A LIGHTER SHADE OF GREEN:
THE CONCEPT OF BOUNDED SPACE AS AN INFLUENCE ON SUSTAINABILITY IN ARCHITECTURE

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Architecture

by

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Abstract

Sustainable approaches within the discipline of architecture are largely oriented toward a building's energy considerations and physical attributes, and often do not delve into the human experiential essence of dwelling. Environmentally conscious “green” building strategies focus on the construction and the operational aspects of the physical structure, often neglecting the significance of the ethereal aspects of the human being’s relationship with the earth. It is the human being’s perspective of themselves in this world, and their relationship to the essential life elements of the earth, that hold the key to a “lighter shade” of sustainable application in architecture.

In looking to Native American philosophies of dwelling as a source of influence, this research navigated toward the intriguing writings of Viola F. Cordova (a philosopher of Jicarilla-Apache descent), and specifically to her concept of Bounded Space. The qualities and attributes of Bounded Space dwelling include aspects of community, awareness, individual perspective, diversity, and ultimately an intimate relationship between the human being and the land upon which he/she dwells. Through the research and examination of Cordova’s theories, interspersed with extrapolations from varied philosophical perspectives, a set of principles for Bounded Space dwelling was developed for application in architectural design constructs. Three case studies, representational of current projects of laudable achievement in sustainable building design, were selected and then evaluated based on Bounded Space principles.

The relationship of the individual to the group and the group’s relationship to the place of dwelling, defines the core principle of Bounded Space dwelling. By exploring the determining qualities of Bounded Space dwelling, this research attempts to provide a complimentary and enriching approach to sustainable application in architectural design criteria; an approach which looks beyond architecture as art or object - or high performance eco-machines - into a more ‘participatory’ aspect of architecture and human dwelling.
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1.1 Dwelling on the Earth

Within architectural endeavors relating to sustainability lies the potential to transcend perceptions of architecture as an object of art or high-performance engineered machinery, and to instead perceive architecture as a participant in the fundamental concept of what it means to be a human being dwelling on the earth. German philosopher Martin Heidegger (1997) explains at the outset of his essay *Building Dwelling Thinking* that his philosophical endeavor does not intend to perceive building as art or as the technology of the construction itself, but rather his efforts pertain to the exploration of that place where everything “that is – belongs”. For Heidegger, the essence of dwelling lies in the basic manner in which human beings exist on the earth.

The focus, however, often remains on the object and the technology. What I believe Heidegger was expressing that has great implications for architecture is that the act of building - or rebuilding - is dwelling. It is not the object (noun) of a dwelling, but the participatory action of dwelling that presents an engaged component. It is perhaps the verb of architecture.
There is an aspect of this engaged dwelling that pertains to the human being’s relationship to a specific land region, and to the relationships within groups, as group members engage together in a particular place of dwelling. Viola F. Cordova, a philosopher of Jicarilla Apache descent, explains and explores this aspect of dwelling through the term Bounded Space. Her perception and theories are both an inspiration and a key resource for this paper’s hypothesis and conjectures. Cordova’s concept of Bounded Space emphasizes both the significance of the more tangible aspects of the physical landscape and the four compass directions, as well as the more intangible state of ‘belonging’ to a group and a particular place on the planet. Bounded Space represents a place on the earth where a group of human beings dwell, and the group’s recognition of the physical and conceptual boundaries of their place on the earth.

Bounded Space is an area of land defined by boundaries recognized by a group of people that encompasses the space in which they existentially dwell. An unbounded space is void of recognized boundaries, where existential resources hold little or no relationship to any particular group of people. Bounded Space exists when: (1) a social group identifies (2) with a set of geographic features or other boundaries that (3) provide the understanding of a defined place on the earth to which (4) their group alone belongs and (5) which sustains that group.
Cordova’s writings expound on the subtle nuances in human perspective which can have profound and powerful consequences in regard to the human relationship with the earth and with each other. The conceptual and experiential aspects of the Bounded Space perspective carry far-reaching implications, which touch the very core of our ‘dwelling’. Therefore, this research will explore current perspectives relative to sustainable architecture and will address two important sequential questions: How can architecture begin to capture the quality of a more ‘transcendent’ sustainability? How can Cordova’s concept of Bounded Space be incorporated into a qualitative application for architecture?

SHADES OF GREEN

The term “Green” refers to the general global green movement of sustainability, environmental protection, and natural resource management. A ‘lighter’ shade signifies a more transcendent or ethereal quality of application, implicating the emotional and spiritual essence of dwelling and the innate relationship that ensues between human beings and what is often referred to as nature.

How we as human beings perceive our relationship with the natural environment is a critical and revealing aspect of what it means to dwell. The word nature often evokes images of woodland and mountains, desserts and beaches, and all the undomesticated creatures of the earth. It is generally encapsulated by an envisioned veil of wildness which places human beings ‘here’ and nature ‘out there’. But whether we dwell within an isolated area of ‘wilderness’, in a suburban...
neighborhood, or within an inner-city fabric, we all rely on the essential elements of the earth to sustain us. It is these elements – relative to human existence – that pertain explicitly to the domain of dwelling and the exploration of the concept of Bounded Space.

DISCONNECTION
We all rely on clean water, clear air, the sun’s energy, and the nourishment of vegetation, but there is often an insulated relationship between the source and the significance of these essential life sustaining elements. In “Ominous Trends in Nature Recreation”, Peter Kareiva presents findings pertaining to a declining “wilderness experience” and how this depicts a correlation between the disconnection of humans and nature, and their disregard for the natural environment. Kareiva (2008, p. 2757) further conjectures that city dwellers are still dependent on the “services that eco-systems quietly provide”, even though there is often a waning or absent connection. Life lived in urban fabrication where essential human needs are provided indirectly by others, can result in a view of nature as something quite separate from ourselves.

As humans no longer see themselves as an integral part of nature, they are more apt to devalue nature (Kareiva, 2008). Heidegger (1997) also believed that man’s relationship to and with nature had shifted, and argued that our primordial
perception of nature had waned and been “forgotten” and that a perspective of
nature as “equipment” had emerged to replace our original instinct.

The notion of this disconnection from nature can be further supported through
varied venues of research and documentation, from reports on the decreasing
amount of time children spend outside (Clements, 2004), to studies on decreasing
attendance to regional and national parks. Even within the population of parks and
wilderness users, there is a division in regard to their perspectives and the level of
respect they afford the natural environment.

In her 2012 research study, Natalie Muileberg discovered that the managing
authorities of the Imperial Sand Dune Recreation area in California were finding it
difficult to both satisfy the off-road (4-wheeler) vehicle users and address
environmental concerns. (Muilenberg, 2012) Muilenberg’s work reveals that even
within a ‘wilderness’ context, a view of separation and superiority can still prevail,
and that a better informed - or more connected - park user might be more aware of
their individual impact on the natural environment. She presumes that “the better
informed (the) users are about environmental impacts due to (off-road) recreation,
the less likely he or she may be to affect the natural systems negatively.”
(Muilenberg, 2012, p. 32).

This disassociation between humans and their relationship with the earth is further
evidenced by the view of natural resources as a self-imposed privileged prerogative.
Anthropologist David Price tells the story of an accelerating journey of the transference of energy (predominately food energy) over millions of years, to the unique present day scenario of human beings utilizing energy outside of their being. Thus phenomenon has exploded into the vast amounts of fossil fuels being consumed to propel present day technologically. (Price, 1995)

The concern of the exploitation and potential depletion of natural resources has been a question of sociological and philosophical thinking for hundreds of years. In 1968, Garrett Hardin addressed the social aspect of such concerns in The Tragedy of the Commons, where the commons was presented as a pasture shared by herdsmen grazing their cattle. According to Hardin, as the individual sought personal gain (grazing more cattle), he did so at the expense of the whole community which was served by the pasture and at the expense of the individual (who in the face of immediate gain, ignored his own integral part in the whole). Hardin concluded that in regard to the earth’s population and self-privileged perspective, there was “no technical solution”. An article in a 1964 Scientific America iterates this same sentiment, stating that “if the great powers continue to look for solutions in the area of science and technology only, the result will only worsen the situation” (Weisner and York, 1964).

Yet the situation has only worsened. From accelerated global warming to increasing animal extinction (Foster, 2011) the effects of humanity’s disregard continues to reveal its toll on the earth. While seeds of sustainability are simultaneously sown...
and environmental movements beg for attention, the resulting devastation persists. Now that we as a species have become more aware of our widespread effect on the eco-systems of the earth, our response according to Cordova, resonates with tones of ignorance or arrogance. She poignantly concludes that in this state of disassociation, we either ignore what is apparent, or we proclaim what is apparent and declare that others – scientists, engineers, architects – must fix the problem for us. (Cordova, 2007 p.208). And how will architecture respond?
1.2 A Sustainable Overview

*Combine concern for the well-being of the planet with continued growth and human development. This definition was stated solely from the human point of view. In order to embrace the idea of a global ecology with intrinsic value, the meaning must be expanded to allow all parts of nature to meet their own needs now and in the future.*

William McDonough (1992, pg 4)

**DEFINING SUSTAINABILITY**

To be sustainable means to nourish that which one wishes to perpetuate. In the purest sense, human beings wish to sustain the existence of the human being – the individual self and the human species. In order to sustain human life, the essential elements that contribute to this existence must be respected, supported, and sustained. This requires striking and maintaining a balance between taking and nourishing (Brown, 1984). This balance is reliant on an inherent understanding of the reciprocity of all life. History reflects how humans have repeatedly displayed an undisputed capacity to accomplish this balance and not only adapt, but thrive in a multitude of climates and ecosystems (Cordova, 2007).
INDIGENOUS UNDERSTANDINGS

Among indigenous populations, there is an awareness of and respect for the immediate natural environment, as their contact with it is direct, intimate, and often imminent. Indigenous cultures throughout the world are presented in John Reader’s *Man on Earth: A Celebration of Mankind, Portraits of Human Culture in a Multitude of Environments* (1988), with numerous examples of isolated populations being sustained by the natural resources of their immediate surroundings. Reader points to “adaptation and regulation” as key aspects of dwelling, as they signify both the diversity of human capacity and the “social and cultural practices” that emerge to regulate the dispersal of essential natural resources. His research on these various cultures shows that the groups maintain their population numbers as a result of their respective regions’ ability to support them. Reader further claims that the “very success of an ecological adaptation inevitably creates a need to develop some means of keeping population growth under control.” (Reader 1988, p.7) Such control methods are often unconscious, as they are integral to the process of adaptation and the maintenance of balance within the place of dwelling.

