cooperative.

A BARRIER-FREE PARADIGM FOR INTERDEPENDENT LIVING

By

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Dedication

To my grandfather

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Introduction

Human behavior, of any given individual or group of individuals, occurs within varying ranges of ability. Related to the differences in ability among humans are differences in lifestyle. Built environments that are designed for those of a specific ability range and those that engage in specific lifestyles prevent or limit the activity of others which exist outside of the targeted group of inhabitants. An inclusive, or “barrier-free,” built environment is here proposed, one which promotes universal accessibility and accommodation. This thesis will explore the implications of barrier-free design as it is applied to a multi-family residence which takes the form of a housing cooperative.

Emphasis is placed on achieving an interdependent relationship between the architecture and its inhabitants, the architecture and its context, the inhabitants of the architecture and the context of these. Strategies for achieving a barrier-free environment and said interdependent state include the selected cooperative housing type and its location, the synthesis of “natural” and “man-made” elements, the application of sustainable methods and materials, the employment of technologies which sense and respond to human and other conditions, adherence to ADA /ABA accessibility guidelines.

The project is located in southeast Washington, DC on the public land historically known as *Reservation 13*. Since L’Enfant’s 1791 plan for Washington, DC, the area has remained relatively disorganized and disconnected from the rest of the city. In 2002, the DC Office of Planning proposed a draft master plan for the redevelopment of *Reservation 13*. The draft master plan was devised in accordance with the expressed needs and

desires of various stakeholders, including the occupants of the surrounding neighborhoods, and in accordance with two initiatives: the Anacostia Waterfront Initiative (AWI) and the Strategic Neighborhood Action Plans (SNAP). This thesis critiques and adopts features of the draft master plan for its exploration, operating largely in conjunction with the objectives of the DC Office of Planning and its affiliates.

Figure 1 - Newspaper Clipping from the Washington Post dated Saturday, March 17, 2007;
cartoon by Roger K. Lewis

Chapter 1: Intentions

“Barrier-Free” Environment

It is a natural inclination of the human species to desire and seek freedom. Although freedom is varied in kinds and varied in the motives for which it is coveted and sought, it always involves a certain degree of one’s ability to act (i.e. freedom *to*) and a certain degree of constraints or disabilities that are lacking (i.e. freedom *from*).¹ The measure of the freedom that an individual, or group of individuals, may have is a function of their abilities and disabilities, each of which result from innate/physiological and external conditions, including the conditions typical of developmental life stages. All people perpetually experience ability and disability to certain extents and in specific ways. In spite of the fact that ability and disability are, among humans, universally applicable terms, they are more often applied to particulars.

Those that are labeled as “disabled,” or as another equivalent term, are observed to possess ability which stands outside of an ability range that is considered to be normal (there is little consensus over exactly what constitutes normality). Individuals labeled as “gifted,” or as another equivalent term, with respect to certain abilities, are also thought to stand outside of an ability range that is considered to be normal. The difference

¹ The concept of freedom as the ability to act was first put forth by the 19th century British philosopher John Stuart Mill and elaborated upon by the 20th century Jewish philosopher Sir Isaiah Berlin with the distinction between freedom as ability to act and freedom as lack of constraints. Berlin’s distinction is significant in that it recognizes that freedom, among humans, paradoxically occurs within limits. In reference to the limitations of freedom, Berlin states that “liberty in the negative sense involves an answer to the question ‘What is the area within which the subject—a person or group of persons—is or should be left to do or be what he is able to do or be, without interference by other persons.’” Although Berlin seems to emphasize “other persons” as potential obstructions to actions, it is equally conceivable that other non-human obstructions may exist. The 17th century English philosopher, Thomas Hobbes, summarizes Berlin’s position: “a free man is he that...is not hindered to do what he hath the will to do.”

between the two, however, is that those considered to be disabled are often viewed as deficient and inferior in terms ability, whereas those considered to be gifted are often viewed as having an excess of ability to the point of superiority.

Through designation, the disabled are to some degree excluded by their designators, as a distinction is identified between the two parties. This exclusion can expand to manifest itself *explicitly* through direct social interactions and *implicitly* in other ways, such as in the inaccessibility of built environments. Inaccessible environments which were conceived and constructed by humans may indicate that disabled persons were not among the intended inhabitants. Such environments, in addition to other forms of exclusion, are an infringement upon the civil liberties of the disabled and may contribute to feelings, thoughts, and actions by the disabled which, if ongoing, will be destructive to themselves and to others. The health and growth of contemporary societies deteriorates when opportunities to participate in social and economic activities are limited or nonexistent. In order to prevent the occurrence of the negative consequences of exclusion, and to increase freedom for the enhancement of the act of living, this thesis proposes a built environment in which the access barriers to disabled persons are largely eliminated.

A so-called “universal” or “barrier-free” design is not a fully accurate identification of the primary objective of this thesis. Provisions for access must, of course, be denied in certain cases in order to enable and preserve privacy and security. It is also recognized that the variations of disability, with both innate and external sources, are far too many, and far too conflicting, to accommodate completely. Design solutions cater to the broadest range of disabilities possible. Thus, the main objective of this thesis may be

identified *inclusive* design, *towards* a universal design. This thesis does *not* present a design for housing intended *exclusively for* the disabled. Rather, the design presented herein is intended to be *available for* and *inclusive of*, the disabled.

Inclusive design is markedly different from the architectural designs of the modern period which, though intent on the establishment of neutral and inclusive spaces, did not acknowledge social and physiological differences among people. The architecture of that period was chiefly designed for a homogenous public, for a more or less universal social type and body type. Although consciousness of diversity is becoming more prevalent today, and architectural designs are beginning to reflect that consciousness, there are still vestiges of an exclusive ideology (table 1).

Table 1 – Inclusive design vs. non-inclusive design
(Source: Rob Imrie and Peter Hall, *Inclusive Design*)

The inclusive approach to accessible design also differs from other approaches to accessible design in which specific types of disabilities are addressed as appendages. Such additive designs acknowledge that disabled persons have a right to access the built environment, yet there is little or no concern for social integration. Additive accessible design tends to draw attention to one's disability and more clearly identifies one as "special" or different. This, of course, has adverse effects on the dignity and social status of the disabled. Moreover, the aesthetic value of a built environment may be compromised as the attractiveness of additive elements for access is often neglected.²

The design proposal herein is intended not only to provide access to a broad range of disability types, but also to socially integrate persons with disability. This entails that the accessible aspects of design are central to the design rather than peripheral to it. If accessible design elements are made commonplace, attention is likely to shift away from the disability of individuals and groups of individuals. Potential for ostracism based on difference is thus minimized.

Disabilities Considered

The divisions of disabilities which are herein considered include physiological and financial disabilities, with a primary consideration of physiological disabilities.

² Rob Imrie and Peter Hall, *Inclusive Design—Designing and Developing Accessible Environments*, Spon Press, London and New York, 2001 concerning modernism and social integration

Physiological Disability

This category of disability may be divided into two subcategories: physical and mental.

Physical limitations herein anticipated are categorized according to the body system(s) that they are involved with. Mental limitations, which more or less *originate* in the nervous system, are treated as a subset of physical limitations (e.g. autism, limited intellect of a child compared to that of an adult, etc.). Mental limitations are also classified as relating more or less to non-biological factors which *affect* the nervous system (e.g. certain forms of anxiety and depression).

A person with a physiological disability (i.e. mental and/or physical) that is unable to access, or has difficulty accessing, built environments is often viewed from one of three perspectives—Medical, Social, and Bio-social (table 2):

Table 2 – Medical, Social, Bio-social perspectives of disability
(Source: Rob Imrie and Peter Hall, *Inclusive Design*)

Under the *biological* or *medical* conception of such disability, emphasis is placed on bodily “abnormalities” as the primary barrier to the built environment. Reasons for bodily impairments are varied and debatable. Accordingly, disabled persons are considered to be victims of their impairment and dependent upon the assistance of others—particularly, that of the medical profession to provide a “cure.” This is a “blame the victim” attitude which determines that the onus of resolving the issue of accessibility as it results from physiological disability is largely a private matter. Historically, the medical conception of disability has contributed to the segregation of disabled persons from mainstream society in various ways, including special education systems, housing (e.g. asylums), and modes of transportation.

The *social* conception of physiological disability, conversely, emphasizes obstacles to accessibility which are external to disabled individuals. Here, responsibility of providing the ability to access built environments is placed primarily on the public realm. Built environments which present barriers to disabled persons are perceived to be the consequence of inconsiderate design. Changing the attitudes that inform such design is essential to ensuring adequate accommodations.

The *bio-social* conception of physiological disability, with respect to the accessibility of built environments, synthesizes both the biological and social conceptions. In a commonsense approach, this view attributes the causes of accessibility issues to that which is internal and external to disabled persons. Accessibility of built environments is thus perceived as a function of individual and collective efforts; disabled persons, in conjunction with the medical profession, are responsible for addressing their

impairment(s) as society at large is responsible for removing physical and attitudinal barriers. Of course, the latter assumes that increasing ability, specifically accessibility, for physiologically disabled persons, is desirable.³

This thesis adopts the *bio-social* conception of physiological disability. Individuals that would not normally be considered as “physiologically disabled,” but rather as “able-bodied” persons, are included as potential users of the proposed housing; the abilities and limitations of “able-bodied” persons, as they occur in the developmental stages of life, are considered and addressed (e.g. that of children, the elderly, etc.).

Financial Disability

Contemporary capitalist societies often equate the possession of money with the possession of power and freedom. Indeed, today, as in the past, one in possession of a certain amount of money has a certain amount of power and freedom, as money is a *potential means* for access. Financial disability, similar to physiological disability, involves a limited range of access or financial freedom among individuals and groups of individuals that are considered to be lacking in funds relative to others. Such people are limited with respect to their inability to meet certain costs and do not necessarily have the option or access to participate in particular experiences of life. Reasons for the lack of funds are varied and debatable.

The financially disabled are forced to subsist with that which is affordable. This often entails substandard accommodations, although that which is “substandard” is, to a certain extent, subjectively defined. As with persons with physiological disabilities, the

³ Rob Imrie and Peter Hall, *Inclusive Design—Designing and Developing Accessible Environments*, Spon Press, London and New York, 2001 concerning the three perspectives of physiological disability

financially disabled are typically categorized, or classified, into general income brackets—e.g. low, moderate, high income (considered also in terms of financial ability rather than financial disability) In addition, a social classification is usually associated with a given income bracket. These types of classifications, together with economic factors, tend to result, among other things (e.g. crime for the acquisition of funds), in exclusivity and marginalization in the built environment.

This thesis proposes a housing design which strives for adequate accommodation of persons of all income brackets. The housing, in several ways, is made affordable to those considered to be of low and moderate income brackets and, in several ways, aims for universal appeal among those with income or financial support. Of course, this is exclusive of those without income or financial support, in recognition of the fact that such a housing project, given the current situation of economics and technology, will require funding for its realization, maintenance, and longevity.

Interdependent Living

As part of the agenda of this thesis, an *interdependent* relationship is to be established between those who may be considered as disabled, those who may be considered as able or non-disabled, and the context in which these are situated. The relationship should mitigate the extremes of dependence and independence in light of the fact that the extremes of dependence and independence are potentially detrimental to the parties involved.

For the sake of clarity, the following definitions, with explanations of their relevance to this thesis, have been provided:

Dependence may be defined as a condition, involving two or more entities, in which the participants assume hierarchical positions, such that at least one of the entities supplies to the other entity or entities that which the latter needs and/or desires. In this situation, the “dependent” plays either a passive or active role as it receives or takes by force what it lacks from that which is not lacking. Thus, as a linear, one-sided relationship, a transfer of means proceeds from the “haves” to the “have-nots.” The transfer of means is a step towards equalization between the involved entities with respect not only to means but to the power and freedom that these bring. The state of dependence, however, is never absolute, if only for the reason that the dependent is an entity distinct and “other” from that which it depends upon. One that is dependent is only such to a certain degree.

Independence, by contrast to the preceding, is a state of being, involving one or more entities, in which there is a significant degree of absence of the need and/or desire for anything identifiable as “other.” Freedom is an implication of this state of being, specifically, the freedom *from* and the freedom *to*. Independent entities may therefore be considered capable and sufficient (i.e. free *to*), in disconnect from that which they are not (i.e. free *from*). Yet the divisive aspect of the independent state cannot logically be absolute, that is, without relation to any “other.” If something is to be determined as independent, it must be independent *of* something else. The existence of the state of independence itself paradoxically *depends* on the existence of the state of dependency. One cannot be understood without relation to the other. This is the same as that of the

relationship between any other pair of polar opposites (e.g. up/down, left/right, north/south, etc.). Note that the state of independence is identical with that of the provider in a situation of dependency as defined above.

Interdependence, if one employs the Hegelian dialectical method of unifying opposites (i.e. thesis + antithesis = synthesis / new thesis), presents itself as the synthesis of the states of dependence and independence (dependence as “thesis” and independence as “antithesis”).⁴ The synthesis which constitutes interdependence may be defined as a state of being in which two or more entities are “mutually dependent” upon each other for aid, support, etc. In other words, interdependence is a reciprocal relationship between entities in which the participants rely on each other for subsistence. It may be concluded that interdependence, being a combination of two extremes, fluctuates between equal and nearly equal degrees of those extremes. The impotence which characterizes the dependent state cooperates with the potency characteristic of the independent state. A mutual transfer of means, and therefore of power and freedom, occurs between entities of an interdependent state.

The balance between the states of dependence and independence, identified as the state of interdependence, can also be classified as a kind of symbiotic state:

⁴ Hegel, G.W.F., Science of Logic, Humanities Press Inc., New York, 1966

*Symbiosis*⁵, as it pertains to biology, may be defined as the cohabitation of at least two organisms of different species. There are four kinds of symbiotic relationships that can occur:

Amensalism is a symbiotic relationship in which at least one organism is adversely affected and at least one other organism is unaffected.

