



creating restorative housing **a biophilic approach to dignified design**



swarc

Group 14
ENGINEERING

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introduction

defining biophilia

Biophilia, defined as the instinctive bond between human beings and other living systems, represents our innate urge to affiliate with life and the natural world. The term, which literally means “love of life,” was first coined by psychoanalyst Erich Fromm in 1973 and later popularized by biologist Edward (E.O.) Wilson, who described biophilia as “the innate tendency to focus on life and lifelike processes” (Wilson, 1984, p.1). Since the publication of Wilson’s landmark book, the concept has gained significant traction, especially within the architecture and design industry.



nature as a human right

Nature exposure has been shown to support stress recovery, improve mood, enhance attention restoration, reduce physiological markers of stress, and serve as a preventative health measure, reducing healthcare costs and increasing community resilience (Frumkin, 2017; Kaplan & Kaplan, 1989; Ulrich, 1984). However, as humans increasingly spend more time indoors and in urban environments, we are lacking exposure to these holistic individual and societal benefits.

Similar to how exposure to environmental pollutants contributes to disease, the absence of nature is associated with wide-ranging health impacts, including increased rates of anxiety, depression, cognitive decline, cardiovascular disease, and obesity (Bratman et al., 2019; Twohig-Bennett & Jones, 2018). The growing body of research on “nature deprivation” demonstrates that limited access to natural and nature-infused environments has measurable and compounding impacts on physical and mental health, establishing that equitable access to nature is both a matter of public health and social justice (Berto, 2014; Louv, 2005).

Furthermore, access to natural environments is unevenly distributed. Research consistently identifies a “nature gap,” wherein low-income communities and communities of color are more likely to live in areas with reduced tree canopy, higher urban heat island effects, and fewer safe and functional green spaces (Center for American Progress, 2020). These disparities are associated with higher asthma rates, increased heat-related illness, and poorer mental health outcomes, demonstrating that nature access functions as a critical social determinant of health (Jennings, Larson, & Yun, 2016; WHO, 2016).

The framing of nature access as a human rights issue is supported by global policy shifts that recognize environmental quality as fundamental to human well-being. In 2022, the United Nations General Assembly formally declared access to a clean, healthy, and sustainable environment a universal human right (United Nations, 2022). This decree emphasizes the fact that integrating enriched natural elements into our daily lives goes beyond being a luxury to being essential to our health and well-being.

biophilic design

Part of the solution is to intentionally incorporate nature-immersive experiences and opportunities for biophilia into our buildings and urban fabric. As a result, biophilic design has become an increasingly popular, evidence-based architectural approach that connects people with nature within the built environment to improve physical, mental, and emotional health (Kellert, 2008).

Proponents of biophilic design seek to answer the following essential questions: In what ways does nature exposure improve health? How can we design spaces that capture these benefits and provide restorative qualities? What are the essential elements of nature that must be included?



Ultimately, **biophilic design is about creating environments that cater to our intuitive brain** and address both our sympathetic and parasympathetic nervous systems. It emphasizes design elements, orientations, and relationships that we are subconsciously attuned to and that promote relaxation, ease, and nourishment that is salutogenic and biological in nature. Incorporating biophilic elements into our built environment can support equitable access, promote health, and improve ecological and economic outcomes.

A photograph of a modern, multi-story apartment building with a light-colored facade and large windows. The building features a prominent wooden overhang on the left side. In the foreground, there is a courtyard area with a paved patio, several blue wooden Adirondack chairs, and a covered outdoor dining area with tables and chairs. The sky is clear and blue.

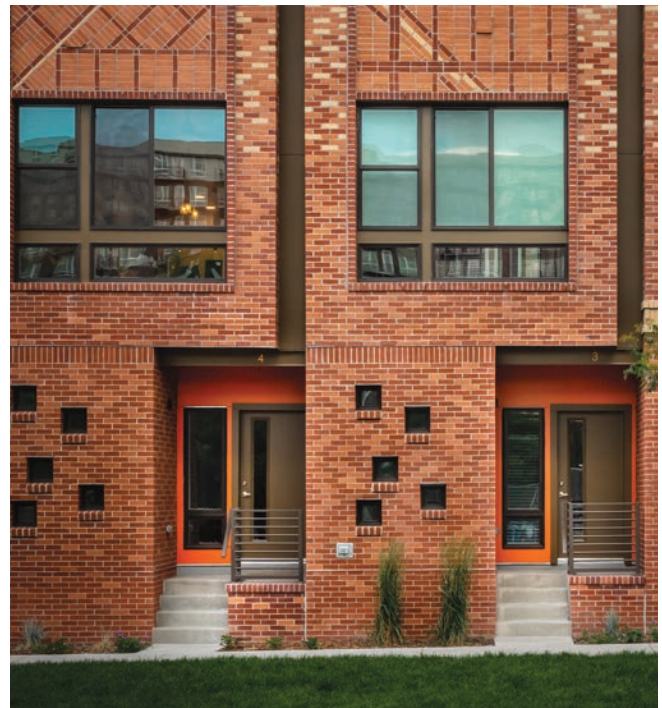
state of housing

In response to **the increasing need for affordable homes across the country**, there has been strong financial and political support to increase housing “units” – especially in our city centers.