One example of indigenous North American practices relative to sustainability is described in a joint report by the American Indian Studies Center and Applied Earthworks, Inc.. This study reports on a past population of approximately 100,000 Native Americans who maintained an existence for a span of 10,000 years in the Sierra Nevada. Although they employed various tools and environmentally
intrusive methods – including pruning, burning, and selective harvesting – the report suggests that the disruption to the ecosystems was insignificant, if not beneficial. (Anderson 1996) This represents a philosophy of abundance, where species do not thrive at the expense of another, but rather the practices of sustainability enhance all life and all life cycles. This particular example of pre-colonial America’s human induced environmental vitality, poses as a sort of predecessor to William McDonough’s “Upcycle” theories where he proposes a vision of thriving and abundance to replace the limiting constraints of simply trying to do no more harm. (McDonough 2013)

Life cannot sustain itself without taking other life, and it is the awareness of the balance of life and death, giving and receiving, and the connectedness of all things, that “casts a sense of reverence and appreciation over any act of taking, and it reminds us to use the gift in a responsible way” (Brown, 1984, p.20). When this reverence is disregarded and human behavior trespasses beyond the limits of the natural environment, civilizations will inevitably founder (Reader 1988).

TECHNOLOGY, GREEN, AND LEED

Architecture has responded to environmental concerns through applications labeled with the term “sustainability”. The architect’s creative process, however, is drawn through filters and diverting considerations, such as image, economy, monoculturalism, consumerism, power, technology, and various regulations. These influences of various motives and focus, act as insular mediators between the
architect’s design process and the existential nature of dwelling. These diversions represent a potential for an increased disconnection between existential dwelling and the end user or occupant.

The umbrella term of sustainability in the context of architecture is recognized by certain systems of design (such as water collection systems, solar energy systems, and wind power systems) as discussed in Jason McLennan’s *The Philosophy of Sustainable Design*, (2004), and the prevailing application is directed first and foremost on energy, in regard to both generation and consumption. In an attempt to bring the grassroots endeavors of sustainable systems into our mainstream design constructs, a governing rating system emerged called Leadership in Energy and Environmental Design (LEED) certification. LEED is a points-driven system that provides a measurable means of promoting environmentally sensitive solutions in the design, construction, operation, and maintenance of buildings. This system is situated to serve a wide range of project types and sizes, and has served also to promote the awareness of environmental issues to people involved in the building industry, as well as to the general public.

LEED is based on a technological and systems approach (in fact the very approach which Hardin warned against over 40 years ago). Constricting aspects of this system are explored by Kaustav Gupta in his thesis, “Towards Sustainable Design; The excluded issues” (2009). He criticizes LEED for being heavily dependent on mechanical and operational solutions, and sees the point system as creating an easy
“shorter route” to obtaining the coveted sustainable title. In a 2009 *Energy & Buildings* publication, two separate articles provided evidence that LEED certified buildings do not necessarily use less energy than their non-certified counterparts do (Scofield, 2009 and Newsham, 2009). And, according to a 2012 article in *The Architect’s Newspaper*, the subsequent certifications upon which LEED and other regulations rely are questionable. Lumber certification is one such example, as the governing LEED lumber certification organization, the Forest Stewardship Council (FSC) is gleaned as being ‘married’ to the forest industry, which is consequently accused of advancing its own interests (Ulam, 2012). Structured solutions such as LEED, although founded on good intention, are burdened by layers of imposing baggage that can greatly inhibit their effectiveness.

THE SUSTAINABLE OUTLOOK

According to architect Sandy Mendler, a nationally recognized expert on sustainability in architecture, we are evolving toward a greater sense of connectedness in architecture through “greater emphasis on connecting to place and history, engaging the natural world, and revealing natural systems” (Mendler 2012, p. 66). She contends that rating systems for architecture, such as LEED, are becoming more stringent in qualitative terms, implementing more comprehensive criteria, and incorporating experiential qualities. A picture-perfect paradigm is painted.
Mendler expresses the beautiful sentiment that "a shift in perspective from one based on the domination of nature, to one that views man and nature as fundamentally interconnected and interdependent" is taking place. (Mendler 2012, p.66) Yet sustainability in architecture still operates within the constraints of systems and structure. Mendler’s premise that “high-performance green buildings” will connect people to the cycles and nuances of nature, does not fully encompass the ways in which it is necessary for humans to develop and sustain an awareness of the existential quality of dwelling and integrate into the fragile, diverse, and balanced ecosystems of the world.

In their recent publication, The Upcycle: Beyond sustainability – Designing for abundance, McDonough and his colleague Michael Braungart suggest that an essential shift is required in order to transcend our stifled efforts of sustainability. They suggest that we migrate away from the negatively charged perspective of trying to do less “bad” – regulating and inducing less negative environmental impact – and instead move toward a perspective of doing “more good” in a manner that will actually contribute positively to the earth’s eco-systems and enhance all life. But how is this shift in consciousness achieved? In the continued context of sustainability, there is a consistent call for the need for applications in architecture to continue to meet current life standards, in comfort and quality (McLennan, 2004 p.6). This appears to be a consistent hurdle over which sustainable architectural projects must vault: developing and employing sustainable design and technology which does not alter or challenge our current perception of habitation.
But why? Why is architecture yielding to a singularly homogenous perception of dwelling, as the only definition? In seeing our existence on this planet from a diverse and Bounded Space perspective, perhaps we can find a more effective sustainable approach in terms of architecture.
1.3 The Concept of Bounded Space

*When those in search of a new relationship with the land turn to Native Americans, there is a failure to take into account the sense of bounded space.*

V.F. Cordova (2007, p. 198)

THE PLACE OF BOUNDED SPACE

There is an aspect of the traditional Native American view of dwelling that peers deeper into the specific properties and diversity of the land and the people. Cordova speaks of this in terms of Bounded Space. In her view, Native Americans both conceptually and generally, do not see the land as something to be owned, but rather as something to “belong to”. Cordova further interjects that there is the “recognition that all people have a right to a home-ground” (Cordova, 2007 p.187). It is the belonging to a certain place, and the way in which human beings dwell within the diverse environmental eco-systems of the earth, that is of great significance.

Each environment has its own weather, mineral make-up, plants, animals, and even microbes. Humans dwell in diverse ways, depending largely on the all-encompassing qualities of their Bounded Space. This adaptation to dwelling
differently within different environments is crucial to the quality of any given ecosystem. This aspect of Bounded Space is explained by Cordova as a land area or region to which a certain group of people belongs and that can inversely support the group. To “go beyond the designated boundaries was to encroach on the homeland of others; to trespass on the rightful spaces of others” (Cordova 2007, p. 186). The respect for conceptual boundaries (Fig. 1) and the rightful dwelling place of ‘others’, instills a sense of intimacy between the human being and the land to which one ‘belongs’ - the place of dwelling.

Figure 1 - Boundaries of Bounded Space

Boundaries can evolve from geological features such as rivers and mountains, as well as more transparent aspects such as changes in the climate and eco-systems, and the awareness of other people’s area of Bounded Space. The application of
Bounded Space holds the potential to revive a sense of community as well as promote the qualities of belonging and sustainability in regard to the essence of dwelling.

VIOLA F. CORDOVA

Through her own unique experience as a person of both North American indigenous Jicarilla-Apache heritage and Euro-American traditional academic training, Viola Cordova PhD presents an integrated interpretation of Native American philosophies. In a collection of her writings -published posthumously by academic colleagues into a book entitled *How It Is* (Fig. 2) – the subtle differences in perceptions are presented for their revealing profundness in regard to existential dwelling.
Cordova does not present herself as an authority or spokesperson for all Native American people, but rather portrays herself as a Native American who has studied the Euro-American ‘story’. Chickasaw poet Linda Hogan observes that we need to acknowledge human differences, and Cordova suggests that the “stories of all people need to be laid out on the table before one understands how to be fully human” (Cordova, 2007, p. viii).
1.4 Transcendent Sustainability in Architecture

QUALITIES AND APPLICATION

The quality of Bounded Space dwelling is rooted in the awareness of our integral and reciprocal relationship with nature. In Cordova’s words Bounded Space is rooted in the “intimacy developed between a people and their (home) land.” (Cordova 2007, p. 190) Before we can begin a correlation between the concept of Bounded Space and application in architecture, we must consider the inter-relationship of the people within any given defined area. All these qualities and applications pivot upon the circle of connectedness.