Commensalism is a symbiotic relationship in which at least one organism derives benefit at little or no expense to at least one other organism.

Mutualism is a symbiotic relationship in which each of the organisms involved derives benefit. There are two kinds of mutualism: obligate and facultative. Obligate mutualism consists of a relationship between organisms in which the participants cannot subsist without the contributions of each other. Facultative mutualism is an interaction between organisms in which the participants derive benefit without a significant degree of dependence upon each other.

Parasitism is a symbiotic relationship in which at least one organism (the parasite) derives benefit and at least one other organism (the host) is affected adversely.

Admittedly, symbiosis, as it is understood in biological terms, is not a concept which is entirely applicable to this thesis. The anticipated interactions herein are inclusive not only of organisms and organic systems (i.e. human beings and the natural environment), but also of non-living entities (i.e. architecture and the built environment). Furthermore, interactions among organisms are not to be exclusive to those of separate species (e.g.

⁵ <http://www.wikipedia.org/> internet encyclopedia

interaction between human beings). Symbiosis is therefore more applicable to this thesis metaphorically.

Both living and non-living entities are treated as “organisms of different species” existing in a state of “cohabitation.” This treatment is to apply not only to the latter as general categories, but also to the subcategories of each—that is, dissimilarities occurring within living and non-living entities are considered metaphorically as “different species” existing in a state of “cohabitation.”

The specific brands of symbiosis are also applicable to this thesis as metaphors. Mutualism, obligate and facultative, is representative of the state of being that is here designed for. Mutualism is to be considered identical with the concept of interdependence as defined above.

Chapter 2: Design Preliminaries

Considerations

The elimination of barriers which impede or prevent engagement with the built environment involves a consideration of the specifics of the disabilities, or limitations, of a wide variety of potential user groups; identifying and specifying the nature of the disabilities of these user groups, as well as the differences and commonalities between such disabilities, is an essential preliminary to an accommodating design.

Universal Needs

Psychologist Abraham Maslow proposed his hierarchy of human needs in 1943 as an explanation for human motivation (fig.2). The basic premise is that there is a sequential process of meeting needs such that successive needs can be met only when the needs prior to them are satisfied. A prioritization of needs occurs with the current level of unmet needs as primary and the previous levels of needs met as secondary. One may have to reprioritize in order to meet emerging and reemerging needs.

Maslow's list of needs is herein adopted as a model which outlines those needs that are held in common by the inhabitants of the proposed project, and, for that matter, the whole of the human species. The hierarchy which Maslow attributes to the universal needs, however, is not fully accepted. The position herein is that universal needs occur

simultaneously to varying degrees and do not always, of necessity, correspond to values or ranks relative to each other.⁶

Figure 2 – Diagram of Maslow’s Hierarchy of Needs
(Source: http://en.wikipedia.org/wiki/Abram_Maslow)

Unique Needs

Potential conditions and the particular characteristics which correspond to those conditions are herein anticipated among the user groups. These are addressed individually and collectively, taking into consideration any overlap which may occur and catering design solutions accordingly. The design solutions which address the unique needs are not intended to be visible or otherwise identify the user groups as “special,” although this does not imply that the architectural design should be mundane and lacking

⁶ Maslow, Abraham H., Motivation and Personality, Harper and Row Publishers Inc., New York, 1954; http://en.wikipedia.org/wiki/Abram_Maslow

in innovation. Furthermore, the bulk of the accommodations are to be such that they benefit the widest variety of user groups, rather than targeting a specific user group with specific limitations.

Many of the unique needs which result from internal and external limitations are to be addressed with general urban design solutions rather than catering to specific needs within the proposed housing complex. It is acknowledged that the specific needs of individuals with particular limitations are, to a certain extent, beyond the scope of architecture and best accommodated by other fields, such as medicine.

Strategies

- One obvious strategy used to achieve the objectives of this thesis is the establishment of *place*. It is necessary to establish place in order to enable the existence of a barrier-free environment and interdependent relationships.

Following is the definition of place as it is applicable to this thesis:

*Place*⁷ may be defined in one sense as “a particular portion of space, whether of definite or indefinite extent.”⁸ This implies that place is a location, a “here” which is distinct from and relative to a “there.” As such, place must be an entity which has boundaries (i.e. finite). One might argue that the totality of space, as it contains within itself spatial places, serves as the *Place* of places. However, if place is regarded as a location in space, necessarily referential to at least one other location in space, then the totality of space cannot logically be considered as a

⁷ Kate Nesbitt, *Theorizing a New Agenda for Architecture—An Anthology of Architectural Theory 1965-1995*, Princeton Architectural Press, New York, 1996; Christian Norberg-Schulz, *The Phenomenon of Place* (pp. 414-428) concerning place

⁸ Random House Webster’s Dictionary

place because it is not referential to another. Thus, space as a totality is essentially placeless.

Place, defined only as a location in space, is not broad enough to be applicable to this thesis. If it is the case that *time* is essentially connected to space, then a place existing in space must also exist in time. Therefore, places can be relative to each other in terms of their positions in space as well as their sequence in time.

Place is also here defined in relation to the properties, or lack thereof, exhibited by its constituents. The constituents of a place may exhibit material substance, shape, texture, color, etc. These phenomena, experienced through the senses of a human being, collectively participate in a perceived “character,” “atmosphere,” or “spirit” of a place, otherwise known as *genius loci*. Alteration of at least one of the properties of a place results in an alteration of its *genius loci*. Note that the perceived properties and *genius loci* of a place are a function of its location in space and time. Note, also, that a place does not necessarily have a *genius loci* that is understood universally due to differences in human perspectives. In turn, particular places may or may not be comprised of aspects which are appropriate for the “taking place” of certain human and/or other happenings.

Generally, there are only three kinds of places: “natural,” (see definition of Nature) “man-made,” and the combination of these (this is inclusive of the less tangible places such as virtual places and “metaphysical” places, although the current definition is bent towards what is commonly referred to as the “physical” realm of the human world). It may be argued that natural places, otherwise

known as “landscapes,” serve as the setting for man-made places, the context in which man-made places are situated (while this may be true in a global sense, on a local level it is possible for man-made places to be the setting for natural places). Man-made places may be designated as “settlements.” These occur at different scales (e.g. a house, city, state, etc.) and are connected to each other, if there is more than one, by “paths” (e.g. trails, streets, highways, etc.). So-called settlements are characterized, as one might expect of a place, by finitude. This necessarily implies an *inside* and an *outside* of the place, a distinction made known as a result of *openings* (although the exact boundaries between the inside and outside of a place may not always be clear). The relationship between a settlement and its context is comparable to the relationship between a figure and its ground; the settlement acts as a focus in the landscape.

Settlements consist of a “thing” or “things” in the state of, and/or created by means of, the raw materials existent in the natural environment. (Note that the sum of parts that is an individual settlement is only a totality through a mental construct. The whole which is considered to be the settlement, as with a “house” for example, does not physically exist. However, this does not seem to be true in the case of a settlement which is monolithic.) Settlements therefore draw on or “gather” from the natural environment for subsistence. That which is utilized in settlements supports and/or makes possible one or a combination of the following:

- 1.) the act of living among humans 2.) life of natural elements. The physical essence of the settlements which serve as immediate means for present human

activity, also serve as means for potential activity and as means of recalling past activity.

- The establishment of a *place for dwelling* is another strategy used to achieve the objectives of this thesis. Following is the definition of dwelling as it pertains to this thesis:

*Dwell*⁹, in a general sense, means “to live or stay as a permanent resident; reside.”¹⁰ The word is a derivative of the Old Norse *dvelja*, which meant to linger or remain. Specific questions, however, arise from the latter definition, questions which require descriptive answers:

Who and/or *what* dwells? The act of dwelling requires a performing entity.

Within the context of this thesis, the term “dwell,” as with the term “symbiosis,” is applicable to both living and non-living entities.

Where does dwelling occur? The act of dwelling occurs “here,” “there,” or at a fixed and clearly identifiable (i.e. specific) locale. This thesis addresses dwelling as it occurs at multiple scales—primarily that of the city, neighborhood, building complex, and intimate quarters.

When does dwelling occur? Dwelling, as defined above, is a perpetual state, rather than a temporal state. For all intents and purposes herein, dwelling is considered to be *towards* perpetual. The act of dwelling was, is, or will be at a

⁹ Kate Nesbitt, *Theorizing a New Agenda for Architecture—An Anthology of Architectural Theory 1965-1995*, Princeton Architectural Press, New York, 1996: Christian Norberg-Schulz, *The Phenomenon of Place* (pp. 414-428) concerning dwelling

¹⁰ Random House Webster’s Dictionary

specific time. Dwelling which happens in the past or future, of course, happens in the *present* of those times, in the “now.” This thesis acknowledges and builds upon the conditions of the present.

How does dwelling occur? This may be considered as a dual question, one which simultaneously asks “In what way does dwelling occur?” and “What is the cause(s) (force which acts upon and brings about) of dwelling?” The answer(s) to the former is a function of the specifics of the preceding questions and the question to follow. It would be presumptuous and shortsighted to attempt an answer to the question as it is in its general form. The answer(s) to the question of causality also requires knowledge of the specifics of the preceding questions and the question to follow, which is, in part, the same question. This thesis concentrates primarily on the various ways in which dwelling can occur and attempts to accommodate as many modes of dwelling as possible.

Why does dwelling occur? As with the question of *how*, the question of *why* may be considered as dual, one which simultaneously asks “For what purpose does dwelling occur?” and “What is the cause(s) of dwelling.” The answer(s) to the former are a function of the answers to the preceding questions. It would be presumptuous and shortsighted to attempt an answer to the question as it is in its general form. The purpose to be identified, at minimum, requires a relation to a “*me*,” an “*other(s)*,” or an “*us*.” Likewise, the answer to the question of causality, as it is posed in its general form here and in the question of *how*, also requires knowledge of the specifics of the preceding questions.

Psychological factors involved in the act of dwelling among humans include the following:

Orientation: In order for “man” to be orientated, he must locate himself with reference to that which is other than himself (e.g. other people, other places, other times, etc.). If man does not know where he is, then he cannot know where he is going, save his belief. In a lost state, man is more likely to lack the feeling of security which occurs in a state of dwelling. According to Kevin Lynch, devices which can assist man in orientating himself include “landmarks,” “nodes,” “paths,” “edges,” and “districts.”

Identification: The identity of a human(s), as with orientation, is established by means of comparison with that which is other and, to some degree, qualitatively different to said human(s). One who is among that which is nearly or entirely reflective (i.e. bearing the same or similar qualities) of one’s identity tends to have a sense of belonging, which is characteristic of dwelling. In this situation, the identifying human is to some degree conscious of “me” as unified with “you” or “this,” and “us” as distinct from “them” or “these.” A feeling of alienation tends to result when one is among that which is nearly unreflective of one’s identity (note that it is impossible for an “other” to be entirely unreflective of one’s identity due to the ontological connection of each). In this situation, the alienated human is to some degree conscious of “me” as distinct from “you” or “this,” and “us” as incompatible. The determination, however, of a particular

identity is not necessarily universal as a result of differences in subjective perspectives.

- A Housing Cooperative and its location will serve as the place for dwelling to achieve a barrier-free environment and interdependent / symbiotic relationships.

Following is the definition of a housing cooperative as it is applicable to this thesis:

A *Housing Cooperative*¹¹, also known as a *Co-op*, is a legal entity that owns real estate in the form of one or more residential buildings. Shares of the legal entity are sold, entitling the shareholders to occupy one housing unit. It is not the shareholders that own the housing cooperative, but rather the legal entity in which the shareholders participate.

The shareholders are subject to an Occupancy Agreement or Proprietary Lease which identify the rules of the co-op. The rules are established in a democratic fashion, as each shareholder is entitled to vote. Typically, the shareholders, at a general meeting, elect a board of directors from among them. The board of directors serves as the governing body of the cooperative and is mainly responsible for making business decisions. Members of the board of directors usually elect their own officers and often appoint standing committees, for various purposes, among the shareholders.

¹¹ <http://www.coophousing.org/> website of National Association of Housing Cooperatives (NAHC), <http://www.wikipedia.org/> concerning housing cooperatives

Self-sufficiency is strived for in the maintenance of a housing cooperative.

Members collectively attempt to perform as much work as possible that is necessary for up-keep. Legally, a housing cooperative has the right to hire services from entities outside of it, in the event that such services are needed or would be more efficient.

Housing cooperatives are typically, *de facto*, not for profit. The members of a co-op are the source of its income as they pay rent on their housing units. Rent rates are usually not set higher than that which is required to meet the expenses of the co-op, although it may become necessary to generate a surplus of funds for the replacement of assets. There are two methods of financing housing cooperatives, namely, *market rate* and *limited equity*. The market rate method of finance permits the members' share price to fluctuate on the open market. Shareholders may sell their shares, when they wish to move out, at whatever price the market may bring forth. With the limited equity method of finance, by contrast, rules are established which control the prices of shares when sold. Only the purchase price is permitted to be collected upon selling. This method is aimed at providing affordable housing.

The purpose of the cooperative housing type within the context of this thesis is to facilitate interdependent living, foster a sense of communal identity and individual identity, and provide affordable housing. These are facilitated by the essential character of the housing cooperative as outlined above. Interdependent living occurs as the members of the co-op participate collectively and individually

(through monetary contributions, a democratic process of decision making, and the provision of services) in sustaining a dwelling(s) which enables and enhances the act of living. Persons in this situation are dependant upon the independent efforts of each other as they contribute to the organization as a whole. In this respect, one might conclude that the housing cooperative is a kind of commune. As such, it is, in this thesis proposal, accommodating of the shared interests of its members while preserving diversity; unity is not emphasized to the point at which difference is lost, nor is difference emphasized to the point at which unity is lost. Finally, the limited equity method of finance mentioned above is selected to make the housing cooperative affordable to a broad range of income brackets.