The design and construction of multifamily buildings often prioritize cost efficiency and density over residents’ health, well-being, and dignity (Ajeen et al., 2023; Faerden et al., 2023). Stakeholders increasingly warn that conventional designs may reduce quality and unintentionally harm or retraumatize those individuals and communities they aim to support (Bittencourt & Amaro, 2019; Gallagher, 2004; Pless et al., 2017). In other words, what and how we design and develop matters.

The environments in which people live have a profound impact on their health, well-being, and daily functioning. Urban settings, when compared to rural environments, have been shown to elevate stress indicators—individuals in cities experience higher pulse rates (by 4–6%), increased systolic blood pressure (by 19.4%), elevated cortisol levels (by 13–16%), heightened parasympathetic activity (by 56%), and reduced immune functioning (Ulrich, 1983). These physiological differences underscore the inherent stressors associated with urban living, and these effects are often magnified for residents of affordable housing.

For individuals and families residing in affordable housing, the daily burden on physical and mental health can be relentless. Persistent stressors—such as unreliable transportation, limited financial resources, underinsurance, high rent and utility costs, restricted access to quality food, and ongoing safety concerns—compound daily life (Arcora Foundation, 2024). When current or historical traumatic stress is added to this mix, the capacity to cope with life's challenges becomes increasingly strained. Chronic stress and mental fatigue are constant companions for many residents living with low-income. In addition, many are contending with more than just the mental demands of poverty. Veterans, individuals who have experienced homelessness, survivors of abuse and violence, and those living with mental illness often carry layers of trauma (Padgett, 2016). For these individuals, the need for environments that provide a sense of safety, comfort, control, community, and opportunities for mental, social, and physical health is essential.



Despite the critical role that nature plays in supporting well-being, access to high-quality natural environments in low-income neighborhoods has historically been limited. While some research suggests park access may be comparable across neighborhoods regardless of income disparities, perceptions of safety and quality are often lower in under-resourced areas, discouraging use among residents (Rigolon, 2016; Trust for Public Land, 2021). Immersive nature experiences, such as visits to state or national parks, present steeper barriers—ranging from lack of awareness and financial constraints (e.g., entry fees and transportation costs) to the absence of time and mental bandwidth to enjoy these opportunities (U.S. Fish and Wildlife Service, 2016). This restricted access to nature compounds the stressors already present. Conversely, intentional integration of nature and natural elements within these communities can offer vital reprieve, helping to mitigate symptoms of mental fatigue and trauma and providing residents with essential opportunities for restoration and healing.

relationship with the environment

The environments in which we reside play a fundamental role in **shaping our neurology, biology, and social structures**, presenting cues that promote particular actions or reactions and influence our behavior.

Our environmental surroundings communicate messages of belonging, possibility, and self-worth, often in subtle yet impactful ways (Ingold, 2000). For instance, the distinction between sitting in coach versus first-class on an airplane—or occupying a corner office with a view as opposed to an interior cubicle—or a workplace break room with comfortable furniture and outdoor access versus eating lunch at one's desk. These environments impart a sense of status, opportunity, and value, directly informing how individuals perceive themselves, their potential and possibilities, and how they interact with others (Ingold, 2000).



These messages about possibility and value are most clearly recognized in housing settings in which our home has a direct and inseparable connection to our self-identity. As Pallasmaa points out, “Our domicile is the refuge of our body, memory and identity... it is impossible to detach the image of the Self from its spatial and situational existence” (1996, p64). Home becomes an integrated part of us, a place where our personal history, current identities, and aspirations converge. Understanding these complex relationships underscores the necessity of designing housing that fosters dignity, belonging, and well-being. By moving beyond the notion of shelter to cultivating environments that nurture the whole person—physically, mentally, and socially—communities can more effectively support the health and resilience of residents.

evolutionary biology and **cultural ecology**

The deeply rooted connection to our environment is well documented through decades of research in the social sciences. Human evolution has refined our instincts and responses to the various surroundings we inhabit, and cultural factors have embedded layers of association and meaning (Falk, 2010). Together, these influences shape the ways in which we read and engage with our environment. Evolutionary biology provides compelling evidence that our species has developed an intrinsic preference for certain characteristics in the natural environment, features that historically aligned with greater survival, pleasure, and well-being. As Falk and Balling (2010) note, habitat preferences are adaptive across the animal kingdom, with fitness tending to be higher in environments that are preferred. Humanity, like all biological organisms, has adapted physically, physiologically, and socially to the environments we have inhabited, shaping everything from sleep patterns and dietary choices to social behaviors and emotional responses.

For the majority of human history—over 99.9% of our existence—people lived closely connected to nature, relying on its signals and cues for survival and adapting accordingly (Orians, 1992). Only in the past few generations has this relationship shifted so dramatically, with individuals now spending over 93% of their time, on average, indoors (McLennan, 2019). This rapid transition from a biocentric existence to predominantly human-made environments has fundamentally altered the context in which we live, all while our biological and psychological responses remain rooted in evolutionary adaptations.