METHODOLOGY

Philosophical concepts of Bounded Space will be explored primarily through the writings of Viola F. Cordova, with complementary as well as controversial insight from other sources such as social and architectural theorists. The key concepts integral to Bounded Space will be extrapolated and transferred into qualitative aspects which can then be applied to the architectural design process. How architecture might begin to fulfill Bounded Space principles will be explored through the presentation and review of case studies.
The intention of the case studies is to determine how and to what degree the concept of Bounded Space is being incorporated into current design considerations in architecture. Three recently executed projects, nationally acknowledged for their accomplishments in sustainable design, will be presented and then evaluated in terms of the resulting Bounded Space criteria.

THE NATURE OF THE ARCHITECT

When the architectural creative process is diluted by various diverting filters, the outcome is often a product that is incompatible with our reciprocal relationship with the earth, and proves to further alienate us from the understandings of Bounded Space. It is instead an ‘arch-tech-tecture’ that reflects our technologically immersed perspective.

When an architect is open to the concepts of instinctually belonging to the earth and the concept of Bounded Space, then these understandings will be manifest in the implemented structures of the architect. Perhaps then architecture can begin to engage more fully in the integral and diverse qualities of dwelling.
PART TWO: BOUNDED SPACE

2.1 Belonging

CORDOVA'S KEY QUESTIONS

To belong is to be bound together; to function in terms of allegiance and/or to depend on one another. In terms of our existence on the earth, these are the key questions Cordova believed we should be asking ourselves.

1. What is the world?

2. What is a human being?

3. What is the role of a human being in the world?

(Cordova, 2007 p. xv)

The awareness of the existential and reciprocal relationship between human beings and the earth is a key ingredient in the Bounded Space concept of dwelling. Inclusive in this relationship is a deliberate acknowledgement of the four essential elements.
ESSENTIAL ELEMENTS

Held sacred by Native American tradition and recognized in Greek philosophy, Fire, Water, Air, and Earth represent the encompassing makeup of all things, and the interwoven integration between people and the earth. Plato attributed the respective geometry of the cube, icosahedron, octahedron, and tetrahedron, to these four ‘sacred’ elements. In Plato’s *Timaeus*, he laces together a story where the elements flow and dance from one to another in intertwining transformation.

*We must get a view of the nature itself of fire and water, and air and earth.*

*First, the very thing we’ve now named water we see condensing, thereby becoming, so it seems to us, stones and earth; and this same thing again, by melting and dissolving, we see becoming wind and air; and air, having been heated, becoming fire; and conversely we see fire, having been contracted and quenched, going back once more to the look of air; and air, by coming together and thickening up, going back to become cloud and fog; and when these are compressed still more, we see water flow from them, and from water back to earth and stones – a circle – thus passing on to one another …*

Plato (Plato 2001, passages 48B, 49C)
Heidegger also speaks of “the four” belonging together as one, and that in terms of dwelling, to "be 'on the earth' already means (to be) 'under the sky’” (Heidegger, 1997, p.102). To be a human being dwelling on the earth is to be a part of this intertwining dance, grounded to the earth and open to the sky. Every group of people dwelling under the sky in any particular place, as Cordova observed, has its own set of circumstances that defines their place on the planet. And according to Reader, different ways of life develop accordingly and appropriately to these varying environments and circumstances. This presents one possible response to Cordova’s first question of order “What is the world?” - It is a set of varying environments and circumstances.

From these human circumstances, Cordova begins to present the concept of Bounded Space as an awareness of belonging to a specific place. There ensues an intimate knowing of the land upon which one dwells, where the land becomes an extension of the people, as the resources within that place sustain them. There follows further - with the understanding of belonging to a specific place - the awareness that ‘others’ rightfully belong to other places. The world’s resources are not viewed as something “there for the taking”, because those resources are in a space occupied by others - a place others belong to. Integral then to the Bounded Space concept is a direct understanding of the “carrying capacity” of the land upon which one dwells and belongs, and a generally resultant respect of the homelands of others.
THE FOUR DIRECTIONS

There is a reliance on the four cardinal directions – North, South, East, and West – in granting the human being a sense of ‘place’ in the world. In Cordova’s account of Bounded Space, there is also a ‘sacredness’ attached to the four directions, as the awareness of these orientations gives definition to a person’s place and home ground. The characteristics of the land itself aids in defining these boundaries, as the geographical properties of the four directions signify the place to which a person or group belongs. (Fig. 3)

![Figure 3 - Taking account of your place of Bounded Space](image)

Bounded Space is explained by Cordova as a land area or region to which a certain group of people belonged and that could support that group. Cordova’s father would make account of his homeland by saying: “to the North was the Arkansas River; to the East were the plains of eastern Colorado where the people could go only so far as it took to find the buffalo; to the South as far as the Taos Mountains; to the West, only so far as the homeland of the Utes began”. (Cordova 2007, p. 187)
Cordova argues that among Native Americans, there was a conceptual understanding that all people had a right to a certain homeland, and that all humans had a right to belong to the earth – somewhere. (Fig. 4) Therefore to “go beyond the designated boundaries was to encroach on the homeland of others; to trespass on the rightful spaces of others” (Cordova, 2007 p.186).

There were no doubt some who defied these boundaries and transgressed both the laws and lines of Bounded Space, but there was clearly a recognized understanding that these boundaries did exist. At the time the Europeans first arrived on this continent, there were over 100 different tribes speaking over 100 different languages. (Fig. 5) This serves as a strong indication of the Bounded Space mentality (Cordova, 2007) as well as the existence and acceptance of the vast experiential diversity in regard to dwelling. (Rubertone, 2000).
THE ERADICATION OF BOUNDARIES

Through the historical expansion of Euro-American territories and technological implications there has been a “tremendous disruption of natural boundaries” (Cordova 2007, p. 190). Lost with these natural geographical boundaries and the dividing lines between the diversity of eco-systems and cultures, is the consideration of the carrying capacity of the land - the acknowledgement of a specific region’s ability to support and maintain a diverse and inter-connected set of species, including human beings. As individualism and perspectives of hegemony spread across this continent, the diversity of human dwelling began to disappear.
With the elimination of Bounded Space is a waning of intimacy; the intimacy within a community and their intimate belonging to the land.

When disassociation becomes the accepted state of human habitation, there is the loss of a sense of belonging, whether to a place or a community. With this dissolution there is at best a vague correlation between the people and the carrying capacity of the land. Applied concepts of sustainability then become ubiquitous and inconsequential.

Bounded Space areas serve as reciprocal living systems which include human beings as a part of the balance, and where each group in their respective bounded area plays a crucial part in the balancing of the whole. The connectivity to place is then inseparable from the existential essence of dwelling.
2.2 The American (usa) Perspective

_When Columbus got off the boat, he asked us who we were. We said we’re the Human Beings, we’re the People. Conceptually the Europeans didn’t understand that, it was beyond their conceptual reality. They didn’t see us. They couldn’t see who we were. They taught us to call ourselves Indians, now they’re teaching us to call ourselves Native Americans. It’s not who we are. We’re the People._

John Trudell, Santee Sioux poet and activist (Trudell, 2005)

Cordova reminds us in her writings, that before we can begin to understand other peoples’ philosophies, we must first recognize that we each have our own point of perspective and reference. This, she deems, must be recognized before we can benefit from the consideration of another construct. If we do not acknowledge our own perspective and point of reference, then our understanding will remain in a closed circle. It is based upon this observation, that this paper considers aspects of the underlying American perspective as an integral component of the exploration of Bounded Space
The concept of Bounded Space is a universally applicable principle, however as its influence and application in architecture is considered, this research chooses to focus on the North American continent. Investigations of Native American, Euro-American, and American perspectives are focused on prevailing ideas and attitudes that represent the human being's perspective in regard to their own being, their relationship to all other life, and their relationship to the earth. This also can be defined more succinctly as their view of themselves within the context of dwelling.

WHAT IS A HUMAN BEING?

Our perspective implicates how we dwell on this earth. Our perspectives will affect our answers to Cordova’s Key Questions. Human perspectives, including the perception of dwelling, are molded by family, cultures, surroundings, and the human biological memory. The latter factor is however easily trumped by the impact and influence of the more external components. Human beings are pliable and absorptive, and their infantile introduction to the world instills a particularly strong sense of their concept of what it means to be a human being. An infant from one culture can be placed into a totally different cultural group and that person’s perspective will be nothing like that of the siblings who remained in their birth culture. A specific concept of the human and world perspective is imprinted on any given individual in any given context of dwelling. (Cordova 2007)
HEGEMONY AND HIERARCHY

The classic early Euro-American hailed ironically from a continent of cultural diversity, which simultaneously shared various Christian based religions and an intellectualized view of human species’ superiority. They arrived in North America with this privileged perspective in tow. In the early 1870’s, at a time when the Euro-Americans of this nation were engaged in the “winning the West”, a group of men were discussing the commercial value of the land area now known as Yellowstone National Park. While they were contemplating plans for their individual claims, a man named Cornelius Hedges presented the novel idea of preserving the land. He introduced the notion of setting aside this land area as a reserve for all people to enjoy (Kieley, 1940).