In addition, certain criteria for admission are to be established in order to protect the investments of the current occupants. This, of course, is a measure of exclusion and in direct opposition to the inclusive objectives of this thesis. However, it is recognized that a more or less mutually cooperative situation among members cannot exist with the admission of people that are unable and/or unwilling to mutually cooperate (e.g. those of no income or financial support, those with a criminal history or that of bad credit, the severely disabled, etc.). Although devices are in place to enable a maximum of ability to cooperate, some limitations must be acknowledged. Voting will occur among the current occupants to determine whether or not the admission of an individual or group of individuals is acceptable. Under no circumstances is this voting to violate a candidate's civil liberties as prescribed by nature and by law (i.e. discriminate on the basis of race, gender, age, etc).

- Another strategy employed to achieve a barrier-free environment and interdependent / symbiotic relationships is the merger of “natural” and “man-made” elements. Following is the definition of nature as it pertains to this thesis:

Nature, if one adopts the traditional western attitude, is understood as “the world as it exists without human beings or civilization.”¹² This definition is divisive in that it posits nature as all that is other in relation to human beings and the products of human beings. Considered as such, nature is objectified and regarded by its observers as disconnected from them and all that they produce. The tendency of western cultures operating under the latter point of view has historically been to subordinate and exploit nature to its detriment, a relationship which is identical to the parasitic kind of symbiosis defined above.

If, however, the traditional eastern attitude is adopted, the term in question is still identified as “the world as it exists without human beings or civilization,” yet it is inclusive of human beings and civilization in acknowledgement of the fact that these are not absent from the world. In other words, nature, as it has been seen in the west, is here considered as *Nature*, which is inclusive of all phenomena. Thus, human beings and all that they produce assume subordinate positions as parts of the whole of *Nature*. The tendency of eastern cultures operating under the latter point of view has historically been, in contrast to the tendency of the west, to worship and passively receive *Nature*. Accordingly, the ebb and flow of *Nature* serves as the prime directive for all of its parts.

¹² Random House Webster’s Dictionary

Nature, within the context of this thesis proposal, consists of the synthesis between the traditional eastern and western definitions, though it is more closely identifiable with the former. Paradoxically, nature herein is treated as essential to all things and as sacred, however, it is also treated as something which is separate and distinct from human beings and all that they produce. The term in question is applied as an absolute (i.e. as *Nature*), but also, and more frequently, in specific reference to “the world as it exists without human beings or civilization.”

It is herein maintained that the synthesis and integration of the natural environment with the built environment will yield results which are beneficial to all participating entities. A built environment composed, entirely or in part, of natural elements must necessarily contribute to sustaining the natural environment if it is to be sustained. In turn, both the built and natural environments must be sustained by their inhabitants if there inhabitants are to be sustained.

The physical and psychological benefits of the natural environment are also recognized and embraced herein. The inclusion of natural elements within the built environment avoids the feeling of alienation and health problems which tend to occur when built environments are devoid of natural elements.

- Applications of sustainable means and methods will contribute to the achievement of the objectives of this thesis. These are used, in part, to bring about the merger of natural and man-made elements, creating an environment which sustains itself as well as its inhabitants and its context. It is intended that the sustainable

applications participate in making the proposed housing affordable through cost effective construction, recycled and inexpensive construction materials, the conservation and generation of energy.

- Utilization of devices which sense and respond to human and other conditions also contribute to the achievement of the objectives of this thesis. Such devices could participate in the reduction and elimination of barriers for the occupants (e.g. entry/exit doors which open and close automatically in response to the location of a person or persons). These devices could also participate in the comfort of the occupants and affordability of the housing (e.g. sensors which respond to climate and temperature of the occupant).
- A final strategy to bring about a barrier-free environment and interdependent / symbiotic relationships is adherence to ADA / ABA accessibility guidelines. Use of these guidelines will better integrate the physiologically disabled with their environment by accommodating their particular disability or disabilities. Application of the guidelines may also contribute to a reduction in present and future costs.

Guiding Principles

The Center for Universal Design, in collaboration with universal design researchers and practitioners has outlined seven principles and corresponding

guidelines of universal design.¹³ These are adopted and applied to the proposed project in order to satisfy both universal and unique needs:

1.) Equitable Use

- Provide the same means of use for all users: identical whenever possible; equivalent when not.
- Avoid segregating or stigmatizing any users.
- Provisions for privacy, security, and safety should be equally available to all users.
- Make the design appealing to all users.

2.) Flexibility in Use

- Provide choice in methods of use.
- Accommodate right- or left-handed access and use.
- Facilitate the user's accuracy and precision.
- Provide adaptability to the user's pace.

3.) Simple and Intuitive

- Eliminate unnecessary complexity.
- Be consistent with user expectations and intuition.
- Accommodate a wide range of literacy and language skills.
- Arrange information consistent with its importance.

¹³ “Copyright 1997 NC State University, The Center for Universal Design”; cited: “The Center for Universal Design (1997). The Principles of Universal Design, Version 2.0. Raleigh, NC: North Carolina State University.”; http://www.design.ncsu.edu/cud/about_ud/udprinciples.htm

- Provide effective prompting and feedback during and after task completion.

4.) Perceptible Information

- Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
- Provide adequate contrast between essential information and its surroundings.
- Maximize "legibility" of essential information.
- Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).
- Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

5.) Tolerance for Error

- Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.
- Provide warnings of hazards and errors.
- Provide fail safe features.
- Discourage unconscious action in tasks that require vigilance.

6.) Low Physical Effort

- Allow user to maintain a neutral body position.
- Use reasonable operating forces.
- Minimize repetitive actions.

- Minimize sustained physical effort

7.) Size and Space for Approach and Use

- Provide a clear line of sight to important elements for any seated or standing user.
- Make reach to all components comfortable for any seated or standing user.
- Accommodate variations in hand and grip size.
- Provide adequate space for the use of assistive devices or personal assistance.

Chapter 3: Site

Historical Context (1791-Present)¹⁴

Public Reservation 13 is located in the southeast quadrant (Ward 6) of Washington, DC and consists of approximately 67 acres of land (figs.3-7).

Figure 3 – Reservation 13 within Washington, DC
(Image source: <http://earth.google.com/>)

¹⁴ District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002
<http://www.planning.dc.gov/planning/cwp/view.a,1285,q,571735.asp>

Figure 4 – Ward map of Washington, DC highlighting ward 6
(Image source: <http://www.planning.dc.gov/>)

Figure 5 – Reservation 13 within local context
(Image source: <http://local.live.com/>)

Figure 6 – Reservation 13 boundaries
(Image source: <http://local.live.com/>)

Figure 7 – Reservation 13 aerial perspective
(Image source: <http://local.live.com/>)

The site is found to exist within L'Enfant's 1791 plan of Washington, DC and is depicted as a fragmented portion of the city, slightly smaller relative to its current size (fig.8). The revisions to L'Enfant's plan which occurred in 1792 and 1800 maintained the depictions of Reservation 13 as a fragmented portion of the city, albeit the size of the site had increased to the size that it is of late.

Figure 8 – L'Enfant plan of Washington, DC 1791
(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 <http://www.planning.dc.gov/planning/cwp/view.a,1285,q,571735.asp>)

Between 1843 and 1846, the Washington Asylum was relocated from Judiciary Square to Reservation 13. Subsequently, the site came to be called “Hospital Square,” as is evidenced in writings and city plans of 1848. On January 20, 1877, a mandate was issued for the construction of work houses to serve the District in connection with the Asylum. These workhouses were to be constructed south of the Asylum along 19th Street.

The “McMillan Plan” or Senate Park Commission Plan of 1901, which proposed a new park system for the city, referred to Reservation 13 as the “City Farm” and conceived of it as a point of change in the character of the Anacostia landscape from an urban waterfront to that of a marshland (fig.9). In this plan, Massachusetts Avenue is shown to pass through the site of Reservation 13 and continue as a bridge to the other side of the Anacostia River. The bridge served to mark the transition in the character of the Anacostia landscape.

Figure 9 – Senate Park Commission Plan of 1901
(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 <http://www.planning.dc.gov/planning/cwp/view.a,1285,q,571735.asp>)

Building Uses:

In time, many buildings came to occupy Reservation 13 in a sprawling and disorganized manner relative to the general organization of Washington. These include that of the DC General Hospital, the Department of Health clinics and services, the Department of

Mental Health, the offices and work spaces of the Medical Examiner, the DC Jail and Correctional Treatment Facility, and, finally, a school for persons with mental disabilities—St. Coletta School (figs.10-11).

Figure 10– Diagram of historic building usage
(Image source: <http://earth.google.com/>)

DC General Hospital

Bldg. No. 1	Security, Mechanical Rm.
Bldg. No. 4	DC Jail Holding Cells / Administration
Bldg. No. 5	Laundry / Copy Center / Cafeteria / Comm. Ctr.
Bldg. No. 6	Kitchen
Bldg. No. 7	Warehouse / Maintenance
Bldg. No. 8	Boiler Plant
Bldg. No. 9	OB / GYN
Bldg. No. 10	Pediatrics
Bldg. No. 11	Laboratory / Pathology
Bldg. No. 16	Care Center
Bldg. No. 29	Ambulatory & Critical Care Center

Department of Corrections

Bldg. No. 20	Correctional Treatment Facility
Bldg. No. 28	DC Jail

Department of Mental Health

Bldg. No. 14	Mental Health Services Commission
Bldg. No. 25	Psychiatric Treatment Center

Medical Examiner

Bldg. No. 27	Medical Examiner Building
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Department of Health

Bldg. No. 8	Sexually Transmitted Diseases Clinic
Bldg. No. 12	Detox Unit
Bldg. No. 13	Women's Services
Bldg. No. 15	Tuberculosis / Chest Clinic
Bldg. No. 17	Substance Abuse Treatment

St. Coletta School

Figure 11– Diagram of current building usage
(Image source: <http://earth.google.com/>)

Active Buildings

Bldg. No. 1	Security, Mechanical Rm DC Jail Holding Cells / Administration
Bldg. No. 7	Boiler Plant
Bldg. No. 12	Detox Unit
Bldg. No. 13	Women's Services
Bldg. No. 14	Mental Health Services Commission
Bldg. No. 15	Tuberculosis / Chest Clinic
Bldg. No. 17	Substance Abuse Treatment
Bldg. No. 20	Correctional Treatment Facility
Bldg. No. 27	Medical Examiner Building
Bldg. No. 28	DC Jail
Bldg. No. 29	Ambulatory & Critical Care Center
St. Coletta School	

The buildings of the DC General Hospital (figs.12-13) were constructed in the 1930's and 1940's and eventually grew to a complex of about 1,416,695 gross square feet. The main buildings of the hospital were concentrated primarily in the center of the site and came to be surrounded by vast areas of surface parking lots. In 2001, the DC General

Hospital closed leaving many of its buildings either vacant or partially in use. Per an agreement with the City and the Health Care Alliance, the Ambulatory and Critical Care Center and Emergency Care Center continue to provide sub-specialty clinics and emergency care services.



Figure 12 – DC General Hospital: Ambulatory and Critical Care Center



Figure 13– DC General Hospital: Care Center

The Department of Health (figs.14-15), which once functioned in conjunction with the DC General Hospital, came to be located near the eastern edge of the site. It is currently operational and includes clinics for sexually transmitted diseases, a detoxification program, Woman's Services, and a Chest / Tuberculosis Clinic. Also operational and located along the eastern edge of the site are the Department of Mental Health, which includes a Mental Health Services Commission and a Psychiatric Treatment Center (fig.16), and the Office of the Medical Examiner (fig.17).



Figure 14 – Department of Health: Substance Abuse Treatment Facility



Figure 15 – Department of Health: Special Services



Figure 16 – Psychiatric Treatment Center



Figure 17 – Medical Examiner Building

The DC Jail (fig.18) was originally constructed in the 1870's and located at the corner of Independence Avenue and 19th Street. In 1976, a new central detention facility, located near the southwestern edge of the site adjacent to 19th Street, replaced the original jail. Shortly thereafter, a Correctional Treatment Facility (fig.19) was erected southeast of the new jail. In the 1980s, an addition to the DC Jail was constructed. The DC Jail and Correctional Treatment Facility collectively came to comprise 860, 229 gross square feet. Today, these establishments are operational in service of the City.



Figure 18 – Department of Corrections: DC Jail



Figure 19 – Department of Corrections: Correctional Treatment Facility

St. Coletta (fig.20) is a private, non-sectarian, not for profit organization which operates as a school and day program for children and adults, between the ages of 4 and 22, with moderate to severe mental retardation, autism, and secondary physiological disabilities. It was founded in 1959 by Joseph and Hazel Hagarty of Arlington, VA. Since its foundation, it has moved to several different locations until recently landing on the northwest corner of Reservation 13, occupying less than 4 acres of land and bordered by Independence Avenue and 19th Street. Today, it serves individuals from the entire metropolitan Washington, DC area. The school is one of the initiatives implementing the redevelopment plan as proposed by the DC Office of Planning.



Figure 20 – St. Coletta School; Designed by Michael Graves, built in 2006

Building Conditions:

Heights of the existing buildings range from one to eight stories. The architectural “styles” of the existing buildings range from the “traditional” to the “modern.” Many of the buildings are nearing the end of their lifecycles and are in need of considerable repair and/or replacement. Asbestos was used in a number of the earlier buildings on the site and poses a concern for the well being of current and future occupants.

Land Conditions:

Reservation 13 has a topographical slope which falls approximately 45' from 19th Street to the river basin (fig.21). This allows for views of the river and its islands from within the site, as well as views into the site from locations east of the river, including River Terrace and Anacostia Park, and the Whitney Young Memorial Bridge (East Capitol

Street SE) which crosses the Anacostia River as it approaches Washington from the east. Due to the slope of the site and the large areas of surface parking, a substantial amount of storm water runoff occurs during and after heavy rainfall. This tends to contaminate the soil of the site, the Anacostia River, and the ecosystem in general.

Figure 21 – Reservation 13 topography

Storage tanks, some containing gas and diesel fuel, have recently been discovered as buried within the soil of the site at various locations. These contaminants are in the process of being removed from the soil of the site.