Current evolutionary theories suggest that our landscape preferences are deeply influenced by our ancestral experiences. The biophilia hypothesis (Wilson, 1984, 1993), savanna hypothesis (Orians & Heerwagen, 1992), prospect-refuge theory (Appleton, 1977), and preference matrix (Kaplan & Kaplan, 1989) all suggest that innate landscape qualities that once enhanced survival continue to shape our preferences today. In *The Aesthetic Brain* (2013), Chatterjee highlights that much of our brain evolved during the Pleistocene epoch, a period in which humans developed a preference for savannah-like environments—a pattern preference now encoded in our genetics. These environmental patterns, experienced repeatedly, trigger powerful physiological responses and even influence genetic expression, demonstrating the lasting impact of our evolutionary past.

Over the last few generations, drastic transformation of our surrounding environment to one dominated by human-made structures has been driven by a pursuit of stability, productivity, control, and precision (Browning, 2012). However, as humanity has moved toward these pursuits, there has been little reflection on the profound impact these changes have on us as a species. Despite our remarkable adaptability and innovation—allowing us to thrive in diverse settings across the globe—emerging research and lived experience suggest that our nature-oriented instincts are not fully equipped to handle the overstimulating and artificial spaces we now inhabit (Louv, 2005).

Whether in natural landscapes or built environments, humans are constantly evaluating their surroundings for signals of safety. At a neurobiological level, we are assessing whether an environment can sustain us, offering protection, resources, and the conditions necessary to meet our needs—or whether it threatens us, requiring protection, defense, or avoidance. Our sensory systems rapidly gather and interpret environmental cues, shaping our perception of what a space affords. The brain processes an estimated 11 million bits of information per second, yet only a small fraction—approximately 50 bits—reaches conscious awareness (Dijksterhuis, 2004). Most of this filtering occurs below conscious thought, where stimuli are first registered as emotion and feeling before being translated into deliberate reasoning (Cimic, 2021). Because this scanning is continuous, environments that offer coherent, legible, and regulated sensory input are easier for the nervous system to process. When spatial conditions reduce unnecessary cognitive load and support efficient sensory integration, individuals are more likely to experience calm, sustained, attention and a grounded sense of presence.

brain health

In processing these environmental cues, there are a few key parts of the brain essential to neuroception—the **subconscious processing system that distinguishes whether situations or people are safe, dangerous, or life threatening** (Porges, 2004). This system plays a direct role in determining how we interpret, respond, and behave to our surroundings.

prefrontal cortex

The prefrontal cortex, often referred to as the body's "watchtower," acts as a top-down regulator in neuroception. It is a critical region in the frontal lobe of the brain essential and responsible for a range of executive functions. Among its core roles are emotion regulation, the initiation of voluntary and conscious behaviors, attention management, decision-making, and the interpretation of emotional states and empathic understanding (Van der Kolk, 2014). This area empowers individuals to observe their environment, anticipate outcomes based on prior experiences, and make deliberate, conscious choices. Importantly, the prefrontal cortex is instrumental in restoring homeostasis or returning the body to a baseline state following a stress response (Van der Kolk, 2014).



amygdala

Another key part of the brain essential for scanning our environment is the amygdala. Described as the brain's "smoke detector," or alarm system, it is a small, almond-shaped structure located deep within the temporal lobe (which is part of the limbic system), which is integral to threat assessment, forming and storing emotional memories, fear conditioning, and memory consolidation (Van der Kolk, 2014). When confronted with a stressor—such as the sudden approach of a speeding vehicle—the amygdala overrides the prefrontal cortex in order to focus the body's resources on activating the nervous system, brain, and body to appropriately respond to the threat.



the autonomic nervous system

Together, the prefrontal cortex and amygdala direct the autonomic nervous system (ANS) how to react. The ANS will alert us to three pathways: (1) safe, (2) danger, or (3) life threatening (Porges, 2022). If safe, the ANS will function via a pleasure response. This triggers the release of dopamine and oxytocin, lowering blood pressure and heart rate, enhancing cardiovascular health, and fully activating the immune system (Van der Kolk, 2014). We enter a 'rest and digest' state, which fosters an experience of relaxation, groundedness, and overall well-being (Psychology Today, 2025).

If we determine a situation is dangerous, we mobilize; this triggers our fight-or-flight response (Porges, 2022). Our hypothalamus triggers the release of stress hormones, such as epinephrine and cortisol, which elevate blood pressure, heart rate, and respiratory rate. This prepares the body to respond to the threat by fighting back or fleeing. Muscle tension increases, and breathing becomes shallow and rapid (Harvard Health, 2024).

If we determine the situation is life-threatening, then we enter an immobilized or disassociated state, also known as the death-preparatory state (Porges, 2022). In this response, our body shuts down, heart rate and blood pressure decrease, and pain receptors minimize their signals to reduce suffering.

If a situation is determined to be dangerous or life threatening, the prefrontal cortex is disabled (often described as “popping our top”), shifting the brain into survival mode (Cimic, 2021; Harvard Health, 2024). This can also impair the Broca’s area of the brain (responsible for speech and language) as well as the hippocampus (responsible for time management and distinguishing past from present), rendering it challenging to verbally communicate or differentiate current reality from past traumatic events (Chu, 2024; Harvard Health, 2024; Van der Kolk, 2014).

This phenomenon is familiar to all of us—whether snapping during a stressful encounter or freezing during a public performance. We experience our brain and body going on autopilot. Then, once the threat has passed, the amygdala stops signaling to danger, allowing the prefrontal cortex to resume its regulatory role and restore homeostasis.