The fact that this idea swiftly became a reality, suggests that many others besides Hedges recognized the need to draw a line around a land region in order to protect it. And what were they protecting it from, if not their own “take and leave” tenacity; their own capacity to disrespect, disregard, and subsequently destroy a land and its ecosystems. This Euro-American perspective of disregard, displays a tendency to place the self in dominance over not only nature, but over other human beings that might be viewed as “less than ourselves” - less cultured, less civilized, and/or less technologically advanced.

When a group of human beings view themselves as the capping hierarchy of being human, other groups of people are often labeled as primitive, underdeveloped, or
developing - as in developing and moving toward the perceived supreme “modern” way of being. According to Cordova, it is this perspective which provides a rationale for invading the lands of “underdeveloped” people, disrupting their culture, displacing them from their homeland, and seizing their land's natural resources.

This superior position declares a controlling power over everything from plants and politics, to people and national parks. Power and control lurk beneath the painted picture of environmental responsibility. As recently observed by United States congressman Rob Bishop, “How a government deals with property has been a window to the soul of that government” (Bishop, 2012, p. 49). Property - or land ownership - equals control of the land’s resources, suggesting there is perhaps more to the establishment of our National Parks than pure preservation. The United States Government claims ownership rights to almost one third of the entire country’s land mass. Bishop further recognizes this extensive governmental land ownership as a bit of an irony for a people who exalt the qualities of individualism and the right to own property. There is in essence a hierarchy within the hegemony.

INDIVIDUALISM

There are countless culprits to point to in regard to the Euro-American mindset of Individualism. Herbert Spencer’s Social Darwinism and the many facets of Christianity are touted for much of the once labeled “me movement”. However,
regardless of the sources or precepts, “Individualism” is undoubtedly an integral part of being American.

In a 2012 article for The Journal of Cross-Cultural Psychology, Jean Twenge and colleagues studied pronoun usage in American literature from 1960 to 2008 and found clear indications of a continued trend in individualistic traits in Americans. Their findings show that within this time span, the usage of first person plural pronouns of “we” and “us” decreased, whereas the use of the first person singular pronouns of “I” and “me” significantly increased. In an American college classroom, Cordova was asked by her Euro-American professor, as to why she continually referred to herself as “we”. When she was asked “What do you think?” she would reply with “We think…”. She explained that she was referring to all the collective influence and shared notions that culminate into her perspective. She then realized that the Euro-American students in her class did not recognize that they had a collective point of perspective (Cordova, 2007 p. 158). In contrast with Ford Madox Ford’s declaration that there is no such thing as an individual thought, they saw their views as their own, belonging solely to the “I”.

With Individualism comes competition. Also, with individualism comes a more easily manipulated individual. The recent financial housing crisis of the past decade provides an example of this premise, as its guiding principles preyed on both these very American qualities of individualism and competitiveness (Davidson, 2012). The individual's right to the dream of single-family homeownership and the isolated
individual's nonattachment to a contextual “tribe” provided the financial institutions with an emotionally vulnerable human being as a ripe commodity for their economic undertaking.

There is a duality to individualism in property ownership, where the venerated individual competes for his/her rightful share of property and the American dream of a home, and yet simultaneously this individualistic driven dream perpetuates a degree of sameness and monoculturalism regardless of the place and context of dwelling. The concept of dwelling is no longer tied to a place on the planet, but to a consumerism driven identity of the “self” - visibly reinforced through the acquisition of property. (Davidson, 2012)

When individualism seeps into a discipline such as architecture, there is a symbiotic partnering that cries out for an outward display of unique expression. Creative competition. Thus, individualism becomes a primary consideration in a profession that controls the design of our habitable structures; our dwellings. Christopher Alexander, an Austrian architect and theorist, distinguishes this phenomenon in terms of self-conscious or unselfconscious architecture.

In unselfconscious architecture, the process and practice of constructing a form of dwelling, is executed by the inhabitants of the dwelling. The people have an intimate relationship with the materials, process, and the form of their own dwelling. Selfconscious architecture is executed by others in a system of taught
understandings, removed often from the actual experience of the making (Alexander, 1964). There then ensues an insulating quality in both the occupant and the architect. The architect is insulated from the direct contact with the materials and the process of making, and the occupant is insulated from the process and end resulting form of his/her own dwelling. The sense of belonging is subsequently severed.

Euro-Americans continued to pave a repetitive pattern of consumer driven constructs across the continent, inducing a diminished sense of place. Natural environments, ecosystems, and distinguishable local cultures became diluted, as they dissolved into the monoculture of “America”. Bounded Space was conceptually and physically eradicated.
2.3 Bounded to Diversity

The responsibility for maintaining the diversity of life falls on the shoulders of ‘modern’ man. It is his attitude toward the Earth and its varieties of humans that most threatens the demise of the very diversity he celebrates as essential to the health of the planet. Viola F. Cordova (2007. p.206)

PLANTS VS PEOPLE

In the paradigm of Euro-American self presumed superiority, Cordova believes there is a denial of the validity of other peoples’ cultures and life styles, and that “the diversity of the human species is (conceptually) denied” (Cordova, 2007 p.161). Yet this planet and its peoples are undeniably diverse. The monoculturalism that erupts from the Euro-American hegemony of hierarchy begins to displace the diversity. At the very least, less consideration is granted in regard to the diversity of the human species than is granted to the vast realm of plants and animals.

The science of ecology recognizes the harmful effects of monoculture in agriculture and forestry, but the monoculturalism of the human society has yet to be viewed in a similarly threatening capacity. In recognizing the diversity of ecosystems on this planet, there is an imperative to also recognize the diverse ways that humans can
viably dwell. Cordova presents the “bushmen” of the Kalahari Desert as a prime example. She states that saving certain animals and forest vegetation is understood to be a matter of great importance, but there is no apparent plea to save the “bushmen” or their way of dwelling on the earth. In fact, as Cordova perceives it, there is almost – in regard to the monocultural mindset - an “acceptance of the demise of the bushmen” (Cordova, 2007 p.162).

In regard to the diversity of indigenous dwelling in pre-colonial North America, there is a void of understanding and a lack of incentive to fill the void. Archeologist Patricia Rubertone in her paper *The Historical Archeology of Native Americans*, noted that “historical archeologists have given relatively scant attention to the study of Native Americans” (Ruberton, 2000, p. 425), and that in regard to recent endeavors, the research remains irresolute. Her investigation revealed that attention was granted to North American indigenous culture, largely only when it was impacted by contact with the Europeans, and that there is subsequently an absence of “pre-contact” constructs in archeological data. Rubertone argues that if multiple resources were utilized, a cohesive construct could emerge to reveal “the rich diversity of experiences among the Native Americans” (Ruberton, 200, p. 425), as each group utilized and employed the unique set of resources pertaining to the respective places where they dwelled.
BOUND EXISTENTIALY

When Bounded Space defines the predominant model of dwelling, there is a consequential awareness of the resources within that area and thus the carrying capacity of that area. This otherwise obvious aspect of dwelling is extinguished when the recognition of boundaries is lost. As resources are imported from other places on the planet, people become unconscious of the geographical origins of their essential needs. There is not, according to Cordova, any indigenous Native American group which did not develop an awareness, understanding, and essential set of “rules” for the utilization of the resources within the group’s bounded area. This speculation aligns with Reader’s claim that the regulation of resources was a key aspect to any successfully sustained indigenous culture. There was also an “awareness of how the numbers of the group affect the resources of the area” (Cordova, 2007, p.189). Population limits were apparent. As human population clustered into dense urban constructs reliant on imported essentials (such as food, water, raw materials, etc.) the relationship between the land and its population numbers became an illusive consideration.

According to research compiled by population ecologist William Rees, cities can be attributed to an “accelerating global ecological decline” and are not in-and-of-themselves sustainable (Rees, 2013, p. 158). Rees offers his interpretation of the Malthusian theory by defining the human carrying capacity as the “maximum population that can be supported indefinitely in a defined habitat without permanently impairing the productivity of that habitat” (Rees, 2013, p.158).
The human being is “bio-physical”. Furthermore as Edward O. Wilson contends in his book Biophilia, the human being is naturally “biophilic”, having an instinctual bond with other living systems. He suggests that the human being will respond accordingly when placed into a situation with more direct contact and association to living eco-systems. In terms of architecture, biophilic design refers to the use of natural materials, natural systems, and a general exposure to elements of the natural environment. This design approach is believed to enhance the relationship between people and nature. But will such efforts promote awareness of biological survival?

High-performance engineering, advanced technology, and economic power, cannot produce the essential life supporting resources of the earth. It is a reminder of Kareiva’s observation of the often present disconnection of urban dwellers to their biological sustenance. Rees infers that most urban areas exist in a state of “ecological debt”. (Rees, 2013) He developed a set of guidelines to determine what he termed the “ecological footprint” for a defined population of people.

As the existential qualities of Bounded Space are considered, Cordova reminds us that when boundaries are respected, population numbers coincide with the land’s resources. But rather than ask the question of how large of a population a land area can support, Rees proposes that this critical question be posed inversely as “How large an area of productive land is needed to sustain a defined (existing) population?” He then asks where “on earth (is) that land located?” (Rees, 2013, p. 159).
BOUNDED TO THE TRIBE

The “tribal” mindset views the group’s survival as a necessary condition of the survival of the individual, whereas an individualistic mindset holds the primary motivation of self-interest.