The land of the site occupied by the DC Jail and the Correctional Treatment Facility has been found to contain archeological remains of pre-historic settlements and graves. The land on the south side of the Correctional Treatment Facility has been designated as “Reservation 13 Archeological Site.”

Entry Points:

Existing entry points to Reservation 13 include the drive-way which extends from the intersection of Massachusetts Avenue and 19th Street as well as two smaller drive-ways extending from Independence Avenue.

*Mass Transit*¹⁵:

A Blue and Orange Line Metrorail station (fig.22), designated as “Stadium-Armory,” is located within a five minute distance of travel from the site. There are two entries/exits to the Stadium-Armory station: one is near the intersection of C and 19th Street SE, and the other is located immediately west of the DC Armory.

Figure 22 – Diagram of “Stadium-Armory” metrostation locations and 5-minute walk
(Image source: <http://local.live.com/>)

Metrobuses are also available means of public transportation (fig.23). Metrobus stops are within a five minute distance of travel from the site. These include the East Capitol

¹⁵ <http://www.wmata.com>

Street-Cardozo Line, the Bladensburg Road-Anacostia Line, and the Sibley Hospital-Stadium-Armory Line.

Figure 23 – Diagram of metrobus routes in relation to local metrostations
(Image source: <http://local.live.com/>)

Metrorail and Metrobus together serve 3.5 million people within a 1,500 square-mile area of the DC Metropolitan Region. Both forms of transportation are, to a great extent, made accessible to customers with mobility, sensory, and dexterity impairments. Among other features, every metro station is equipped with elevators and escalators (to and from the street and platform); fare vending machines with easy-to-use instructions in Braille, raised alphabet, and audio; extra wide fare gates for customers that use wheelchairs or other mobility devices; a TTY-telephone on every mezzanine level; rubber, bumpy surfaces near the edge of the platforms to alert the vision impaired that they are nearing the edge of the platform; gap reducers and barriers between rail cars. The accessible features of metrobuses include low floor ramps and lifts, two wheelchair securement areas, audio stop announcement system and a visual display.

Other means of public transportation from Reservation 13 are also available including, but not limited to, MetroAccess, DC Circulator, and the Washington Elderly

Handicapped Transportation Service (WEHTS). These, as well as the Metrorail and Metrobus systems, participate in a reduced fare program for persons with physiological disabilities in an effort to make public transportation more affordable for such persons.

Boundaries and Local Context

- The north side of Reservation 13 is bordered by Independence Avenue which extends to the west beyond the National Mall toward the Potomac River, and to the east, turning into East Capitol Street SE, beyond the limits of the city. Traffic on Independence Avenue moves in one direction, from east to west, and consists largely of commuters. The DC Armory and the Robert Fitzgerald Kennedy (RFK) Memorial Stadium occupy areas adjacent to the north side of Independence Avenue.

The DC Armory (fig.24), built in 1941, is situated adjacent to RFK Stadium on the same 190 acres of Federal land. It is currently in full operation, serving as a 10,000 seat, multipurpose arena for the city of Washington. It hosts local sporting events, concerts, inaugural balls, as well as other events.¹⁶



Figure 24 – DC Armory

¹⁶ http://en.wikipedia.org/wiki/D.C._Armory

RFK Stadium (fig.25) is an open air arena constructed in 1961 with a seating capacity of over 56,000 and an associated parking capacity for over 10,000 cars and 300 buses. It became the “home” of the National Football League’s Washington Redskins, Major League Baseball’s Washington Senators (now called the Washington Nationals as a result of new ownership) and the Major League Soccer’s DC United. It has also served as a venue for concerts and significant events. The Stadium, as well as the 190 acres of land upon which it rests, is owned by the Government of the District of Columbia. Access to the Stadium is gained, in part, by way of Independence Avenue.



Figure 25 – Robert Fitzgerald Kennedy (RFK) Stadium

Subsequent to the formation of Major League Baseball’s Washington Nationals, it was announced that a new stadium, with a seating capacity of 41,000, will be constructed for the team. The new stadium is to be located in SE Washington in

an area bounded by South Capitol Street to the west, M Street to the north, First Street to the east, and Potomac Avenue to the south. The official ground breaking ceremony for the National's new stadium took place on May 4, 2006. The stadium is expected to open in April of 2008.¹⁷

There are also plans to construct a new 27,000 seat soccer stadium for DC United. It is to be located directly across the Anacostia River from the proposed site of the new stadium for the Washington Nationals.¹⁸

After the completion of the new stadiums for the Washington Nationals and DC United, RFK Stadium is expected to be demolished. The National Capitol Planning Commission (NCPC) is currently considering potential uses for the site as a grand gateway to the city of Washington. A large waterfront park is envisioned with, among other things, recreational and commemorative spaces (fig.26).¹⁹

Figure 26 – Government land surrounding stadium and sketch of vision of waterfront park redevelopment
(Image sources: <http://earth.google.com/>, http://www.ncpc.gov/planning_init/RFK/RFK.html)

¹⁷ <http://washington.nationals.mlb.com/was/ballpark/index.jsp> concerning RFK Stadium history and new stadium for Washington Nationals

¹⁸ <http://dcunited.mlsnet.com/t103/index.jsp>

¹⁹ http://www.ncpc.gov/planning_init/RFK/RFK.html

- The west side of the site is bordered by 19th Street which runs one-way north. A residential community primarily comprised of row houses, known as Hill East, is located adjacent to the west side of 19th Street (figs.27-28). Passing through Hill East and joining with 19th Street perpendicularly are Bay, Burke, and C Streets SE. These run two-ways in east-west directions. C Street is identifiable in the earliest plans of the city and, unlike Bay and Burke Streets, extends to the full length of the city. Two diagonal streets, Potomac Avenue and Massachusetts Avenue, also pass through the Hill East community and terminate at 19th Street. The latter are identifiable in the earliest plans of the city. Massachusetts Avenue extends northwest and passes through some of the most significant neighborhoods and landmarks in Washington.



Figure 27 – Hill East Neighborhood



Figure 28 – Hill East Row (Terraced) Houses

- Immediately south of the site is a large area of land designated as the Congressional Cemetery. Its southern most edges are bordered by the Anacostia River. Beyond the cemetery, across the river, are Anacostia Park, Fort Dupont Park, the continuation of Massachusetts Avenue, and locomotive tracks that extend from a bridge which crosses the river and continue northeast.

- To the east of the site is a DC Water and Sewer Authority (DCWASA) pump station and swirl concentrator (fig.29). The latter treats and pumps sewage to the Blue Plains station located across the Anacostia River. In the same vicinity as the sewage station lies a large area of surface parking which accommodates RFK Stadium. The Anacostia River is located to the east of these areas. In the center

of the Anacostia River, as it runs past the Reservation, is Kingman Island. This is one of several islands which occur within the Anacostia River.



Figure 29 – DC Water and Sewer Authority (DCWASA) pump station and swirl concentrator

Chapter 4: Draft Master Plan

On March 20, 2002, the DC Office of Planning released a Draft Master Plan (fig.30) for the redevelopment of Reservation 13. This plan was approved by the Council of the District of Columbia on October 15, 2002. It was accomplished in accordance with expressed needs and desires of various stakeholders, including the occupants of the surrounding neighborhoods, and in accordance with the Anacostia Waterfront Initiative (AWI) and the Strategic Neighborhood Action Plans (SNAP).

Figure 30 – Draft Master Plan as devised by the DC Office of Planning showing grid infrastructure, central park and connections to proposed waterfront park
(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront, 2002* <http://www.planning.dc.gov/planning/cwp/view.a.1285.q.571735.asp>)

- The **Anacostia Waterfront Initiative** is a collaborative endeavor by Federal and District governments to transform the Anacostia Waterfront into a system which supports and enhances natural and built environments. The involved parties formed a partnership in March of 2000 through a signed agreement entitled “Memorandum of Understanding.” This agreement outlines, among other things, the specific goals of the AWI:²⁰
 - a. To realize the full potential of the District of Columbia's waterfronts (the "Waterfronts") in order to enhance the quality of life for residents of, and visitors to, the greater Washington, DC area through a partnership which will provide access to, where appropriate, and improvement of the Waterfronts. For purposes of this Memorandum of Understanding, and as more fully described in Exhibit A, the Waterfronts consist of, *inter alia*, both shores of the Anacostia and Potomac Rivers, and landmarks such as the Southwest Waterfront, Fort McNair, the Navy Yard, RFK Stadium, the Anacostia River parks, the National Arboretum and the Kenilworth Aquatic Gardens. It is clearly understood by all of the parties to this agreement that security is the number one priority of military installations. Consequently, where issues arise concerning public access to waterfront areas on military installations, the installation commanders will be the ultimate decision-makers.

²⁰ http://www.planning.dc.gov/planning/cwp/view,a,1285,q,571868,planningNav_GID,1708.asp

- b. To ensure that the Waterfronts are planned and developed to provide the appropriate development potential for the District of Columbia and the federal government. This development will preserve the environment and encourage the use of sustainable development techniques. Waterfront development should be planned to take advantage of its location, particularly view corridors and where appropriate, access to green spaces.
- c. To build on existing relationships to ensure that Waterfronts are planned and developed with the participation and input of surrounding communities and community organizations. The Waterfront Revitalization Endeavor will build on existing relationships between the City, federal agencies, and the Washington, DC community (e.g., the Bridges to Friendship initiative).
- d. To assess existing infrastructure with respect to anticipated future demand, particularly with respect to transportation, storm water management, wetland restoration, and bulkhead rehabilitation. The infrastructure will be planned in order to support the mix of private development and park protection and rehabilitation desired by the District of Columbia Government, the federal government, and the surrounding communities.
- e. To build a framework by which the Parties will develop a cooperative plan for the Waterfront Revitalization Endeavor.

- f. To develop a timetable and appropriate implementation and management mechanisms for the realization of the Waterfront Revitalization Endeavor. The implementation should assess the impact of development in the project area on environmental quality, economic development, access to open space, where appropriate, and sustainability of the entire region.
- g. To build on existing plans for the District of Columbia, including the L'Enfant Plan and the McMillan Plan, to create consistent and compatible development.
- h. To bring economic development, employment, and recreational opportunities to the communities surrounding the Anacostia River consistent with all applicable laws

A “Framework Plan” for the waterfront initiative was devised, along with the above agreement, in which five themes of the AWI were identified:²¹

- 1.) *A Clean and Active River*—environmental healing through restoration of streams and wetlands, the controlling of pollution and run-off, the promotion of water activities, etc.
- 2.) *Breaking Down Barriers and Gaining Access*—waterfront is recognized as an amenity which should be accessible by the public

²¹ http://planning.dc.gov/planning/cwp/view.a,1285,q,582193,planningNav_GID,1708.asp

3.) *A Great Riverfront Park System*—a system of connected waterfront parks is proposed as a unifying and revitalizing device

4.) *Cultural Destinations of Distinct Character*—cultural heritages as they are embodied in the neighborhoods surrounding the river are to be enhanced and protected

5.) *Building Strong Waterfront Neighborhoods*—sustainable economic development and revitalization of surrounding neighborhoods is promoted

- The **Strategic Neighborhood Action Plans** is a collaborative endeavor to preserve and enhance each of the District's 39 neighborhood clusters. Details of priority issues in each neighborhood are identified, and solutions are suggested, by District neighborhood residents together with "Neighborhood Action" teams, led by neighborhood planners from the Neighborhood Planning and Development/Urban Design Division of the DC Office of Planning. The latter has four primary goals:²²

- 1.) Revitalize neighborhoods
- 2.) Restore economic health
- 3.) Create a world-class waterfront
- 4.) Encourage a diverse and dynamic downtown

²² <http://planning.dc.gov/planning/cwp/view.a,1279,q,569096,planningNav,|32339|.asp>

Nine objectives were established for the redevelopment of Reservation 13. As stated by the DC Office of Planning, the objectives are the following:²³

- 1.) Connect and integrate Reservation 13 with adjacent neighborhoods, and the new waterfront park along the Anacostia River
- 2.) Utilize the site to meet a diversity of public needs including health care, education, employment, government services and administration, recreation and housing
- 3.) Extend the existing pattern of local streets to and through the site to create simple, well-organized city blocks and appropriately-scaled development
- 4.) Maintain a human-scale of building heights that match existing neighborhood buildings and increase in height as the site slopes downward to the Anacostia waterfront
- 5.) Connect the Hill East neighborhood and the city at large to the waterfront via tree-lined public streets, recreational trails and increased access to waterfront parklands
- 6.) Demonstrate environmental stewardship through environmentally sensitive design, ample open spaces, and a great waterfront park that serve as public amenities and benefit the neighborhood and the city
- 7.) Promote the use of mass transit by introducing new uses near Metro stations and create an environment where the pedestrian, bicycle, and auto

²³ District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 (<http://www.planning.dc.gov/planning/cwp/view.a,1285,q,571735.asp>)

are all welcome, complementary, and unobtrusive, reducing the impact of traffic on adjacent neighborhood streets

8.) Create attractive “places” of unique and complementary character

including:

- A new, vital neighborhood center around the Metro station at C and 19th Streets that serves the unmet neighborhood commercial needs of the community and extends to the water front with a new residential district;
- Massachusetts Avenue as a grand Washington “boulevard” in the tradition of the L’Enfant plan and devoted to a new center for Public Health and Science;
- A district for city-wide uses and services, such as health care, education, and recreation along Independence Avenue;
- A grand public waterfront park incorporating monumental places and quiet natural retreats accessed by a meandering park drive set back from the Anacostia River.

9.) Limit improvements to correctional facilities to areas south of

Massachusetts Avenue.

The Draft Master Plan includes approximately 800 residential dwelling units, 35,200 gross square feet for retail construction, and 3.2 million gross square feet for health care uses, clinics, and offices. The new buildings are to increase in height as they approach the Anacostia River due to the slope of the site (fig.31).