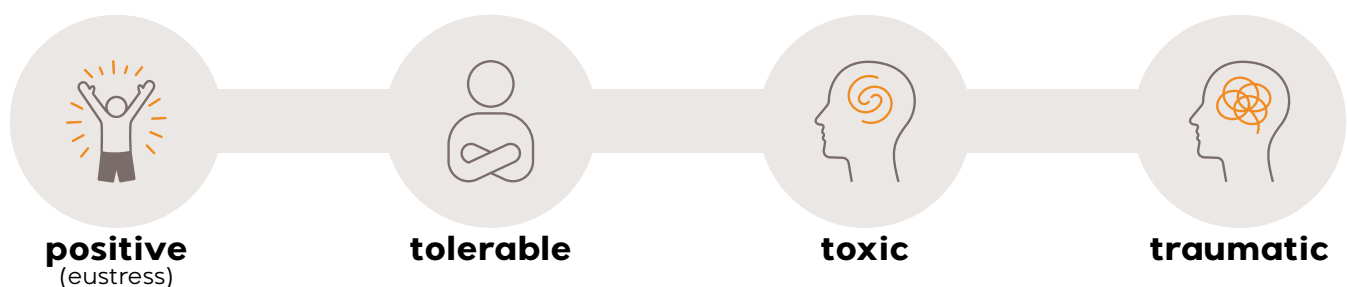
homeostasis and regulation

The intricate interplay between senses, mind, body, and brain is fundamental to human survival, with the majority of our neurological processing dedicated to survival-related functions (Steffen, 2022). Much like the ebb and flow of ocean waves, a healthy system continually strives to restore balance and stability. The more experiences we have in the safety zone, the more we build resilience, the stronger our prefrontal cortex is in moments of arousal.

However, the more time we’ve spent in dangerous or life-threatening situations, when the stressors we’re exposed to are prolonged, persistent, or unpredictable, the more disrupted and overwhelmed our regulatory mechanisms can become, resulting in detrimental impacts on our health and well-being.

stress along a spectrum

Stress exists along a spectrum, ranging from positive “eustress” to toxic and traumatic stress (AIAS, 2025). At one end of this continuum, positive stressors—such as acquiring new skills or climbing a mountain—are experiences that individuals actively seek out. These forms of stress activate our safe and mobilized ANS response (Porges, 2022). They are beneficial, offering healthful challenges that promote growth and development and foster adaptability (McEwan 2015).



Tolerable stress occupies a middle ground and encompasses circumstances like meeting work deadlines, managing household disruptions, or navigating interpersonal tensions. When experienced acutely, individuals are typically well-equipped to manage these stressors, often emerging stronger from the experience (McEwan, 2015). However, when tolerable stress becomes chronic, it can take a toll on health and well-being by continuously activating our danger-detection system. It is as if there is a steady drip of cortisol running through our body at all times. Notably, approximately three-quarters of individuals report experiencing chronic tolerable stress (AIAS, 2025).

At the more severe end of the spectrum lies toxic and traumatic stress. These experiences are characterized by their intensity and potential for lasting impact on an individual's life. According to the Substance Abuse and Mental Health Services Administration (SAMHSA), “trauma results from an event, series of events, or set of circumstances that is experienced by an individual as physically or emotionally harmful or life threatening and that has lasting adverse effects on the individual's functioning and mental, physical, social, emotional, or spiritual well-being” (2014, p. 72). Crucially, the focus is not solely on the nature of the event—rather, on the individual's personal experience of how it is internalized and embedded and the ongoing effects that follow.

impact of chronic stress

Traumatic stress manifests through a range of biological, psychological, social, and environmental factors. Biologically, individuals may experience traumatic stress as a result of injury, illness, or inadequate nutrition. Psychologically, it can stem from adverse childhood experiences (ACES), such as abuse, neglect, household dysfunction, or living with family members who struggle with mental health or substance abuse. Social and environmental contributors include excessive noise, crowding, pollution, unsafe surroundings, and broader systemic challenges, such as racism or institutional oppression (AIS, 2023). Prolonged exposure to the toxic and traumatic end of the stress spectrum impairs an individual's ability to regulate and return to a state of homeostasis (Van der Kolk, 2014). It is essential to recognize that traumatic stress is not confined to the few. In fact, by some estimates, 77% of people have experienced or are currently living with traumatic stress (AIAS, 2025), underscoring the familiar role that stress plays in our lives and the societal need to address the impacts.

Neuroscientific research reveals that chronic, toxic, or traumatic stress fundamentally alters brain function (Porges, 2022; Shatz, 1992). The prefrontal cortex, which is responsible for regulation and executive functioning, becomes less effective at restoring balance, while the amygdala shifts into a hyper-responsive state, reacting more rapidly, intensely, and for longer durations than might be considered appropriate (Van der Kolk, 2014). This phenomenon is often described as “what fires together, wires together,” highlighting that repeated activation of certain neural pathways can create a “groove” in the brain, making the reaction easier to access and habitual, even becoming the default over time (Shatz, 1992). What was initially an adaptive survival response, keeping an individual safe and alive, can become maladaptive over time, establishing entrenched fear-based responses that persist throughout life. The more we reinforce the reaction through repetition, the deeper the groove becomes.