If I were to introduce myself in accordance with Cordova’s perception of Native American tribal customs, I would say first that I am a Pennsylvanian (the land from which I was born), and that I am of German, English and Irish descent (the cultural tribes that influenced me). I may or may not choose to further offer my individual name. This does not mean that there is an absence of respect or regard for the individual, but rather the entrapment of one’s identity becoming cohesively bound to a name was avoided. Native American names were often symbolic, and could be changed if a person’s life experience or circumstances changed. And Cordova further claims that the identity of the individual self was held by Native Americans in a lower hierarchy than that of the group.

It is a reflection of the issue with Hardin’s “commons” (where he unwittingly addresses the notion of Bounded Space). Multiple individuals vie for their rights of self-interest, inadvertently resulting in a detrimental effect on the individual. His argument revolves around the issue of the “population problem”, yet his presented dilemma of the common pasture also includes the matter of individual consciousness. Hardin repeatedly cites the exercising of individual rights as a key
pitfall to any resolution, and continually examines this in a legislative context. For Cordova, it is the very notion of the ‘individual’ that is the foreign and parasitic germ in the ointment. In a Bounded Space paradigm, the group is viewed with a stronger sense of identification than the individual. Without the group the individual will perish.

Within this state of self-focus, the individual “cannot place himself into a larger sphere of meaning” (Cordova, 2007, p. 156). Working together as a group would have ensured that the livestock of Hardin’s commons were maintained at a capacity that the land could accommodate, and subsequently accommodate the individuals comprising the group. Being a part of a group can, as Cordova iterates, bring about an enhanced sense of responsibility and belonging.
2.4 Grounding the Human Being

The problem then of educating a populace to environmental crises is not to shove more and more facts about ozone holes, erosion, and greenhouse effects into the arms of the populace, but to discover ways to convince humans that their definition of themselves must change.

Viola F. Cordova (Cordova, 2007, p.218)

The world is a set of varied environments and circumstances, the human being is a biological being with varied imprinted perspectives of what it means to be a human being, and the perceived role of the human being in the world is a consequential array of often conflicting concepts. As the Bounded Space principles are applied to the architectural design process, perhaps a new answer will emerge in regard to the definition of the human being and his/her role in our present “world”.

MODELING PRINCIPLES
Defining and determining a place of Bounded Space within the current construct of the American landscape is not a precise undertaking. Natural boundaries of geography, climate, ecosystems, and diverse cultures, do not hold the same degree of meaning and clarity that was understood by the indigenous populations. In order to begin to incorporate Bounded Space theories into architectural construct, four
degrees of bounded area will be established, and social ecological models - such as Bronfenbrenner’s ‘Ecological Framework for Human Development’ (Fig. 6) – will serve as a template for structuring the principles and parameters of Bounded Space.

Figure 6 - Urie Bronfenbrenner’s ‘Ecological Framework for Human Development’

The conceptual area of Bounded Space will be divided into four areas: the individual dwelling unit, the developed ‘project site’, the peripheral neighborhood, and the outlying region. (Fig. 7) The Social-Ecological Model will be utilized to represent these areas of Bounded Space and their various implications.
Figure 7 - Social-Economical Model translated into areas applicable to Bounded Space criteria for architecture

These scales are further charted (Fig. 8) and defined as follows:

Figure 8 - Areas of Bounded Space Application
**Dwelling Unit** – This represents a defined area of intimate dwelling for a small group of people (related or not) who choose to live together in an intimate setting or space of dwelling. By creating a responsibility and/or awareness of the essential elements and the existential aspects of dwelling - including resources consumed, the disposal of ‘waste’ - the occupants are exposed to the principles of Bounded Space and the awareness of the implications within their dwelling unit.

**Building Site Community** – This represents the land footprint of the project being implemented, including multiple dwelling units, all aspects of the site development, and the people who will engage together within this particular place on the planet. Bringing a sense of community to this degree of bounded area is a core objective, as these boundaries are clearly established by the determined project undertaking, and also represent an area of integrated ‘design control’. The size of the intended community (inclusive or non-inclusive of the outlying neighborhood) might be guided by the research of anthropologist Robin Dunbar, in regard to the ideal number of people that can maintain a stable social connectivity - a sustainable community. This ideal number of 148 is generally rounded up to 150 (Dunbar, 2010), and is now commonly known as “Dunbar’s Number”.

**Neighborhood** – This represents the population dwelling in the immediate periphery of the project site. This could be an area of established boundaries, or this area may need to be established. This effort of engagement will undoubtedly
require dedicated intention, and the participation and cooperation of the surrounding neighborhood occupants.

Region – This represents the geographical and ecological area which is existential to the collective Neighborhood. This should be the area which represents the ultimate carrying capacity for the neighborhood - whether the current neighborhood exceeds this capacity or not – and will most likely initiate as a superficial (albeit workable) model for Bounded Space. As argued in a joint ecological article on Sustaining Human Carrying Capacity, “achieving sustainability at the regional scale is important since it’s at this scale where social institutions and ecological functioning are most closely linked” (Graymore, 2010, p. 459). The element of water could be utilized as one determining factor in defining this ‘regional’ area of bounded space, through the investigation of watershed boundaries and water source locations.

APPLICATION OF QUALITIES

Within these four varying defined areas of Bounded Space, the four essential elements will be utilized as a means to identify qualitative design elements. The intention is to bind the human being to their individual dwelling unit, then to the place of the project site community, then to the land of the out-lying neighborhood, and finally to the extended region which represents the ultimate existential elements within the area of Bounded Space and the carrying capacity of that land. This will be executed through applying qualitative design elements for Fire, Water, Air, and Earth.
A set of guidelines were prepared by William McDonough for the World’s Fair 2000 EXPO in Hannover Germany, entitled *The Hannover Principles* (H.P.). Notably these design competition guidelines were structured through the defining categories of Fire, Water, Earth, and Air (McDonough, 1992). An interpretive summary of these guidelines is as follows:

**H.P. Fire** – Viewing this element as a ‘symbol’ of the human relationship with harvested energy, McDonough’s main design focus was the incorporation of on-site energy production, use of renewable energy and solar energy, and the accountability of the energy utilized to produce and manufacture utilized building materials.

**H. P. Water** – Celebrating this element as the “life-giving resource“, these guidelines focused on both the existential and emotional aspects of water. There should be an accounting of water usage, an application of the cycles of water, a collection and utilization of rainwater, and a protection of water sources, as well as a responsibility toward water waste treatment. Within these applications there was a call also to promote an experiential design quality which could serve to educate occupants about water, as well as promote the enjoyment of water.

**H.P. Earth** – The designers were requested to consider not only the human habitation of the project site, but to be aware to take into account all “flora and
fauna”. The “unbuilt” land was held in high value and existing build environments were to be re-furbished whenever possible. There was certainly a call for the use of natural indigenous construction materials and recycled materials, as well as a responsibility toward the awareness of toxins and toxic releases from certain manufactured products. Solid waste (compostable waste) was encouraged to be dealt with naturally on-site.

H.P. Air – The guidelines for air emphasized the global implications of polluted air, and also encouraged the utilization of natural ventilation. Designers were required to not only not add any pollutants to the already strained atmosphere, but also were encouraged to explore ways to improve – clean – the existing air. It was indicated that wind patterns should be observed and utilized, and that even noise pollution should be addressed as part of the air guidelines.

McDonough went as far as to include the fifth ethereal element - spirit (or prana) - which he viewed as an “ineffable” element. Listing such an illusive quality as an integral part of the design guidelines for a physical construct is a difficult task; it is a courageous inclusion. McDonough indirectly implicates the concept of Bounded Space when he states that the design should “embody humanity, nature, and technology, fostering the sense of place essential to any human experience of the meaning of sustainability (McDonough, 1992, p. 12).
McDonough’s guidelines reflect the philosophy of Bounded Space in most of the elemental aspects, with the exception of ‘Earth’. The idea of growing food or accommodating for a land area for consumable vegetation is not considered. There is mention of promoting the “enjoyment of water”, yet otherwise his Hannover Principles do not emphasize a call for the direct awareness of the elements.

The Bounded Space design qualities will be guided by the predominant principle that any aspect of the physical design construct relating to the four essential elements (in regard to dwelling), will occur within the bounded area of the unit, site, community, and region. The awareness of the essential elements should also be incorporated into all design considerations. (Fig. 9)

![Diagram of Bounded Space](image)

**Figure 9**  *The Four Essential 'Sacred' Elements applied to various degrees of Bounded Space*

The following Bounded Space principles have been generated from this research, for utilization in the architectural design process.
**Fire**  
Promotion of the awareness of the building's heat and energy sources  
Incorporation of a direct relationship to fire  
Incorporation of solar cycles and angles  
Generation of on-site renewable energy

**Water**  
Promotion of the awareness of the existential water source  
Incorporation of an experiential relationship with water  
Incorporation and utilization of on-site rainwater  
On-site management and treatment of waste-water and protection/treatment of storm & ground water

**Earth**  
Promotion of the awareness of regional vegetation and animal life  
Incorporation of on-site vegetable gardens  
Utilization of natural indigenous building materials  
On-site management of solid waste and consumer waste