Figure 31 – Building Heights
2 - 4 Story Buildings (yellow)
4 - 7 Story Buildings (peach)
7 - 10 Story Buildings (orange)

(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002
<http://www.planning.dc.gov/planning/cwp/view.a,1285,q,571735.asp>)

The plan is divided into four districts (fig.32), unique in terms of location, character, and use: that of Independence Avenue, C Street Neighborhood, Massachusetts Avenue, and the Waterfront. Descriptions of these four districts, as stated by the DC Office of Planning, are as follows:²⁴

1.) *Independence Avenue District*—This area provides easy access from Independence Avenue and the surrounding regional network of roads and will be devoted to city-wide uses, St. Coletta School and services

²⁴ District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 <http://www.planning.dc.gov/planning/cwp/view.a,1285,q,571735.asp>

including health-care, recreation, and education. (Sites in this area are also large enough to support the construction of a new hospital, should future need or funding for one be demonstrated)

- 2.) *C Street Neighborhood District*—This district is the extension of the Hill East neighborhood to the east along C Street and Burke Street and is primarily residential in use with other neighborhood amenities. Retail will be located at the Village Square along 19th Street SE.
- 3.) *Massachusetts Avenue District*—This district will be comprised of new civic and municipal buildings dedicated to health care and municipal services. It will also define the space of the avenue to the waterfront.
- 4.) *Waterfront District (National Park Service land)*—New parklands characterize this district stretching along the banks of the river. These park spaces are places of great variety with a Meadow, a Monument Circle in the Washington, DC tradition, a series of bike and pedestrian paths and a Park Drive for low speed automobile movement. Connections are proposed to Kingman Island and to a linear park up and down the river. The Park Drive will provide a pleasurable way to move along the river's edge in an automobile and continue access to parking lots for sporting events at RFK Stadium.

Figure 32 – Districts:

Independence Avenue (purple)
C-Street Neighborhood (yellow)
Massachusetts Avenue (orange)
Waterfront (green)

(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002

<http://www.planning.dc.gov/planning/cwp/view,a,1285,q,571735.asp>)

Seven recommendations are also put forth with respect to the design of streets, blocks, and the circulation through these. Said recommendations, as stated by the DC Office of

Planning, are the following:²⁵

- 1.) Provide on-street parking for all streets
- 2.) Locate shared parking structures in convenient, yet less visible locations
- 3.) Return 19th Street SE to two-way traffic, thereby making the street easier to cross and functioning as a neighborhood center
- 4.) Locate large, city-wide uses on Independence Avenue to reduce the amount of heavy traffic passing through the neighborhood

²⁵ District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 <http://www.planning.dc.gov/planning/cwp/view,a,1285,q,571735.asp>

- 5.) Provide an integrated street grid to reduce the impact of traffic on existing neighborhood streets
- 6.) Provide a Park Drive on adjacent National Park Service land to improve access and enhance local traffic circulation
- 7.) Provide side walks throughout the site, quality streetscapes and traffic calming techniques for safe and pleasant pedestrian movement

It is anticipated that the redevelopment of Reservation 13 will take place over a period of years (i.e. 20+) and evolve through a series of stages. Two events have recently transpired which have significantly advanced the process 1.) the construction of St. Coletta School and 2.) the transfer of jurisdiction over the site to the District of Columbia (December 2006), as it is was owned by the United States of America and controlled by the General Services Administration (GSA).

Chapter 5: Precedents

Sensory Garden²⁶

This project engages people of various abilities with the natural environment through devices that appeal to the senses of sight, sound, smell, and touch. The strategies and design solutions utilized are applicable to this thesis in both exterior and interior spaces. The design has the effect of creating experiential choice for the occupants as these may interact with the environment in a variety of ways. Involving as many senses as it does, such a design may afford a fuller experience, compared to an otherwise limited design (fig.33).

Following is the project synopsis as stated by the source:

The Sensory Garden initially was developed as a renovation of the ‘Garden for the Blind’ in Oizumi Ryokuchi Park, Osaka, Japan. The earlier garden opened in 1974 and was designed to appeal specifically to people with vision disabilities. Tucked away in a distant corner of the park and with a name that denoted a place segregated from sighted visitors, the garden received few visitors and stagnated over the years.

The Sensory Garden evolved from concepts of integration and universal design. This new garden, established in a more central location within the park, invites visitors of all ages and abilities to enjoy its displays. As many as 500 people with a range of abilities were consulted on the features to be included in the park.

²⁶ *Sensory Garden*, NCSU Center for Universal Design, 2007 <http://www.design.ncsu.edu/cud/>

Maintaining some of the garden's initial purpose, emphasis has been given to plant beds of vividly contrasting colors; raised to allow close inspection, smelling, and easy touching. The new location, adjacent to the park's centrally located lake, spawned the integration of water elements. The new name denotes a place that can be experienced through a variety of senses and is inviting to all people. It is a delightful combination of hard surface walks and retaining walls, dominated by soft profusion of foliage and flowers and the serenity of an intimate relationship with water.

Year of Project Completion: 1997

Location of Project: Sakai City, Osaka Prefecture, Japan

Designer / Developer Name: Yoshisuke Miyake

Figure 33 – Images of sensory garden features with captions as stated by the source

Following are features of this project, as stated by the source, which adhere to universal design principles:

Principle 1: Equitable Use

All visitors use the same level entrance and route of travel, and are afforded the opportunity to have a sensory experience. The water element, the aquatic life, the tactile elements, and the sculpture all make a rich experience possible for people with vision disabilities, and enhance the experience for other visitors. The elevated plant beds and elevated pond place the experience within a range that can be experienced equally by standing and seated visitors and not require seated users or users with limited flexibility to bend and lean over.

Principle 2: Flexibility in Use

Visitors may explore and examine features at their own pace. Sufficient numbers of sitting alcoves are available so users may linger as long as desired. The design of the alcoves allows visitors to interact with water from either the bench provided or a wheelchair or stand.

Principle 3: Simple and Intuitive Use

The garden is small and laid out with a single wide path, marked with pillars, and a strongly defined entrance, all useful for orientation. The metal guide rail embedded into the path also marks the path for both sighted and visually disabled visitors. Users also are informed of their location in the garden by different surface materials along the walk and paths.

Principle 4: Perceptible Information

Relief tiles, Braille text at the entrance and at each display, audio systems and text in both English and Japanese provide a variety of methods from which a visitor may choose to receive information. Wayfinding cues are plentiful and readily apparent, i.e., the pillars, changes in the texture and color-contrasting edges on the raised flowerbeds.

Principle 6: Low Physical Effort

The path through the garden is short and generally flat, requiring little effort to traverse the route. Raised plant beds and ponds are easy to experience, allowing visitors to maintain a neutral body position and requiring little stooping or bending to approach and enjoy.

Principle 7: Size and Space for Approach and Use

The bench, walkways, plant beds, and water elements have all been sized and positioned to accommodate multiple users simultaneously. Visitors, both standing and seated, as well as people of short stature may reach all components comfortably.

Universal Design Demonstration Home²⁷

This project, designed and realized by the NCSU Center for Universal Design, applies universal design principles and methods in order to ensure that its occupants are more than adequately accommodated. Although it is a single-family residence, its interior and exterior design solutions are relevant, and are applied to, this thesis proposal (figs. 34-38).

Figure 34 – Watercolor of universal design demonstration home

Following is an overview of features and amenities as stated by the source:

- Custom designed shingle-style 3,500 sq.ft. residence
- Smooth, stepless entries for ease of access
- Covered porches for outdoor recreation
- Wider doors and hallways, with easy-to-grasp, functional hardware
- Convenient, flexible kitchen designs with sitting workspaces, specialized cabinets and appliances
- Bathrooms designed for maximum usability, including curbless showers
- Home elevator and chair lift installations
- Healing Garden designed for children and adults

²⁷ The Casino Reinvestment Development Authority, *Universal Design Demonstration Home*, NCSU Center for Universal Design, 2002 <http://www.design.ncsu.edu/cud/>

Figure 35 – Site plan of universal design demonstration home

Figure 36 – First floor plan of universal design demonstration home

Figure 37 – Second floor plan of universal design demonstration home

Figure 38 – Healing garden of universal design demonstration home

Accessible Multi-family Housing²⁸

This project, produced by the NCSU Center for Universal Design, is an examination of the ways in which individuals living in a multi-family residence may be accommodated using universal design principles and methods in accordance with the requirements of the North Carolina State Building Code. It presents three types of design solutions primarily for bathrooms and kitchens: type “A” *fully accessible*, type “B” *accessible*, and a *Universal* synthesis of types “A” and “B.” The proposed thesis project adopts these design solutions in order to accommodate the broadest range of individuals possible (figs.39-48).

²⁸ *Accessible Multifamily Housing*, NCSU Center for Universal Design, 1999
<http://www.design.ncsu.edu/cud/> information, images, and captions

Figure 39 – Example Bathroom Plans

Figure 40 – *Universal* Bathroom with In-swinging Door 8'-10" x 8'-6"

Figure 41 – Type “A” *Fully Accessible* Bathroom with Universal Features 9’-2” x 6’-9”

Figure 42 – Type “A” *Fully Accessible* Bathroom 8'-8" x 6'-9"

Figure 43 – Type “B” *Accessible* Bathroom 5’-9” x 9’-0”

Figure 44 – Type “B” *Accessible* Bathroom with Universal Features 6’-6” x 9’-4”

Figure 45 – Example Kitchen Plans

Figure 46 – Type “A” Fully *Accessible* Kitchen 10’-6” x 8’-6”

Figure 47 – Type “B” Accessible Kitchen 8’-6” x 8’-0”

Figure 48 – *Universal Kitchen* 10'-6" x 8'-6"

Harbour Square—Washington, DC

This is a housing cooperative which has within its plan considerable landscape amenities for its residents. Landscape is enjoyed in large courtyard common spaces. The housing includes a variety of unit types as well as variations in the massing of the architecture to create these unit types. Interior amenities include an exercise facility, swimming pool, and ball room / meeting hall. All of these aspects are relevant to this thesis and are incorporated into the design solutions (fig.49).

Figure 49 – Harbour Square-Washington, DC

Via Verde – Grimshaw Architects²⁹

This residential project, designed for the Bronx in New York, was based on a German architectural precedent which had as its roof surface a series of downward spiraling, landscaped terraces. The project imitates its precedent with similar green roof terraces. On the green roof, the residents are able to commune and grow edible plants. This allows for them to have more opportunities to connect with each other and with nature. The massing of the structure affords excellent views to the surrounding context. These aspects are imitated in the design solutions of this thesis (fig.50).

Figure 50 – Via Verde-Grimshaw Architects—depicting exterior views of the building, the green roof and context, and precedent study

²⁹ www.aiany.org

Logements a Paris 20-Philippe Madec³⁰

This housing project in Paris uses sliding wooden louvered panels to control solar gain and day-lighting of the interior spaces. The glazing and corresponding panels extend from floor to ceiling. The wooden louvered panels slide horizontally upon a track which rests in a concrete floor slab projected beyond the façade. These ideas are appropriate for the intentions of this thesis and are incorporated into the design solutions (fig.51).

Figure 51 – Logements a Paris 20 – Philippe Madec

³⁰ Broto, Carles, *New Housing Concepts*, Gingko Press Inc., Corte Madera, CA, 2006 (pp.202-207)

Cite Internationale de Lyon – Renzo Piano³¹

This project is linear in plan with a central pedestrian spine and buildings of different uses on both sides of the spine. Of particular interest here is the glass “skin” of the various buildings. In the words of the source, this outer layer of glass “breaks the force of wind and rain so that the windows behind may be left open at all times...the air in the gap between louvers and building is warmed by the sun: in summer it rises and escapes drawing cool fresh air up and into the windows; in winter the air is trapped to form a thermal jacket.”(p.82) Aspects of this skin concept are applied to the design solutions of this thesis (fig.52).

Figure 52 – Cite Internationale de Lyon – Renzo Piano

³¹ Buchanan, Peter, *Renzo Piano Building Workshop: Complete Works*, London: Phaidon Press, 1995 (pp.74-97)

Chapter 6: Program

The housing which this thesis proposes is to be located within the residential district of the Draft Master Plan proposed by the DC Office of Planning (fig.53). Said residential district consists of six blocks . One of these blocks is occupied by a square-shaped park which is approximately 1.43 acres = 62,500 sq. ft. (250 ft. x 250 ft) and flanked on its east and west sides by two other blocks. The blocks to the east and west of the park are rectangular in shape (short sides adjacent to the park) and each is approximately 2.87 acres = 125,000 sq. ft (250 ft. x 500 ft.). Collectively, the three blocks comprise approximately 7.17 acres = 312,500 sq. ft. The six blocks of the residential district comprise approximately twice as much as the latter. The Draft Master Plan indicates approximately 30 ft setbacks, from the curb, on all sides of the rectangular blocks which propose housing. The buildable area of one of the rectangular blocks is approximately 2.37 acres = 103,400 sq. ft.

Parti 1

Ultimately, this thesis proposes a design, at varying scales, for the entire residential district, and indeed the entire urban plan of the site. Within the residential district, the block size, location, zoning, building heights, and general usage, as proposed by the Draft Master Plan, are herein adopted. The block situated west of the park is selected as the primary location for the housing design within the residential district of the Draft Master Plan (fig.54). This block is adjacent not only to the central park, but also to one of the Stadium-Armory metrorail station entrances. Its proximity to the metrorail will afford

the anticipated occupants fast and convenient access to the surrounding DC metropolitan area. In addition, the topography at the selected location is more easily traversed, particularly for those occupants with mobility impairments, by comparison to the topography which nears the Anacostia River.