When dysregulated and caught in a heightened arousal state, access to the prefrontal cortex is severely limited. Logical reasoning, clear speech, and prosocial behaviors become challenging, while irritability and aggression increase. Individuals are stuck in the fight-or-flight response, and in extreme cases, will flee or disassociate. The long-term consequences of chronic traumatic stress extend to physical health, exacerbating pre-existing conditions and increasing susceptibility to new ones (Van der Kolk, 2014).

Supporting individuals in achieving stable housing, employment, and relationships requires an understanding that chronic exposure to extreme stressors complicates that journey, as rewiring the brain to establish new neural pathways is a gradual process (Van der Kolk, 2014). Many people living in poverty or low-income housing, especially those who have endured biological, psychological, environmental, and/or social trauma, likely have an increased sensitivity to their environment, heightening the need to view one's surroundings as a signal of sustenance (Bona and Courtneage, 2012). Therefore, the environment's ability to communicate safety and support stress management is fundamental to promoting self-regulation and the cultivation of internal resources necessary for healthy living.

role of the built environment

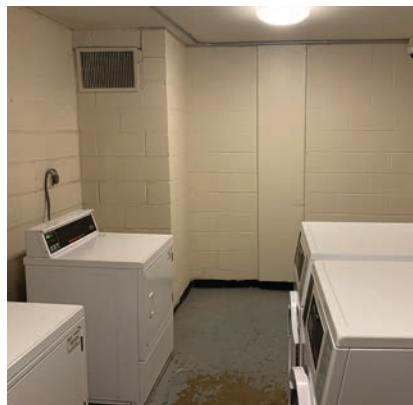
As noted, **design is not neutral**. It has the potential to be threatening and harmful or to foster health and healing.

Recognizing the profound impact of stress on our capacity to cope, contemporary research underscores the importance of how our surroundings can support our ability to self-regulate and recover from adversity (Yates, 2003). Once habitual neural patterns of chronic stress have formed, the built environment can either reinforce these patterns or provide the signals necessary for restoration and nourishment. Spaces that communicate safety and support can enable individuals to relax, even incrementally, thereby facilitating access to higher-order brain functions in the prefrontal cortex. By offering a network of support and intentional engagement in resilience-building activities, these environments can play a pivotal role in the healing process (McEwan, 2013). For this reason, architecture must be intentional and responsive, offering opportunities for generosity, connection, choice, and safety.

threatening environments

Many urban and indoor environments fall short of providing the fundamental conditions that support well-being. When spaces lack access to daylight or living systems, are noisy or crowded, are filled with sterile, institutional materials, or introduce conflicting sensory cues, the environment becomes difficult to interpret, placing significant demand on the brain to continuously filter and assess the stimuli (Browning, 2020). This narrowing of attention and activation of stress-related coping strategies can trigger a sense of danger or threat, prompting individuals to shift into a heightened and protective arousal state. This process depletes cognitive resources, leading to mental fatigue, anxiety, restlessness, emotional dysregulation, and a range of behavioral and somatic pathologies (Lipowski, 1974; Moser, 1988). As established earlier, such responses are largely automatic and subconscious, deeply rooted in our neurobiology.

Across our communities, there are spaces that make self-regulation and healing exceedingly difficult—if not impossible. When considering such places, it is vital to reflect on several key questions: *What do these spaces afford us? How do they guide behavior? What feelings do they evoke? What messages do they send about our worth?*



Even when we have enough access to our prefrontal cortex to consciously reassure ourselves that these places are not immediately dangerous, our physiological systems often tell us a different story. Research finds that in threatening environments, we experience elevated blood pressure, increased heart rate, raised cortisol levels, suppressed parasympathetic nervous system, and diminished presence of calming alpha brain waves—all directly related to environmental stress (Louv, 2011; University of Chicago, 2008)

Persistent, long-term exposure to harmful, threatening, unenriched, or overstimulating environments can result in long-term negative health outcomes, restricting our ability to thrive and increasing our risk of mood and anxiety disorders, mental health conditions, substance addiction, and chronic diseases (Achab, 2011; Peen, 2010; Clarke, 2009; Prina, 2011). This impact is especially pronounced when these elements characterize one's home—the place that should ideally provide a sanctuary and respite from the stressful outside world. When home itself becomes a source of chronic or traumatic stress, a range of adverse outcomes can emerge, including negative self-identification (Bollo, 2022). In the case of affordable housing, it is often associated with the stigma of “poor housing for those who deserve poor housing,” with residents internalizing negative perceptions that stem from the reflection of self in their living conditions (Goffman, 1963; Wacquant, 2007). Socially, this stigma is also projected onto residents by outsiders, underscoring the critical issue of dignity in marginalized and disinvested places.

nourishing environments

Nourishing and enriching spaces also profoundly shape our experiences, behaviors, well-being, and self-worth (Farrow, 2024; Shopworks, 2025). These spaces are characterized by qualities such as generosity, enrichment, connection, and choice. They activate neurotransmitters (“happy hormones”) and neuroplasticity, encouraging prosocial behaviors and fostering health - leading to significant positive long-term impacts on individuals and communities (Kuhn, 2025; Mandolesi, 2017).