**Air**  
Promotion of the awareness of regional wind patterns and air quality  
Incorporation of natural ventilation  
Optimized creation of outdoor dwelling space (minimization of enclosed ‘interior’ spaces)
In the Hannover Principles, McDonough addressed a fifth element of ‘spirit’. This research will also refer to a fifth aspect, which will be labeled - Community. The ‘spirit’ of belonging permeates through every endeavor of this conceptual research and suggested application. The inherent qualities of belonging to a community, serve to enhance any applied design considerations regarding the four elements. (Fig. 13) The fifth and essential aspect of ‘Community’ can be more plausibly transferred into tangible guidelines for architectural application. It is the belonging to a group of people within a specific place of dwelling – a Community - that can further cultivate the existential belonging to the earth and the awareness of the sustaining capacity of the land upon which we dwell. Thus, the presence of community type design qualities can foster and amplify the design considerations relating to the four essential elements. (Fig. 10)

Figure 10 - Influence of Community on design applications of the essential elements
Principles of the application of Community:

- Provision of common/shared space both indoor and outdoor
- Incorporation of shared systems and resources
- Promotion of cooperative activities and responsibilities
- Imposed accountability of resource usage

These outlined principles are not intended as a refined and finite solution, but rather they are intended to serve as a catalytic design tool, in terms of shifting the human perception and understanding of dwelling on this planet. As Cordova asserts, it is essential that the “definition of ourselves” is what must change. Bringing a sense of belonging to each degree of bounded area through the applicable qualities of the four existential elements and the quality of community, is an effort to move toward regaining the fundamental concept of Bounded Space dwelling.
CASE STUDY SELECTION

The three projects evaluated for this research paper were selected based on the following criteria:

1. Recognized for excellence in environmental and sustainable design.
2. Current or recently completed (2012 - 2013)
3. Domestic multi-unit project or single business office complex
4. Project location in the United States

The design aspects identified as significant in regard to their environmental and sustainable qualities will be presented for each project. Further investigation into these projects is intended to provide information pertaining to Bounded Space qualities, and to ascertain how and if these concepts of dwelling are reflected in the design criteria of each project.
EVALUATION GUIDELINES

A matrix of the four degrees - or scales - of Bounded Space and the four essential elements, with the additional incorporation of the aspect of Community, will provide a basis for evaluating the selected case studies (Fig. 11). The area designated as “Region” will not be addressed in this undertaking, as this represents an area of definition beyond the limitations of this research.

![Figure 11 - Evaluation Grid for Bounded Space Case Studies](image)

A key design representative from each project was interviewed and asked the following leading questions:

**FIRE**

Is the energy required for the building generated on site?

Is there any direct experience of fire?
WATER

Is there any on-site water collection for use by the occupants?
Is wastewater handled on-site?

EARTH

Is there any on-site gardening (vegetable)
Is solid waste or consumer waste (composting) handled on-site?
Were the resources for the construction materials obtained locally?

AIR

Do the dwelling units and/or project site have any outdoor living space?
Have wind patterns and natural ventilation been incorporated?

COMMUNITY

Are there any community spaces provided for socializing or recreation?
Are any functions, resources, or cultural aspects shared by the occupants?
   (ie: energy, water, gardening, composting, recreation, other activities, etc)
Does any aspect of the project extend into the neighboring community or region?

GENERAL

What do you feel is the main aspect of the project that contributes to its sustainability?
Interviews were conducted via telephone calls with the project representative (architect or designer), and my personal notes were hand recorded on printed question sheets during the ensuing dialogue. These responses and information were interpreted and summarized for each essential element, and then transferred into the evaluation matrix based on the Bounded Space principles in Chapter 2.4. This was coded based on how strongly the project’s design qualities reflect the Bounded Space principles as follows:

- **STRONG** - The design aspects largely satisfy the Bounded Space guidelines
- **MODERATE** - Some design aspects represent the qualities of Bounded Space
- **ABSENT** - There are no design aspects that address the Bounded Space guidelines
3.2 Project Descriptions and Interview Data

Case Study # 1

Eco Modern Flats - Fayetteville, Arkansas

Awards:

Green Builder Magazine Green Home of the Year Award: Best Community Project 2012 LEED for Homes Outstanding Multifamily Project (LEED Platinum)

Architect: Modus Studio, Chris Baribeau, AIA

Owner/Developer: Specialized Real Estate Group

Figure 12 – Eco Modern Flats irrigation system
The Eco Modern Flats project is a renovation and rehabilitation project in the heart of Fayetteville, and consists of 96 rental units. The original structure was built in the late 1960’s. According to the US Green Building Council, the LEED award was bestowed on this project in part due to the developer’s goal to provide a “modern, urban, green multi-family rental – a product that was not currently available in the market” (USGBC, 2012) in Fayetteville, Arkansas. Numerous sustainable strategies were employed in the project, including water collecting and irrigation, solar water heating, and shading considerations through the use of native vegetation. Also, according to the project architect Chris Baribeau, creating a strong sense of community was a key aspect of the initial design considerations. The Eco Modern Flats project reflects the design qualities of Bounded Space and the essential elements as follows: (C. Baribeau, personal communication, 22 July 2013)

**FIRE**

Off-site generated energy is utilized for the heating and general electrical requirements of the units however the hot water demands are met largely by on-site solar energy systems. The experiential relationship to fire is present in terms of a community outdoor gas fireplace, as well as the provision for community food grilling.
WATER

Large galvanized vertically placed piping, collects and stores the rooftop rainwater, then distributes this resource to the community gardens and various planting areas on the site. The “rain garden” filters storm water, eliminating pollutants from the run-off before it proceeds into the local lake. Sewage management is handled off-site by a municipal treatment facility.

EARTH

Local and recycled materials were utilized particularly in terms of steel and cedar. The ample plantings and the provision for a community vegetable garden – including a composting system – instills a sense of awareness and a degree of participation with the earth.
AIR

The provision of outdoor community areas and the network of walkways, serves to expand the “living space” and promote outdoor activity. Windows in the rental units are also operable, to allow for natural ventilation.

COMMUNITY

Creating a sense of community was a design priority for this project. As indicated by Baribeau, there will be a certain kind of like-minded people who will gravitate to this model of living, and hopefully form a sustainable community. There is inference to the sustainability of the “community” proper, not in terms of resources but in terms of sustaining a bonded group of people. Baribeau continued to discuss how in many apartment complexes people often never meet one another, let alone form any
degree of community. The community aspect is highly encouraged in this project, through the various types of common outdoor spaces, the community gardens, the community pool and the on-site trail system.

Figure 16 - Matrix Evaluation for Case Study # 1
Case Study # 2

The Tower at PNC Plaza, Pittsburgh, Pennsylvania

Award:

2012 Evergreen Award

Architect: Gensler Architects

Owner: PNC Financial Services

Figure 17 - Computer generated image of the Tower at PNC Plaza in Pittsburgh, PA
The design for the Tower at PNC Plaza incorporates a natural ventilation system, and when the commenced construction is completed (proposed for summer 2015) the tower will be one of the few office towers in the country to apply this type of environmental strategy. This system features a solar chimney which will act to draw hot air out of the building, and pressure differentials and air thermals will act together to cool the building in the summer months and heat the building in the winter (Gonchar, 2012). This natural ventilation system, in conjunction with several other energy saving design aspects, is predicted to “produce a skyscraper that exceeds LEED Platinum requirements (Gonchar, 2012).

A member of the Architectural design team, Anastasia Huggins, indicated that the commitment of a financial institution to invest (financially and morally) into a progressive sustainable system such as natural ventilation, was of great significance. Other environmental design aspects were investigated and subsequently incorporated when feasible for the project’s limitations. The Tower at PNC Plaza reflects the design qualities of Bounded Space and the essential elements as follows: (A. Huggins, personal communication, 3 April 2013).

FIRE

There is no energy generated on-site to meet the demands of this high-rise office complex. However, energy demands are considerably reduced by the application of the natural ventilation system, natural lighting, and several other energy saving components.
WATER
Rainwater is collected on-site wherever possible and is utilized in cyclical chiller systems as well as for toilet flushing application. There is no water treatment handled on-site.

EARTH
In regard to construction materials, the regional commodities of steel and concrete are highly utilized, and some recycled materials were incorporated into the design. There is no production of edible foods. Consideration was given to the idea of growing herbs in the large planters (for use in the office cafeteria), but this idea was not implemented. There is no composting or consumer waste handled on-site.

AIR
The natural air quality and temperature has been extensively studied, and has been incorporated into the design of the project's comprehensive natural ventilation system. There is also an outdoor plaza – also open to the public – with plantings, trees, and benches.
COMMUNITY

Aside from the generally inclusive office community spaces of cafeterias and conference rooms, there are no expressly intentional community activity or recreation areas for the occupants except for the outdoor plaza at street level. This plaza is open to the building occupants and the surrounding community. The PNC Tower is a structure for offices and not dwelling units, which certainly can attribute to the lack of community design considerations.

Figure 18 & 19 - Images of the PNC outdoor plaza and the exterior tower enclosure

Figure 20 - Matrix Evaluation for Case Study # 2
Case Study # 3

The Puyallup Longhouse’s (The Place of Hidden Waters) Tacoma, Washington

Award:

2012 LEED for Project of the Year

Architect: Environmental Works, design team

Owner: Puyallup Tribal Housing Authority

The Tribal Longhouse project is a cooperative venture of the Puyallup Housing Authority, the Tribal Council, the (Environmental Works) design team, and Common Ground (a nonprofit affordable housing development consultant). Phase I of the project provides ten units for tribal members “with the greatest needs” (USGBC, 2012). The project was awarded the 2012 LEED for Homes award for Innovative Project of the Year, and “seems to have exceeded the (sustainable) expectations ...” (Burrows, 2012)
According to Bill Singer of the Environmental Works design team, one of the prevailing design objectives was to provide a sense of community, and to bridge past cultural aspects of dwelling with a model and vision for future development. The community design aspects of the project (community center, gymnasium, playground, dance circle, and sweatlodge), are intended to serve the ten units of phase I of the project, the ten units of phase II, and also the existing 1970's Puyallup housing that adjoins the site.