Figure 53 – Residential District (yellow): Approximately 14.34 acres = 625,000 sq. ft.
(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002
<http://www.planning.dc.gov/planning/cwp/view.a,1285,q,571735.asp>)

Figure 54 – Park (green): 1.43 acres = 62,500 sq. ft. (250 ft. x 250 ft.)
Part 1--Selected Block (red): 2.87 acres = 125,000 sq. ft. (250 ft. x 500 ft.)
(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002
<http://www.planning.dc.gov/planning/cwp/view.a.1285.q.571735.asp>)

Two housing typologies are selected to occupy the selected block within the Draft Master Plan: Terraced Housing (i.e. row housing) and Apartment Housing. Both typologies are to be located inside and along the perimeter of the block such that a centralized, exterior communal space with backyards may exist (fig.55). The block may be thus approximately divided: 0.63 acre = 27,500 sq. ft. (220 ft. x 125 ft.) of buildable area against each of the east and west perimeters, 0.32 acre = 13,750 sq. ft. (55 ft. x 250 ft.) of buildable area against each of the north and south perimeters, and 0.6 acre = 24,200 sq. ft (110 ft. x 220 ft) dedicated to the centralized, exterior communal space and backyards.

Figure 55 – Part 1-Showing housing types on block west of park
Terraced Housing (purple)
Apartment Housing (blue)

(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 <http://www.planning.dc.gov/planning/cwp/view,a,1285,q,571735.asp>)

The building heights which the DC Office of Planning outlines are to increase with respect to the slope of the topography as it approaches the Anacostia River. Two-thirds of the buildings to be located on the middle to eastern side of the block herein selected are designated to be two to four stories / 24 ft. to 48 ft. The remaining one-third of the buildings on the western side of the block is to be four to seven stories / 48 ft. 84 ft.

Use of terraced housing, being that it is the prevalent typology of the residential neighborhood surrounding Reservation 13, will give rise to a more or less seamless integration of the housing and its occupants into the context; associations such as “special” or “different,” between the occupants and the housing, are less likely to occur as a result of the proposed contextual response. Typical unit sizes of terraced houses range from 1200 sq. ft. to 1600 sq. ft., with two to three stories = 24 ft. to 36 ft. per unit. If the terrace housing is located along the east or west perimeter of the block, approximately 20 units may fit within the specified buildable area of each side

(27,500 sq. ft. / 1400 sq. ft. unit size avg.). If the terrace housing is located along the north or south perimeter of the block, approximately 10 units may fit within the specified buildable area of each side (13,750 sq. ft. / 1400 sq. ft. unit size avg.). The maximum amount of units that would result from exclusive use of the terraced housing typology within the selected block is equal to approximately 60 units.

The terraced housing typology is determined to be located only along the north and south perimeters of the block, within the lower story zones. The total number of terraced housing on the block is therefore equal to approximately 20 units [(13,750 sq. ft. / 1400 sq. ft) x 2].

Use of the apartment housing typology, in conjunction with the terrace housing typology, provides the anticipated occupants with choice and allows for variation in building heights as well as other factors. Although apartment housing is not as prevalent as terraced housing in Washington, DC, it is common enough that it is not likely to invoke “special” or “different” associations. Typical unit sizes of apartments include a 500 sq. ft. studio, 800 sq. ft. one-bedroom, 1000 sq. ft. two-bedroom, and 1500 sq. ft. three-bedroom. If apartment housing is located along the east or west perimeter of the block, approximately 55 studio units (27,500 sq. ft. / 500 sq. ft.), 34 one-bedroom units (27,500 sq. ft. / 800 sq. ft), 28 two-bedroom units (27,500 sq. ft. / 1000 sq. ft.), and 18 three-bedroom units (27,500 sq. ft / 1500 sq. ft.) would each fit on the ground-floor within the specified buildable area of each side. If apartment housing is located along the north and south perimeter of the block, approximately 28 studio units (13,750 sq. ft / 500 sq. ft), 17 one-bedroom units (13,750 sq. ft. / 800 sq. ft.) 14 two-bedroom units (13,750 sq. ft. / 1000 sq. ft.), and 9 three-bedroom units (13,750 sq. ft. / 1500 sq. ft.) would each fit on the ground-floor within the specified buildable area of each side. The maximum number of units on the ground-floor, for each unit size, that would result from exclusive use of the apartment typology within the selected block is equal to 166 studios, 102 one-bedroom, 84 two-bedroom, 54 three-bedroom.

The higher story zone on the western side of the block is to be occupied by the apartment housing typology, given its flexibility for height increase. A reasonable numerical balance between the three typical unit sizes which correspond to the apartment housing typology may therefore be established to accommodate the anticipated occupants. Using an average height of 5 stories = 60 ft. for the higher story zone and the buildable area determined along the west perimeter of the block, approximately 137,500 sq. ft. (27,500 sq. ft. x 5) is available for the apartment typology. It is herein determined that the apartment complex is double loaded, that all unit sizes must exist on every floor in an equal amount, that there must be two common spaces on every floor at approximately 600 sq. ft. each, and that adequate circulation on every floor is provided, including one hallway at approximately 1100 sq. ft., two stairwells at approximately 500 sq. ft. each, and one elevator at approximately 64 sq. ft., these measurements yield a distribution of approximately four of each unit size per floor.

A community center (fig.56), which services the anticipated residents, is located along the western perimeter of the block within the specified buildable area and the lower story zone. The community center is to house and facilitate a variety of programs and activities sponsored by the housing cooperative. The community center is to be two stories with approximately 27,500 sq. ft. per story.

Figure 56 – Part 1-Community Center (yellow)
(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 <http://www.planning.dc.gov/planning/cwp/view,a,1285,q,571735.asp>)

Figure 57 – Part 1-Perspective 1 (outlined in red); 2-4 story buildings (peach), 4-7 story buildings (yellow), 7-10 story buildings (orange)
(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 <http://www.planning.dc.gov/planning/cwp/view,a,1285,q,571735.asp>)

Figure 58 – Part 1-Perspective 2; 2-4 story buildings (peach), 4-7 story buildings (yellow), 7-10 story buildings (orange)
(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 <http://www.planning.dc.gov/planning/cwp/view,a,1285,q,571735.asp>)

▪ Selected residential block	2.87 acres = 125,000 sq. ft
▪ Set backs within block	30 ft. from all curbs
▪ Buildable area of block sq. ft.	2.37 acres = 103,400
▪ Communal Space within block core ft	0.6 acre = 24,200 sq.
▪ Buildable area along each east and west ft. perimeter of block less communal space	0.63 acre = 27,500 sq.
▪ Buildable area along each north and south ft. perimeter of block less communal space	0.32 acre = 13,750 sq.
▪ Terraced housing typical unit size sq. ft., with	1200 sq. ft. to 1600 two to three stories = 24 ft. to 36 ft. per unit 20 units
▪ Proposed number of terraced housing units	Studio @ 500 sq. ft.
▪ Apartment housing typical unit sizes	One-Bedroom @ 800 sq. ft. Two-Bedroom @ 1000 sq. ft. Three-Bedroom @ 1500 sq. ft.
▪ Proposed number of apartment housing units	20 units
▪ Proposed number of apartment housing levels	5
▪ Circulation spaces of apartment housing per level ft.	2 stair wells x 500 sq. ft. Hallways @ 1100 sq. ft. 2 communal spaces x 600 sq. ft.
▪ Community Center	27,500 sq. ft.

Parti 2

The rectangular shaped block situated east of the central park is selected as the primary location for the proposed housing (fig.59). This block has approximately the same dimensions as that of the block to the west of the park: *total area*: 2.87 acres = 125,000 sq. ft (250 ft. x 500 ft.), *buildable area*: 2.37 acres = 103,400 sq. ft.

Given the slope of the topography of the site, as it declines steadily from 19th street toward the Anacostia River, and the distance of the selected block from the nearest metrostation, it may prove to be difficult and perhaps impossible for the anticipated residents to traverse west to east over the site; the location of the selected block in conjunction with its distance relative to other locations and the slope of the topography may become barriers to access. To eliminate or mitigate this problem, it is here proposed that the architecture of the selected block will facilitate the transition from east to west. This might be accomplished through elevated platforms, connected to the architecture of the selected block, that, at varying heights, extend to varying distances and levels of topography along the site. Stairs and elevators would be located beneath the platforms at various locations to connect the platforms with each other and the ground plane.

The building heights at this end of the site are specified by the DC Office of Planning to be 7-10 stories. Apartment housing seems to be an appropriate typology and is herein selected. Due to the “special” accommodations above proposed, an association between the “special” architecture and its “special” occupants may be made. This is not in accord with the agenda of this thesis, however, it may be argued that such accommodations will become a new standard, and, therefore, “special” only for a time.

Figure 59 – Part 2-Building location east of park (blue) with elevated platforms (red, yellow, green)

(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 <http://www.planning.dc.gov/planning/cwp/view.a,1285,q,571735.asp>)

Figure 60 – Part 2-Perspective 1 (outlined in red); 2-4 story buildings (peach), 4-7 story buildings (yellow), 7-10 story buildings (orange)
(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 <http://www.planning.dc.gov/planning/cwp/view.a.1285.q.571735.asp>)

Figure 61 – Part 2-Perspective 2; 2-4 story buildings (peach), 4-7 story buildings (yellow), 7-10 story buildings (orange)
(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 <http://www.planning.dc.gov/planning/cwp/view.a.1285.q.571735.asp>)

Using typical unit sizes of apartments (500 sq. ft. studio, 800 sq. ft. one-bedroom, 1000 sq. ft. two-bedroom, and 1500 sq. ft. three-bedroom), the block would hold two large apartment buildings, in a U-shaped configuration, consisting, collectively, of the following:

Corridor Circulation = 50,890 sq.ft.

Common Space = 63,00 sq.ft.

Apartment Units = 302, 400 sq.ft.

Parti 3

The central park is selected as the location for the proposed housing, and thereby eliminated as a park (fig.62). Its boundary on the western side is to be extended to half of its overall dimension in order to provide for adequate lot sizes. The DC Office of Planning specifies 4-7 story buildings in this area of the Draft Master Plan. Apartment housing is selected as the housing typology for the block. The housing is to be arranged such that the block is semi-enclosed with a large public square in the center. The housing would create this condition through its placement along the east and west perimeters in U-shapes. The public square could be a flexible space for recreation and/or commerce. It may, for example, have an open market in the morning and various events throughout the day. It will be moderately planted for a shaded and otherwise pleasant atmosphere.

Figure 62 – Parti 3-Building location on site of proposed park (blue) with public space (green)
(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 <http://www.planning.dc.gov/planning/cwp/view.a,1285,q,571735.asp>)

Figure 63– Parti 3-Perspective 1 (outlined in red); 2-4 story buildings (peach), 4-7 story buildings (yellow), 7-10 story buildings (orange)
(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 <http://www.planning.dc.gov/planning/cwp/view.a,1285,q,571735.asp>)

Figure 64 – Part 3-Perspective 2; 2-4 story buildings (peach), 4-7 story buildings (yellow), 7-10 story buildings (orange)

(Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill East Waterfront*, 2002 <http://www.planning.dc.gov/planning/cwp/view.a,1285,q,571735.asp>)

Using typical unit sizes of apartments (500 sq. ft. studio, 800 sq. ft. one-bedroom, 1000 sq. ft. two-bedroom, and 1500 sq. ft. three-bedroom), the block would hold two large apartment buildings, in a U-shaped configuration, consisting, collectively, of the following:

Corridor Circulation = 50,890 sq.ft.

Common Space = 63,00 sq.ft.

Apartment Units = 302, 400 sq.ft.

Chapter 7: Design Solutions

Parti 1 has been selected as the basis for design solutions. Through design development, this parti has been altered significantly in several ways.

Figure 65 – Alternate Master Plan (Underlay Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill EastWaterfront*, 2002
<http://www.planning.dc.gov/planning/cwp/view,a,1285,q,571735.asp>

Adopted and Revised Features of Draft Master Plan

This thesis operates largely in concert with the objectives and principles put forth by the DC Office of Planning and its affiliates. Following are key features of the draft master plan which are either adopted or revised (fig.65):

- The site has been, and is, a barrier for the residents of the surrounding communities, and the District in general, impeding access to the amenity which is the Anacostia Waterfront. In service of the city and its constituents, the proposed redevelopment plan for Reservation 13 intends to transform the role of the site to that which facilitates access to the waterfront. The redevelopment plan provides access to the waterfront primarily by extending the existing street grid from the Hill East community (fig.66). Herein, access provision to the Anacostia Waterfront is agreed to be of benefit to the city and its constituents, and the extension of streets from the Hill East community, as a means of accessing the waterfront, is adopted.

- The redevelopment plan for Reservation 13, as well as the redevelopment plan for the land currently occupied by RFK Stadium and the Armory, depicts a park system along the Anacostia Waterfront. In accordance with the Anacostia Waterfront Initiative, the park is to become a device which preserves and enhances natural and built environments. The proposed park system is herein adopted and utilized for the same general purpose, with the specific intent of creating an interdependent relationship among natural

environments, built environments, and the inhabitants of these. In addition, the sewage treatment facility is to remain intact for citywide use.

Figure 66 – Existing conditions and proposed street grid
(Image source: <http://local.live.com/>)

- Massachusetts Avenue is depicted as terminating in a monumental traffic circle, just short of the edge of the waterfront. This thesis eliminates the monumental traffic circle as a point of street termination and proposes the continuation of Massachusetts Avenue across the Anacostia River. The continuation of Massachusetts Avenue will link its current separation caused by the passage of the Anacostia River. The connection with the communities on the southeast side of the river via Massachusetts Avenue will establish the

proposed community on Reservation 13 as one of the centers of Washington.

The absence of a direct connection with that which is beyond the limits of the Anacostia River could potentially result in the perception of the community proposed on Reservation 13 as a marginalized entity in relation to the rest of the city. The status of the site and its occupants as marginalized is not in keeping with the inclusive agenda of this thesis.