Farrow Partners



Farrow Partners

As outlined earlier, due to our biological connection to the outdoors, natural settings and nature-infused spaces are the ultimate nourishing environment. These places enable us to shift our internal resources from the constant need for self-protection to the nourishment of our potential (Porges, 2022). In these settings, our nervous system can relax, and we can more easily tap into the full capabilities of our prefrontal cortex, allowing for future-oriented thinking, empathy toward others, complex logical processing, and the pursuit of optimal solutions (Kaplan 1995; Ulrich, 1991). In addition, it can lead to improved learning rates, reduced anxiety and depression, improved immune functioning and cardiovascular health, increased productivity and creativity, stronger social cohesion, and stronger feelings of calm and happiness (Browning, 2014; Browning, 2020; Kaplan, 1995).



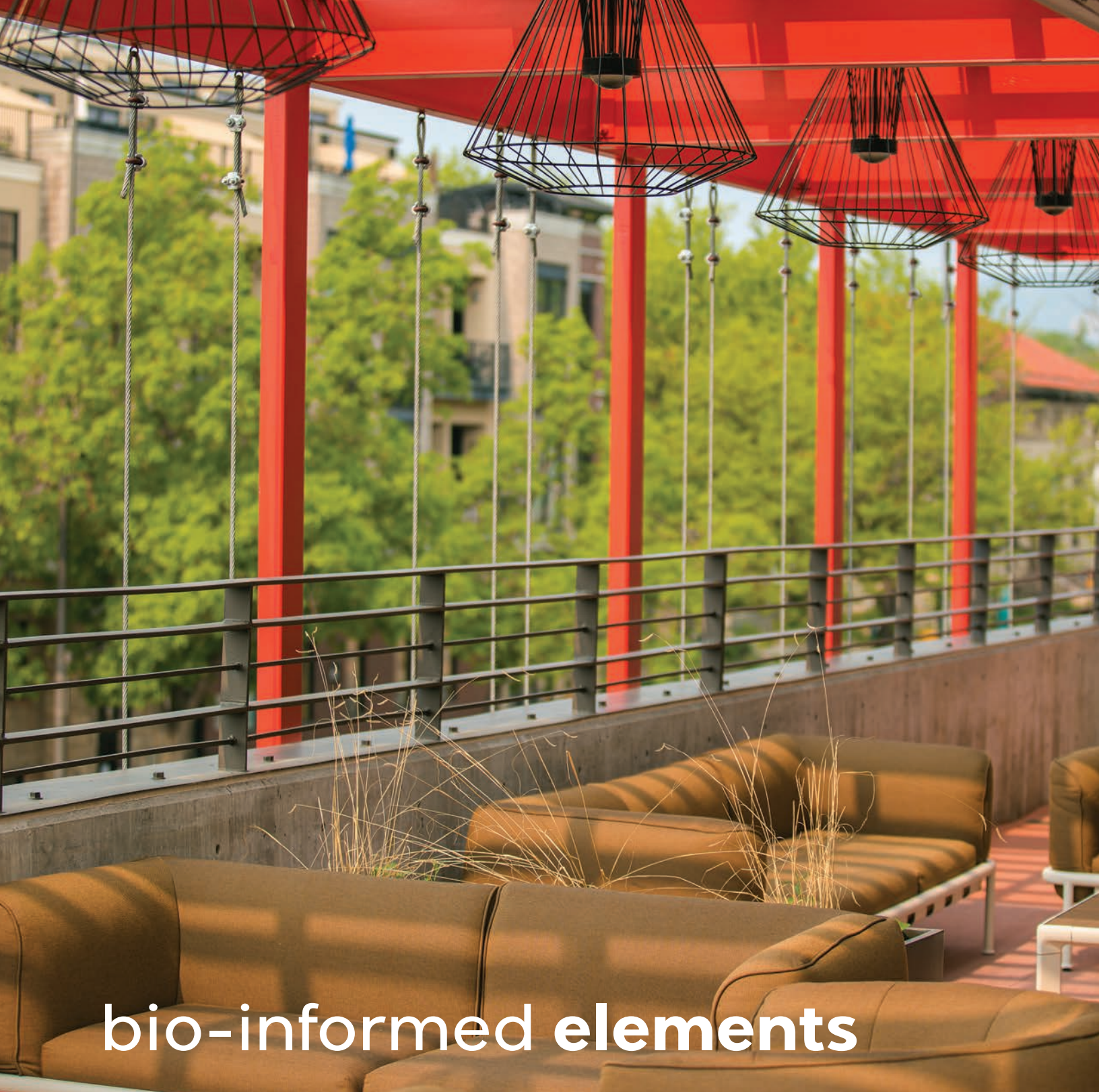
Research led by Kuo (2001) underscores the vital connection between exposure to natural environments and the body's regulatory systems; that when we feel safe, our bodies can shift their focus from protection to investing in our health and immune system building. Kuo's research showed that even modest amounts of greenery—such as a few trees and some turf—can significantly reduce mental fatigue, aggression, and violence among residents, compared to those living in more barren, nature-deprived settings. Even accounting for factors like crowding, noise, and income levels, Kuo's studies in public housing have demonstrated that residents in apartments with views of nature report increased levels of generosity, sociability, social ties, and sense of community; an enhanced sense of mutual trust and willingness to help others; lower drug use and crime rates; improved attentional functionality across ages; and improved concentration and self-regulation among children (Kuo, 1998; Kuo, 2001). These findings have been corroborated by subsequent studies. A ten-year investigation by Branas et al. (2011) found that greening urban spaces reduces crime and promotes health, while research by Maas and colleagues (2009) concluded that green spaces in residential environments are linked to greater feelings of social safety.