Figure 22 - Puyallup Tribal Community with pre-existing 1970's housing and new 2012 construction

The Puyallup Tribal project reflects the design qualities of Bounded Space and the essential elements as follows: (B. Singer, personal communication, 3 April 2013)
FIRE

A ground source heat-pump is utilized to support a centralized heating system. (for unit heating and hot water heating) This reduces unit and community energy usage, which is supplied from outside sourcing (electricity). The Community building contains a central fire ‘pit’ at the main entrance and gathering area, which gives the community and neighborhood a direct experience with the element of fire.

Figure 23 - Fire ‘pit’ in Puyallup Tribal Community Building

WATER

There was no rain-water collection incorporated into the project, however storm water is treated on-site through ‘rain gardens’. The community benefits from the direct experience of the rain gardens and the neighborhood and outlying region benefit from the consequential effects of the treatment application.

EARTH

The majority of building materials were obtained locally or regionally, and wood is utilized extensively throughout the project. Wood and wood products are readily
available in northwest united states, and were procured from a 500 mile radius of
the site. There is no specific accommodation for gardening of vegetables for
consumption, although a small planter has been provided for each unit for
ornamental (or optionally edible) plantings.

AIR
Outdoor ‘living’ space is provided through the means of the courtyards which act as
a shared access ‘corridor’ for the individual units. There is also a playground and an
outdoor ceremonial dance area provided for the community and Puyallup Tribal
neighborhood.

COMMUNITY
There is no function or resource that is shared necessarily by the occupants, with
exception of the shared ground source heating system. There is however an
abundance of socially shared space for community activities, child play, education,
recreation, and traditional experiences, including plans for a future community
sweat lodge. The ‘court’ area between the units also acts as a community area for
the occupants.
Figure 24 - Inner Court Between Units

Figure 25 - Matrix Evaluation for Case Study # 3
CASE STUDY SUMMARIES

SUMMARY CASE STUDY #1 – Eco Modern Flats

The driving design consideration for the Eco Modern Flats, was to create a new model for urban multi-family dwelling, specifically in terms of ‘eco’ and community aspects. Water (through rainwater collection and distribution) is the most visible and integrated of the four elements. It is also a shared resource, that is naturally heated by solar applications. Fire and Earth also have direct experiential design aspects, in terms of a community outdoor fireplace, a community grilling area, and community vegetable gardens. The abundance of outdoor activity and gathering areas, brings a considerable degree of exposure to the natural air and the outdoors, as well as encourages community cooperation and socializing. Although Eco Modern Flats did not create a physical breach into the outlying community, there is a great sense of the Bounded Space quality within the defined area of the project.

SUMMARY CASE STUDY #2 – The Tower at PNC

The PNC Tower is a venture in sustainable office building construction, which has chosen to focus heavily on the utilization of natural ventilation. This natural system
is a significant undertaking and it is this feature which has brought attention and award winning recognition to this project. There is a sort of ‘conceptual tribe’ in the entity of the financial institution which acts as client and project owner, and is thus an involved and unifying entity; effective in the outcome of their own ‘office dwelling’. The awareness of air flow and this natural cyclical system of ventilation is impressionable, however Bounded Space concepts have not fully been embraced or considered throughout the project.

**SUMMARY CASE STUDY #3 – Puyallup Tribal Longhouse Project**

Overall, the Tribal Longhouse project appears to have addressed a more encompassing array of the design qualities essential to the Bounded Space concept. However, the key existential elements of food, water, and energy have not been addressed in direct terms of being bound to the specific area of the project, neighborhood, or region. The community focus of the project is very strong and can act as a binding factor, bringing a sense of belonging to that particular group of people who are engaged in dwelling together. The fact that the people of the Puyallup tribe were already bound together in culture and heritage, directly contributed to integrity of the design process. The tribal leaders and end users were involved in the development and design of the project; in essence an inherent part of their own dwelling. This strong community aspect can inspire cooperation – in terms of food, energy, water - toward a greater sense of belonging and Bounded Space sustenance.
REFLECTIONS OF THE FOUR (Essential Elements)

In terms of the Bounded Space design guidelines, all four elements were represented in at least one of the three case studies. The element of Fire in the defined bounded area of the “Dwelling Unit”, was the only matrix category void of any design application. (Fig. 27) Tangible aspects of water, air, and earth were more frequently present in various levels of the bounded areas. The ability to integrate a visible or otherwise tangible biophilic design aspect of an element into the design construct (such as water irrigation or natural construction materials) seemed to be a more easily executed endeavor than the introduction of a design quality that would involve the cooperation and participation of the inhabitants (such as a community garden or a composting system).
Figure 27 - Sumarization charts for elements of Bounded Space principles

The incorporation of a shared resource was executed in each project, as the Eco Modern Flats tenants share the collected rainwater; the office workers at the Tower at PNC Plaza will experience the shared continuous movement of the natural ventilation system; and the inhabitants of the Puyallup Tribal community share the ground water heating system. The responsibility and accountability of resource usage was a condition that McDonough emphasized in his Hannover Principles, in regard to the four elements. This accountability is a critical yet sensitive design consideration. In accordance with Hardin's balance of the commons, McDonough's “Design for Sustainability” guidelines, and Readers recognition of the social rules necessary for a group's survival, the accountability of resource usage should be a priority in any sustainable or Bounded Space based community.

The project site was granted the highest application of Bounded Space principles, and likely represents the most socially acceptable area of inflicting design control; a designer's comfort zone. Introducing new and unfamiliar aspects of design in the individual units might seem to infringe on the American ‘right’ of individualism.
And the outlying neighborhoods may or may not be receptive to some changes, viewing the inclusion as either opportunity or intrusion.

SUSTAINABLE COMMUNITIES

A viable sustainable community revolves around not only such things as the energy consumption of the building structure, but the sustainability of the inhabitants within that community. The most essential commodity being sustained is perhaps the binding relationship between the individuals of a group of people. The belonging itself.

In many present day intentional communities, there is often a pre-determined background that defines the group, such as with the cultural heritage of the Puyallup Tribal community. There are lists and directories of collaborative and intentional communities that pull their groups together through an exclusive value or cultural identification such as religion, or through a focused activity such as golfing or yoga. Prior to this research I would have suspected that this was a necessitous, albeit potentially detrimental, requirement in creating any cohesive sustainable community. This assumed necessary adhesive, presents a form of exclusion. However, as Baribeau presented in his hypothesis for Eco Modern Flats, if a project is approached with certain design qualities that present a different way of dwelling, those people who share this perspective of dwelling, will be consequentially drawn together.
PART FOUR: CONCLUSION

4.1 From Buildings to Dwelling

ENGINEERING ARCHITECTURE

Natural ventilation systems, storm-water treatment, green roofs, solar generated energy, wind captured power, computerized operating programs, recycled materials, and many other technological advances are being applied to the design and construction of our built environment. These applications effectively contribute to reduced energy consumption and a reduction of toxic waste emissions. In some instances, architectural design qualities are incorporated, which communicate a sense of environmental awareness to the occupants. These experiential and biophilic design qualities are gaining increasing attention, and efforts are being made to introduce the application of such qualities into the governing systems of environmental building certification.

Incorporating abstract and ethereal qualities into a governed point-based system is a difficult endeavor, particularly within systems that are already encumbered by layers of logistical intercessions, conflicting motivations, and economical
constraints. In the course of my dialogue with project designers from the presented case studies, there were several instances where additional environmental design aspects were considered, but hindered by governing legislation or by client perceptions and finances. Yet in spite of numerous deterrents, great strides in high-performance engineering continue to emerge to the forefront.

Within the most highly engineered and applauded sustainable architectural achievements, it can be noted that the existential aspects of dwelling—water, food, energy, and materials—are being imported to the site from outer regions and even other continents. Compounding this act of importing is the exportation of consumer waste and human organic waste. Both the incoming and outgoing resources and discharges function as a reliance on other areas of the planet for the sustenance of the occupants. This disconnect facilitates a perpetuated insulation of the human being from the direct act of dwelling. The multitude of professions that encompass the collective driving force in these environmentally responsible advances, directs its efforts into the material make-up and operation of the structure, omitting often the engagement of the occupant. The individual responsibility is avoided and placed in the hands of others.

McLennen (2004) stated that a “total shift” was needed in the discipline of architecture, as the ideas of sustainability were still swimming on the outer edge of mainstream thought in architecture. These environmental ideals have now been incorporated into our architecture and engineering construct, and have served to
put a sustainable buzz in the ears of the general population. But the buzz still often echoes as a commodity of consumerism and status, bouncing around but never landing in the heart of the matter.

In their recently presented notion of the term “upcycle”, McDonough and colleague suggest that a shift of perception is necessary. Their prognosis of our current approach is that our environmental efforts will continually fail to reach our aspirations in regard to sustainability, if we simply try to use less energy and emit less toxins. Instead of doing “less bad”, the Upcycle principles call for solutions that enhance life cycles and eco-systems. It is a perspective of abundance and perseverance, where all life thrives.