- Modes of public transportation, for the future occupants of the site and those of the surrounding communities, to and from other areas in and around Washington, DC are multiple and convenient, as discussed earlier in greater detail. Herein, these features are embraced.
- Provisions are made throughout the site which attempt to eliminate barriers to access and navigation. These provisions are universal in scope, though particularly accommodating for persons with physiological impairments.
- The slope of the site allows for the insertion of increasingly taller buildings as the waterfront is approached. This affords the opportunity to explore the possibilities of barrier-free design in a high-density, multi-family residence. The slope of the site is herein embraced as a significant design component. This thesis disagrees, however, with the plan for building heights as it indicates the lowest densities near the metro station. It is more appropriate to have higher density near the metro station rather than the reverse in order for the residents to derive the most benefit from that amenity.
- The DC Office of Planning intends to preserve two existing buildings on the site: the care center and the substance abuse treatment center. The

preservation of these buildings is incorporated into the alternate draft master plan and the street grid of the plan is adjusted according to the orientation and geometry of said buildings.

- The street which is on axis with the armory is made continuous to join with Massachusetts Ave. This allows for ease of access into and out of the community and changes the dimensions of the central park and the block adjacent to the metro station. The new dimensions make the block adjacent to the metro a more appropriate size for the insertion of one large housing complex.

Universal Needs

Following are design solutions, primarily within the housing complex, that address the anticipated subcategories of the universal needs of the anticipated user groups according to Maslow's theory. It is intended that the fulfillment of universal needs should occur simultaneous with the fulfillment of as many *unique* needs as possible (figs.67-99):

Physiological

Shelter

- One multi-family housing complex, occupying the block adjacent to the central park and the Stadium-Armory metro station, which enables and facilitates the act of living.

- There are 200 units. Every unit of the complex is a “special needs” unit, which means each is made accessible, or has the potential to be made accessible, for individuals with disabilities
- The vertical surfaces of the complex are designed to make flexible the users’ connection with the outside world. Sliding windows, operable glass louvers, and sliding wood panels on the sunny sides of the building (i.e. south, east, west), allow the residents to easily access and control their connection to the exterior environment
- Landscaping of the courtyard and green roof has been designed to provide areas of outdoor shelter and enclosure

Breathing

- HVAC systems and air cleaning devices
- Operable glass louver windows in circulation corridors for ventilation.
- Adequate interior ventilation
- Use of building materials and interior finishes which do not produce off-gas
- Use of organic life in the courtyard, green roof, and interior spaces for the production of oxygen
- Large sliding windows within units for easy access to external light and air
- Courtyard and green roof provide outdoor spaces to enjoy and intake fresh air

Food

- Local grocery store with a variety of healthy foods
- Cafe within the upper ground level of the complex
- Local restaurants with a variety of food types

- Adequate space and accommodations for food preparation and storage
- Access to food delivery services for individuals that may not be able to retrieve groceries by their own strength
- A large dining hall on the upper ground floor which serves meals regularly—this would be of great benefit for residents that are immobile and incapable of retrieving groceries by their own strength
- Individuals of the cooperative may own a plot of the fabricated landscape on the green roof for the growing of edible plants.
- Universal kitchens in every unit that are fully accessible to individuals with disabilities

Water

- Access to clean, running water
- Use of the green roof and slope of courtyard to channel run-off water to the cistern below the pool in the courtyard for reuse throughout the building

Sleep

- Adequate designed spaces which may be used for sleep
- Noise reduction applications (e.g. thick walls, acoustic panels, etc.)
- Large volumes of traffic, and the noise that these bring, are stifled by speed bumps / raised pedestrian walkways on the streets of the neighborhood, and the traffic circle on Massachusetts Ave.

Excretion

- Handicap accessible facilities for excretion and removal of waste (i.e. accessible toilets)

- Handicap accessible facilities for self-cleaning, including “roll-in” showers and accessible sinks

Homeostasis

- The accommodations made for all other needs

Security

Body/Mind/Property

- Use of building materials, interior finishes, and landscaping which are not sources, and/or potential sources, of harm
- The two entrances of the complex, on the east and west sides are staffed with 24-hour security guards
- 24 hour camera monitoring, by security guards, of exterior public spaces
- Strategically placed kiosks, from which one may call for help
- Doors and windows with operable locks
- ID card access to and from the retail spaces within the complex
- Adequate night lighting in exterior public spaces and building entrances
- Pleasant and user friendly interior and exterior atmospheres as a result of design applications—access to light, air, and nature through operable windows, landscaped courtyard and green roof
- Exercise facility on the lower ground floor for the residents which includes a swimming pool and exercise room with free weights, treadmills, and various other exercise equipment. These spaces would be maintained by full-time staff members. These staff members would ensure the safety and appropriate use of available equipment, as well as offer training lessons and physical therapy.

- Lawful, stable, and benevolent community as a function of the housing cooperative
- Underground parking facility for the storage of 271 vehicles. The excess of spaces in comparison to the number of units makes extra spaces available to residents in need of these spaces. The parking spaces generally occur on flat areas and are wider than typical parking space dimensions (11'w x 20'l) in order to accommodate individuals with disabilities and the wider vehicles that such persons may drive. The parking garage is illuminated in part through light wells that occur under the translucent flooring of outdoor terraces and porches
- Way-finding devices both within the building and in its exterior spaces are in place as these needs might occur: Changes of materials to indicate threshold, tactile maps, water features in the courtyard to indicate the direction of the pool and orient one's self in the space

Employment

- Local opportunities for employment

Resources

- Local and reliable convenience stores, educational institutions and programs, recreation facilities and spaces including the park across the street on the east side of the complex as well as the park adjacent to the Anacostia River, communal establishments, health service providers, etc.
- Access to mass transit (and thus access to the amenities of the surrounding urban context) including the Armory-Stadium metro station in front of the west side of the building level with the upper ground floor

- A wellness center within the complex for residents that may need immediate and short term care
- A pharmacy within the complex on the upper ground floor that is accessible to both the residents and the general public
- A daycare center on the lower ground floor for children of the residents as well as those of the general public. This space would be able to accommodate children with all abilities and needs.

Love/Belonging

Friendship

- Benevolent community as a function of the housing cooperative
- Local counseling and psychological services for related issues
- Community building programs within the housing cooperative
- Opportunities for interaction between residents through a hierarchy of common spaces. These include the courtyard on the ground level and the green roof as common spaces for the unity of all residents; the common spaces which occur adjacent to the circulation cores, designed for the “neighborhoods” of units which surround them; the porches adjacent to the circulation corridors, intended to encourage interaction among neighbors as they traverse through the building; a very large dining hall for eating, socializing, and special events; exercise facilities
- Connection with the local community through sharing the use of the retail spaces and day care; residents may sell to the public the edible plants grown on the green roof; day care center is open to the public which creates the opportunity for children of the residents to interact with children from outside the complex; the

porches on the north and south side of the complex encourage interaction with passersby on the sidewalks and streets

Family

- Designed spaces which afford opportunities for communal and family oriented activities
- Units types include one and two bedrooms of varying sizes to accommodate the individual as well as families
- Local counseling and psychological services for related issues
- Community building programs within the housing cooperative

Ego/Esteem

- Housing cooperative as a community which affords the development of self-esteem, confidence, achievement, respect to and from, etc.
- Opportunity to cultivate landscape on the green roof may foster a sense of pride in one's work
- Local opportunities for esteem enhancement through available programs and establishments
- Local counseling and psychological services for related issues

Self Actualization

Spirituality/Morality

- A local “all faiths” chapel which may serve as moral support and guidance for various members of the community

- Option within the housing cooperative to create independent programs and organizations which teach and nurture specific principles and ways of living
- Local counseling and psychological services to address related issues

Intellectual Development

- Adoption of existing local school (i.e. St. Coletta) for those with various mental disabilities
- Teachers and caretakers of the day care center are to foster the intellectual development of the children attending
- Convenient access to schools in and around the DC metropolitan area
- Local book store and access via mass transit to libraries in the DC area
- Books and reading material provided in the common spaces of the complex

Creativity

- Opportunities through local organizations
- Opportunities through cultivation of green roof landscape and courtyard landscape
- Opportunities through social programs established by the housing cooperative

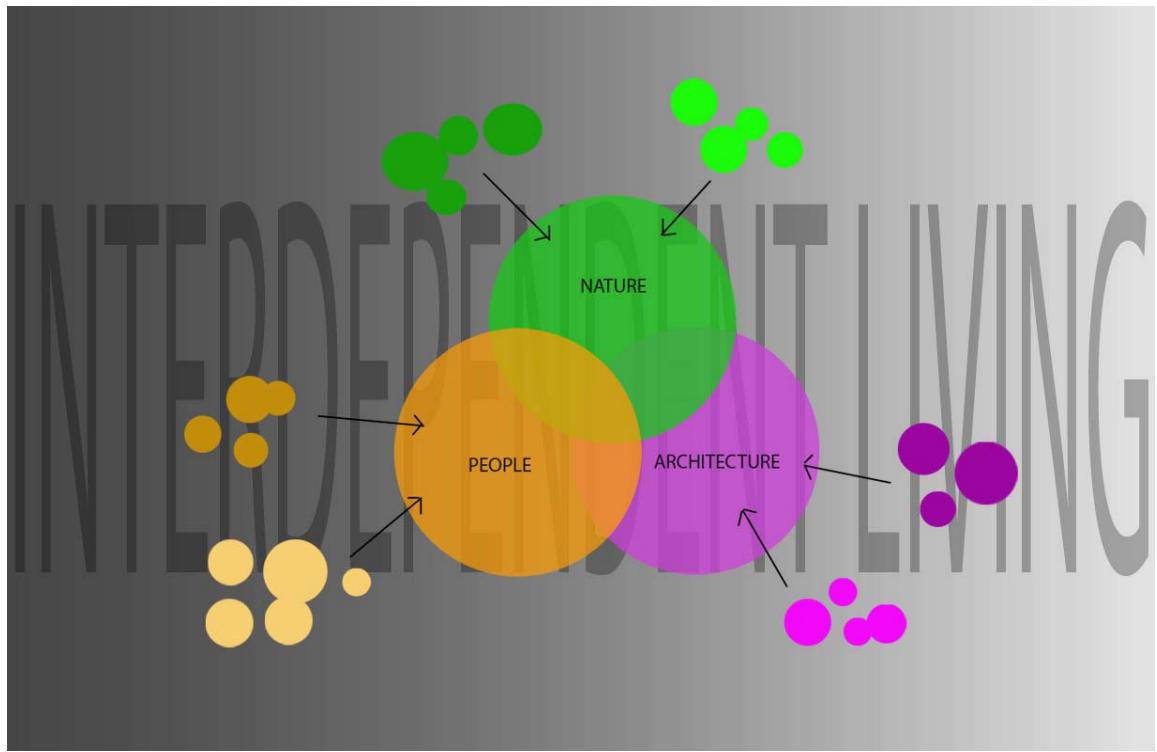


Figure 67 – Diagram of Objectives

Figure 68 – Proposed Building as Reflection / Fractal of Site (Underlay Image source: District of Columbia Office of Planning, *Reservation 13 Draft Master Plan – Hill EastWaterfront*, 2002
<http://www.planning.dc.gov/planning/cwp/view.a.1285.q.571735.asp>)

Figure 69

Green Roof / Courtyard Organization

Spaces are demarcated through the intersection of concentric ring sets

Centers of the rings are designated as common spaces to symbolize "interdependence"

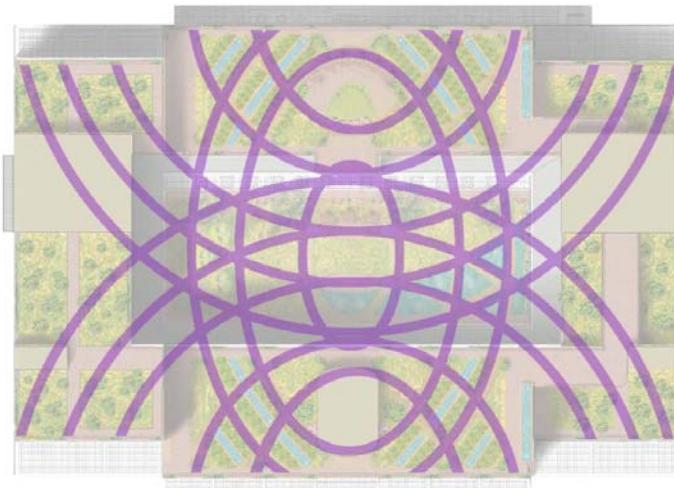
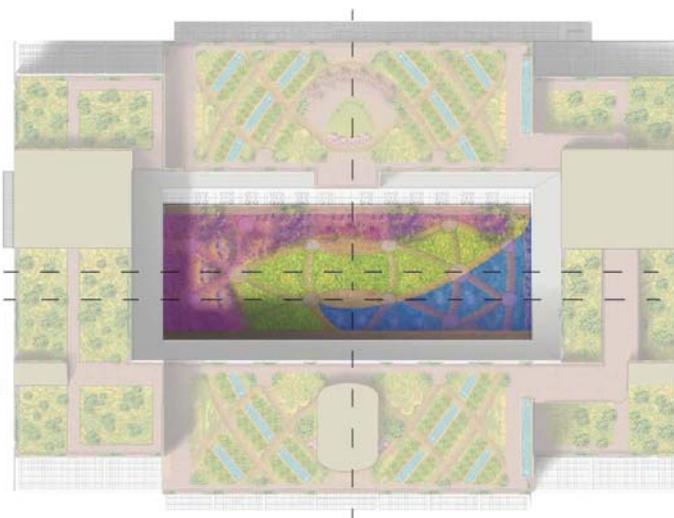


Figure 70

Courtyard Planting Organization

The symmetry of the concentric ring pattern naturally creates a sidedness to the plan. The longitudinal axis of the symmetry creates a conflict with the axis of the indoor swimming pool. Through its form, the planting organization strives to resolve these issues well as address the lighting conditions and sensual experience of the residents.