The benefits of exposure to nourishing environments manifest quickly and have been found to intensify with prolonged immersion. Nervous system regulation and cognitive capacity can be restored in as little as forty seconds (Lee, 2015), while mood improvements can be observed within five minutes (Barton, 201). Ten minutes of nature exposure optimizes heart rate variability and blood pressure, and twenty minutes is sufficient to return cerebral blood flow and brain activity to a relaxed state (Gillespie, 2019; Meredith, 2010). After sixty minutes, creativity is boosted, prosocial behaviors activate, and cortisol levels stabilize (Sudimac, 2022). Finally, two to three days of continued immersion in nature can significantly enhance immune cell function, specifically natural killer (NK) cells responsible for fighting off cancers (Li, 2010).

attention restoration theory

Attention Restoration Theory (ART), developed by Kaplan and Kaplan (1989), provides a compelling framework for understanding the impact of natural environments on mental well-being. ART asserts that the demands of contemporary life—ranging from navigating traffic and managing constant digital interruptions to resolving workplace challenges and making complex decisions—place a persistent strain on our attentional resources (Kaplan & Kaplan, 1989; Kaplan 1995). As these pressures accumulate throughout the day and over time, the result is fatigue and a gradual erosion of cognitive capacity, making coping with life increasingly difficult. In contrast, ART points out that natural settings engage our attention in a manner that feels effortless (“soft fascination”); even though it draws our attention, it does so without fatiguing us and, instead, restores us (Kaplan & Kaplan, 1989; Kaplan 1995).

Furthermore, the Kaplans (1989, 1995) emphasize that mental fatigue is a cumulative wearing down, not merely an absence of energy. It is a misconception to assume that someone is not genuinely fatigued simply because they can perform well under certain circumstances; temporary stressors may indeed prompt bursts of action; however, these only contribute to overall fatigue. In light of ART, the restorative power of natural environments emerges as a foundational element in sustaining cognitive functioning, emotional well-being, and social resilience.



bio-informed elements

Integrating biologically informed or bio-informed elements into our built environments is **essential for creating nourishing, life-affirming spaces.**

Drawing on biology and neuroscience through an evidence-based design approach, the following strategies are considered best practices in creating homes and housing communities that actively nurture the mind and body, supporting regulation, health, and well-being.

daylight

The profound influence of natural daylight on human health and well-being is well-established through a range of studies. Early research conducted at a Pittsburgh hospital demonstrated that patients recovering from surgery in rooms with abundant daylight required less medication and reported lower levels of stress and pain compared to those whose rooms had daylight blocked by adjacent buildings. The rooms with abundant daylight were also shown to reduce healthcare costs and shorten hospital stays, underscoring the tangible benefits of access to natural light (Walch et al., 2005).

Daylight patterns are directly connected to our circadian rhythms, which play a critical role in our overall health. This is evident in our experience with jet lag or shift work, where the misalignment of sleep-wake cycles with daylight patterns impacts mood, energy levels, and cognitive functioning (Ascione & De Pisapia, 2019). Daylight also plays a direct role in hormone secretion—notably serotonin, which regulates mood, sleep, and digestion, as well as melatonin, which orchestrates cycles of sleep, puberty, and aging (CITE). When we're exposed to electrical lighting during the night, specifically blue light, it disrupts hormone production and impacts our daily and life cycles. (Reiter & Robinson, 1995; Rossi, 1986; Shafii & Shafii, 1990; Strassman, 1991).



Research indicates that individuals with severe PTSD symptoms as well as other mood disorders, such as depression and bipolar, often exhibit an “evening chronotype,” in which the body’s natural circadian rhythm is delayed, resulting in sleep disturbances (Cho, 2016; Rumble, 2015). However, increased exposure to daylight for these individuals can shift circadian timing earlier, with those receiving more light demonstrating clinically meaningful improvements in symptoms. Having sufficient daytime exposure to natural light synchronizes the biological clock, enhancing sleep, stimulating circulation, increasing vitamin D production, improving calcium uptake in the intestine, and regulating protein metabolism (Mead, 2008). Furthermore, it counteracts the negative symptoms associated with PTSD, Alzheimer’s disease, brain injury, anxiety, and depression (Cho, 2016). In addition, exposure to abundant natural light, especially in the morning, has been shown to enhance mood and perception, lower medication usage, and shorten healthcare facility stays (De Kort, 2013).

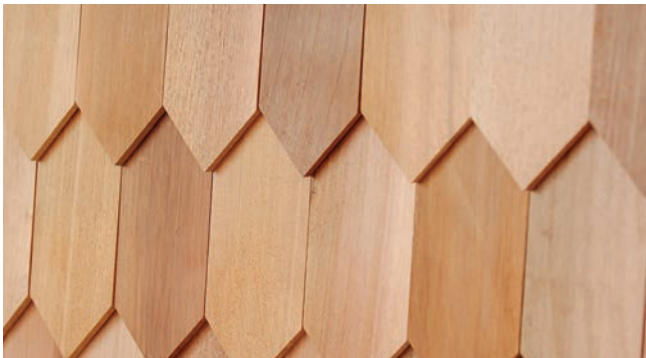
When we’re inside all day, dependent on electric lighting and surrounded by blue light emitted by screens, we disrupt our natural rhythms and lose connection to the environmental signals dictating our behaviors. One solution is to promote exposure to the cycles of daylight in our buildings, offering access and control via windows, skylights, and views of the outdoors, as well as visibility of the shifts in daylight patterns throughout the day via playful shadows and the movement of light through space.