This necessary ‘shift’, I believe, is beyond the engineering and biophilic design of architecture, and is a shift rather in the perspective of the active engagement of dwelling. It is a shift, as Cordova urged, in our perception of what it means to be a human being on the earth.

PARTICIPATORY DWELLING

When architecture moves from building to dwelling, there is an aspect of the design and implementation of the structure that obliges occupant participation. If the act of building is synonymous with dwelling, as Heidegger contended, then the inclusion of occupant participation cannot be denied. It is this participation – in designing,
building, and maintaining sustenance – that binds the human being to a place through dwelling.

Intertwined with this participatory understanding, is the intrinsic value of a group of people dwelling cooperatively, for the sustenance of the group. This alone is a significant shift in perception.

As governing point systems - such as LEED certification - continue to increase the incorporation of biophilic design qualities and strive for greater environmental impact, the engagement of the group might be further addressed as a key criterion. This would include granting credit for the group's efforts in participatory dwelling as a higher priority than the more static accomplishments of the structure or in-place systems of engineering. A group or community cooperating and actively participating in such applications as on-site energy, water collection, composting, gardening, outdoor activities, etc., might be granted some aspect of credit for their efforts. The initial building certification could be based on having such community programs in place as part of the project make-up.

The beneficial by-product of belonging to a group of people who dwell within the boundaries of a certain place, is the awareness of the existential relationship to the earth and the carrying capacity of that particular place of Bounded Space. It is the group participation of dwelling that could thus be incorporated into the architectural design construct.
4.2 What wasn’t said

LIMITATIONS AND OPPOSITION

This thesis research represents an initial undertaking in an area of study which is largely under-investigated (in terms of the diversity of Native American dwelling and Bounded Space concepts), and yet simultaneously overlaps with extremely broad areas of information. The study of the carrying capacity of any determined land area and the evaluation of individualism vs. tribal or group dwelling perspectives - in light of the concept of Bounded Space - could contribute further in the understanding of sustainable communities and applications in architecture.

Efforts which focus on corporate and manufacturing enterprises as a venue for environmental solutions hold the capacity to accomplish significant change on a large scale. However, this approach is greatly influenced by driving factors such as economics and consumerism, and does not address the consciousness and accountability of the human being. The governed point systems are an attempt to enforce environmental responsibility - on the professions and players involved in the design and construction of buildings - but this approach is also hindered by outside factors and conflicting motivations. Object and systems driven approaches
do not address the core component of dwelling, which is found in the human being’s existential connection to a place on the earth. The theories inherent to Bounded Space dwelling begin with the binding of the individual to a place through accountability and group participation, and can thus begin to shift the human perspective of what it means to be a human being living on the earth.

WHAT'S NEXT

How can Bounded Space principles effectively be applied to architecture?
How can groups of people be united into a cooperative act of dwelling?
How might the Bounded Space concept begin to effect population distribution?
How can Bounded Space areas be further defined on a regional scale?
How can restricting legislation be changed or adopted to support Bounded Space concepts?
How will the further awareness of the carrying capacity of a land area effect our perception of ‘being a human being’?

There are many questions - and solutions - that will arise from the pursuit of integrating the principles of this research. As thought in this realm of sustainability continues, it would be prudent to be reminded of Cordova’s key questions in regard to the sustenance of the human race.

1. What is the world?
2. What is a human being?
3. What is the role of a human being in the world?

Through this research I would begin to answer these questions as:

1. The world is a diverse set of circumstances.

2. Human beings are biophysical and existentially bound to the world.

3. The role of the human being is to respect and nurture all the vast diversity that is the world and that which sustains the human being.

The world is a limitless cosmos of life (of which this planet is experiencing unprecedented numbers in regard to the human species). The human being is an integral part of this ‘world’, and the awareness of this innate connection is in essence the primary role of the human being. It is not the act of binding a group of people to a place on the earth that essentially promotes the shift into Bounded Space dwelling. It is rather the ensuing awareness and recognition that we are existentially bound to the earth that serves as the key component in shifting the human perspective. Through this shift from building to dwelling – from architecture as object to architecture as a participant - the human being can begin to re-establish a profound and intimate connection with their place on the earth.
4.3 Transcendent Sustainability

RECLAIMING ARCHITECTURE (from ‘arch-tech-tecture’)

Many disciplines must come together to create “architecture”; particularly when the
table is a total shift in human perspective and a movement toward
the transcendent sustainability of Bounded Space dwelling. But within this mix of
knowledge, experience, and expertise, one of the disciplines must step up to guide
and coordinate the efforts of this collective endeavor. It is not a question of power,
but simply a matter of leadership.

Groups of musicians in an orchestra have a conductor, an athletic team has a coach,
and a group of varied disciplines working together to design and implement the
construction of humanity’s built environment, needs a leader. Traditionally
educated in various disciplines, the architect can ideally dialogue with the extensive
variety of necessary participants - including the occupants - to facilitate this idea of
Bounded Space dwelling.
My observation is that the success of the presented case study projects was not the result of governing regulations, elaborate technology, or the adherence to any points-driven system. Rather these praised projects were the result of a seed of passion planted in the design criteria by the key designer (architect) and - the client. The occupant or owner’s passion and desire to create a built environment in harmony with the natural environment, translated into the selection of a like-minded architect, who was then entrusted to translate this passion into the execution of the implemented physical project. Although these projects chose to obtain badges of recognition, such as LEED certification, their most viable sustainable design qualities - particularly in terms of community - reached beyond the governed guidelines.

BOUNDED SPACE PRIORITY

Creating a sense of community and binding this community to the existential aspect of dwelling is the key component of applying Bounded Space principles to the architectural design process. If architecture could begin to participate in this ethereal essence of dwelling and shift its perspective - intimately considering the diversity of place, and the engagement of the occupants with the essential elements - then Bounded Space principles could begin to create a shift in how the occupant perceives the act of dwelling.

The occupant’s participation in the design process - evidenced by the Puyallup Tribal Longhouse project surpassing its environmental goals - can enhance and
optimize the manifestation of this shift. The encouragement of community participation and resource accountability through design applications, can bring together groups of people who are open to a different way of dwelling.

Although McDonough’s ‘Upcycle’ theories are directed largely toward the processes and resources associated with manufacturing, the plea for awakening to the potential abundance of these theories is directed toward the engagement of the office manager, the employee, and the consumer. There is a call for participation. In essence, there is a suggestion that all aspects involved in the production of a product pertain to a community, and this community is collectively accountable and participatory in the entire production process. The passion to produce a product in a manner that will enhance the natural environment – or an architecture that will enhance the natural environment – begins with the spark of individuals igniting the adhesive group of people to which they “belong”.

In terms of manufacturing, I feel there is an absence of the primary question of “Why is this product being produced?” Furthermore there is the consideration of whether human beings truly even need this product and the matter of the primary principle or “need” driving the production. Often it is driven by the reward of monetary gain, and this gain is possible because consumers are of the perspective that they need this particular product.

This poses equally significant questions for architecture:
- What is the main objective and passion driving the design of this physical structure?
- Is every aspect of the process and the ensuing components being considered in terms of the main objective and the group’s participation?
- Is there a community in place, or the idea of a future community, that is being considered and incorporated experientially into all aspects of dwelling at this particular place?
- Is the architectural design being approached from a Bounded Space perspective in such that: (1) a social group can identify (2) with a set of geographic features or other boundaries that (3) provide the understanding of a defined place on the earth to which (4) their group alone belongs and (5) which sustains that group.

If we can incorporate the principles and qualities of Bounded Space into the varied defined boundaries of our building endeavors, then architecture can become influential in the essential shift in the human perspective of dwelling. The example of the Eco Modern Flats in-fill rehabilitation project reveals people’s openness to new models of dwelling, and to the idea of belonging to a place and a community. By encouraging this shift in perspective we can transcend into a more conscious and comprehensive sustainable approach in architecture.
As an architect, this research provides insight which results in conceptual shifts in my approach to the design process. Breaking down the spatial scales of Bounded Space into manageable design components – Individual unit, Project Site, Outlying Neighborhood - will allow for a focused design effort in terms of binding the individual to both the existential dynamics of 'place', and to the groups of people who live in these defined areas of habitation. The design approach would thus begin with:

- Consideration of the group of people living in an individual unit, and designing for this group’s interaction with each other and the personality of the essential elements in that particular place.

- Consideration of the entire group of people living in the architectural project and designing for that group’s cooperative engagement with the natural resources of that place (ie: energy, water, gardening, outdoor spaces) and waste management (ie: composting and water treatment).

- Consideration of the potential inclusion and/or effect on the outlying neighborhood(s) and the possible cooperation and sharing of the resources in that collective area of Bounded Space.

The enduring sustainability of human and planetary life dwells not in the intellectual solutions of regulated systems, but lies rather in the understanding and
respect for nature and all life, and the sustainability of the group itself. This thesis relied on written resource and documented thought, but not all understanding is stored in a database or even on a piece of paper. It is stored deep within us in every cell of our being (and even the spaces in between). We are an integral part of the circular systems of all life. We are of the earth and we are of the sky.

A shift in perspective is necessary, and it can begin with the architect by designing for community, designing for place, and designing for engagement. The principles of Bounded Space can offer a catalyst to this shift, penetrating the architectural design process with the recognition that we are existentially bound to the earth and that we belong to a place on this planet.
Works Cited