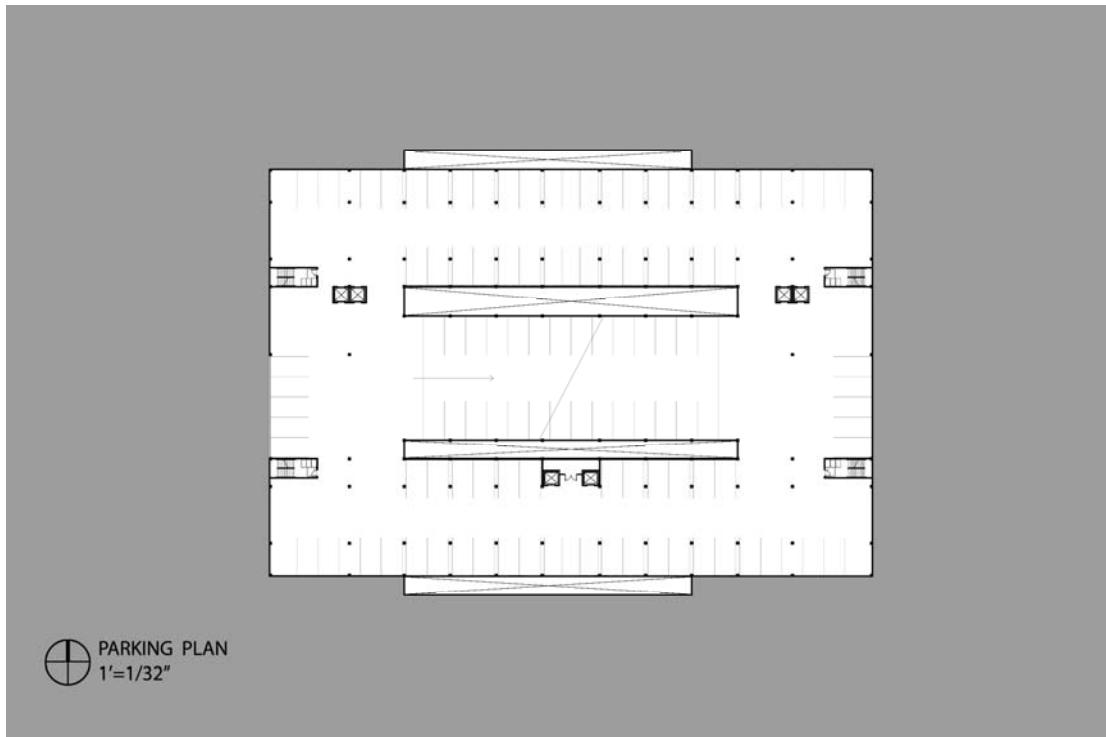


Figure 71 – Parking plan (not sized according to scale indicated)



Figure 72 – Lower Ground Floor Plan (not sized according to scale indicated)



Figure 73 – Upper Ground Floor Plan (not sized according to scale indicated)



Figure 74 – Typical Upper Floor Plan (not sized according to scale indicated)



Figure 75 – Penthouse Plan (not sized according to scale indicated)



Figure 76 – Roof Plan (not sized according to scale indicated)

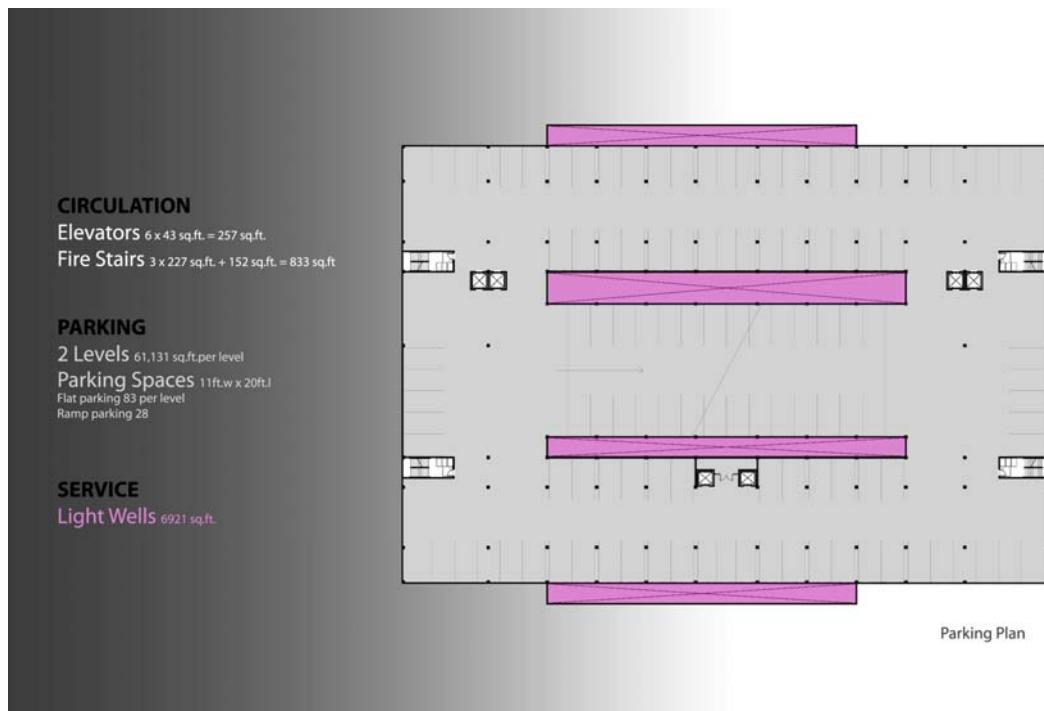


Figure 77 – Parking Plan Use Diagram

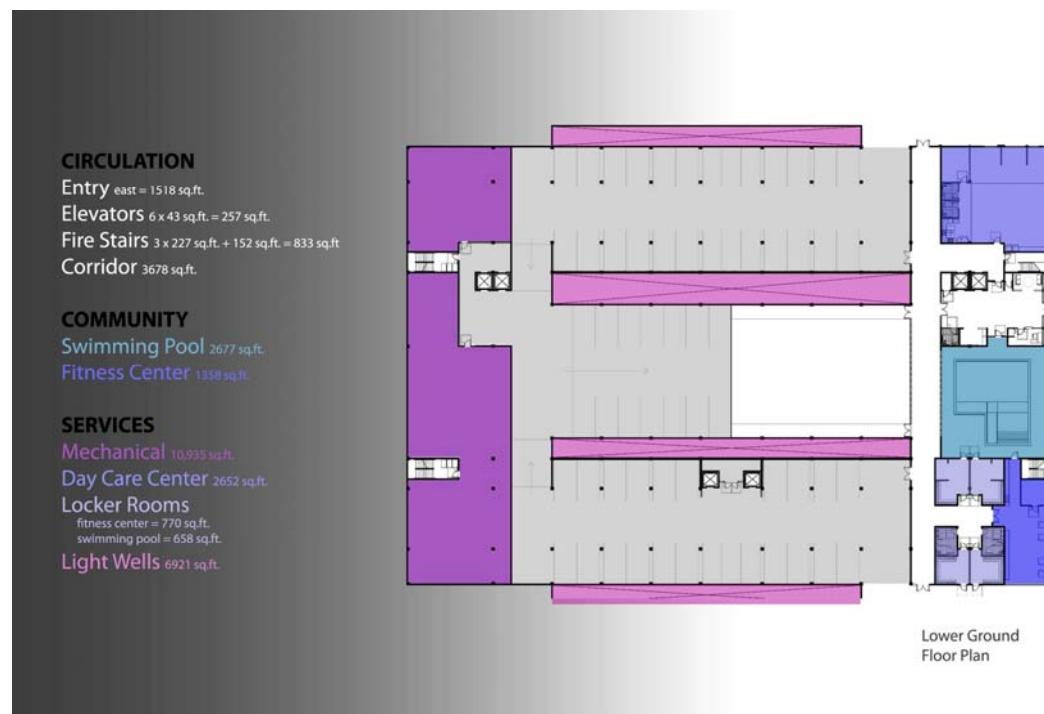


Figure 78 – Lower Ground Floor Plan Use Diagram



Figure 79 – Upper Ground Floor Plan Use Diagram



Figure 80 – Typical Upper Floor Plan “A” Use Diagram



Figure 81 – Typical Upper Floor Plan “B” Use Diagram



Figure 82 – “Penthouse E” Floor Plan Diagram

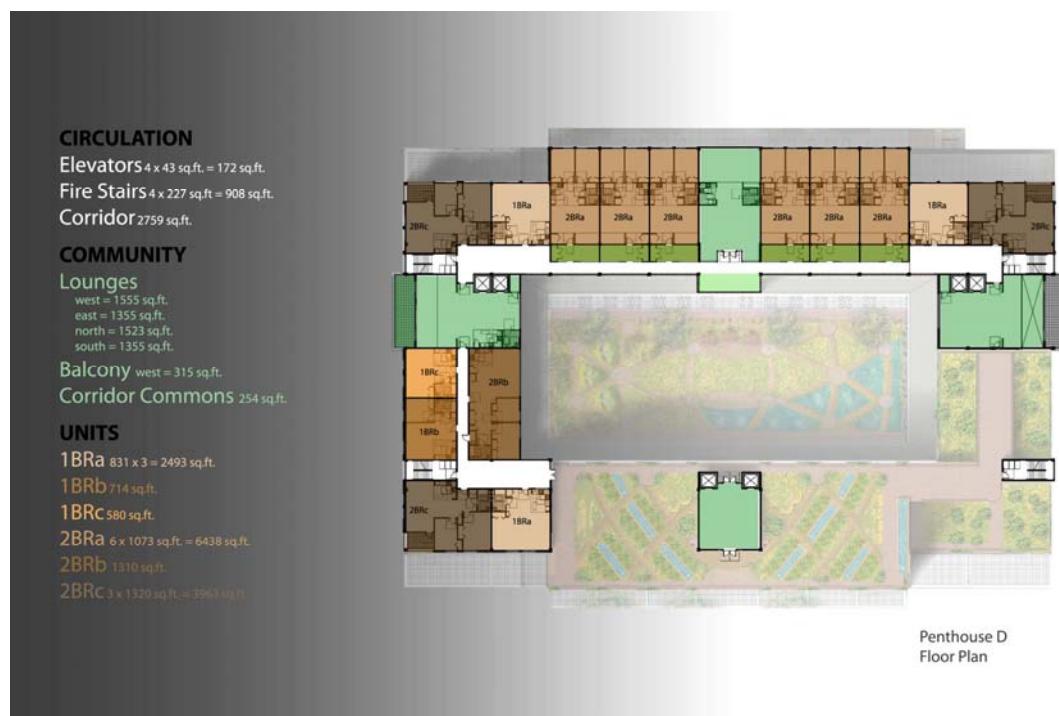


Figure 83 – “Penthouse D” Floor Plan Use Diagram



Figure 84 – “Penthouse C” Floor Plan Use Diagram

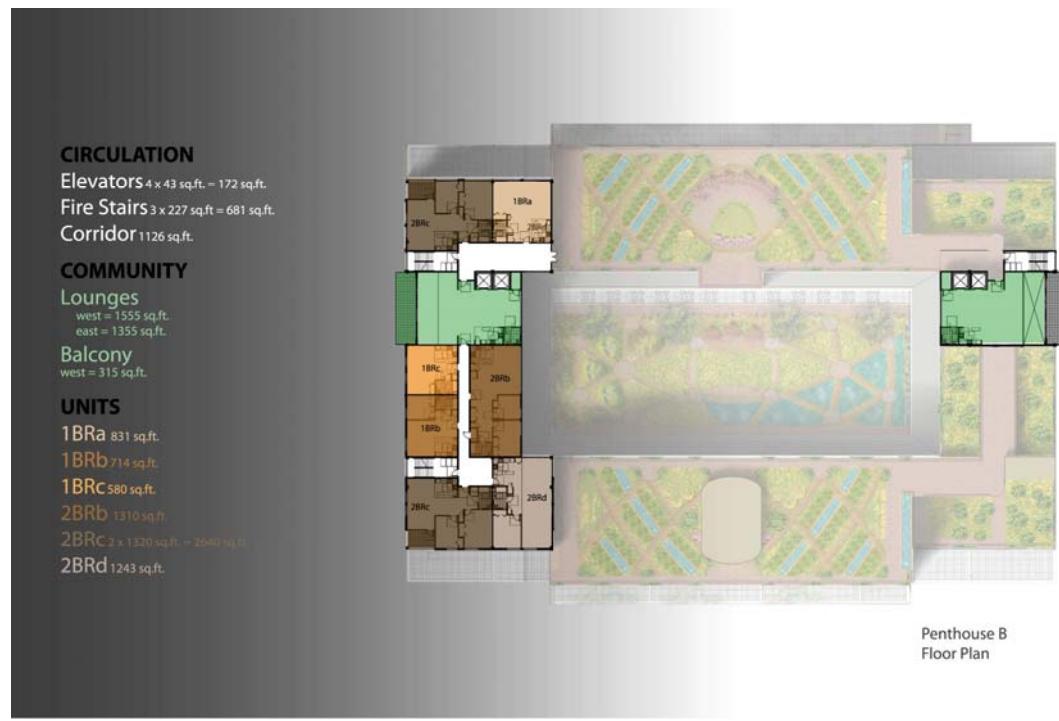


Figure 85 – “Penthouse B” Floor Plan Use Diagram



Figure 86 – “Penthouse A” Floor Plan Use Diagram

Figure 87 – Longitudinal Section / Courtyard North Elevation (not sized according to scale indicated)

Figure 88 – Transverse Section / Courtyard West Elevation (not sized according to scale indicated)

Figure 89 – North Elevation (not sized according to scale indicated)

Figure 90 – South Elevation (not sized according to scale indicated)

Figure 91 – East Elevation (not sized according to scale indicated)



Figure 92 – West Elevation (not sized according to scale indicated)



Figure 93 – Park-side Perspective of Building in Context



Figure 94 – Metro-side Perspective of Building in Context

Figure 95 – Perspective of Green Roof

Figure 96 – Perspective of Courtyard

Figure 97 – Perspective of Corridor and Unit “Porches”

Figure 98 – Perspective of Exterior Porches, south side of Building Complex

Figure 99 – Unit Plans

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