The profound influence of natural daylight on human health and well-being is well-established through a range of studies.



patterns

As we continuously scan our surroundings, one of the primary attributes we're seeking are patterns. In extremely subtle and nuanced ways, we are most acutely attuned to the patterns associated with human faces, followed by other living systems and biomorphic forms and fractal patterns (Sussman, 2014). These sensory priorities reflect deep evolutionary, neurological, and social foundations that have always and continue to shape how we experience and respond to the built environment. When our spaces contain these familiar patterns, they require minimal visual scanning and allow for efficient processing. In contrast, environments dominated by sharp angles, excessive uniformity, lifelessness, or sterile materials—even with brief exposure—are more likely to activate an arousal state, triggering a stress or fear response (Spence, 2020). These reactions occur below conscious awareness yet directly shape behavior, mood, and well-being.



facial recognition

Research across evolutionary psychology and the health sciences suggests that humans are biologically organized around social safety. Social Safety Theory (Slavich, 2020) states that maintaining positive bonds with in-group members is a core organizing principle of human behavior. Across evolutionary history, isolation and rejection significantly increased mortality risk; as a result, threats to belonging activate stress and immune responses (Slavich, 2020). Social connection is, therefore, not simply relational; it is foundational to physical survival.

Furthermore, research on tribal cognition argues that groups that were cohesive and loyal to one another survived at higher rates, prompting members to seek out in-group favoritism, to be sensitive to exclusion, and to have a strong need to belong (Clark, 2019). In ancestral contexts, ostracism often meant “social death,” reinforcing belonging as a biological imperative rather than a cultural luxury, explaining why loneliness and social isolation can lead to increased morbidity and premature death (NIH, 2023).

Central to this survival system is the human face. The Social Face Hypothesis (Albohn, 2022) argues that the face evolved to transmit complex emotional and relational information, enabling rapid assessments of trust, alliance, and threat. Specialized neural systems prioritize faces because they reveal intention, emotion, and kinship. Facial recognition occurs almost automatically, taking precedence over all other visual stimuli (Sussman, 2014).

Familiar faces signal safety, predictability, and cooperation. In contrast, environments devoid of visible human presence can register as socially ambiguous or unsafe. From a neurobiological perspective, faces anchor us in belonging; they shift the nervous system from defense toward connection (Clark, 2019). Designing spaces that support visibility, social interaction, and human presence—through opportunities for gathering, communal activities, and authentic connection—supports this deeply embedded survival mechanisms and fosters trust and psychological safety.



living systems

Beyond faces, human attention naturally extends to other living systems, including flora and fauna. Living elements signal vitality, growth, and sustenance. When we see life and other living systems, we identify the environment as nourishing (Kellert, 1993; Wilson, 1984)—if the environment can sustain other forms of life, there is a good chance it can sustain ours as well. As such, humans evolved to monitor the behavior of animals as sentinels gauging environmental safety. If animals are calm and casually going about their daily activities, it signals an absence of predators, allowing the human nervous system to relax (Reif, 2011). Even in an urban context, the sound of bird songs increases our sense of safety (Spence, 2020). In a more modern context, animals—whether encountered directly or indirectly—evoke feelings of companionship, caregiving instincts, and prosocial behaviors (Yam, 2022).

Similarly, plants provide cues of nourishment and environmental health. The presence of plant life signals a healthy, sustaining environment by suggesting the existence of nutritious soil, available water, clean air, and biodiversity. Plants indicate a stable ecosystem and habitat (Volkov, 2006). Furthermore, our attraction to flowers is not simply aesthetic—they indicate that a plant is blooming which implies food (i.e. fruit, seeds) will soon follow (Chatterjee, 2014). Our ancestors who were drawn to these signals were more likely to survive, and we inherited that positive attraction.

biomorphic forms

Our pattern-seeking tendencies extend beyond living beings into biomorphic forms—shapes, materials, structures, and patterns that reflect the geometry, organization, and movement of nature. These natural analogues include fractals, curvilinear forms, natural materials, and organized complexity. Unlike sterile, lifeless, or monotonous environments, biomorphic forms provide information-rich stimuli that the brain can process efficiently and with minimal cognitive effort (Sternberg, 2009).

Fractal patterns—self-similar structures repeated across scales—are ubiquitous in nature; we typically associate them with the golden ratio spiral (i.e. nautilus formation), but they are the fundamental building blocks creating the foundation for all of life. They are found in everything from tree branches, lighting bolts, and coastlines to human veins, animal fur, and snowflakes. When incorporated into the built environment, fractals are processed with efficiency by the visual system. Research shows that exposure to mid-range fractal densities ($D \approx 1.3$) can reduce physiological stress by up to 60% and elicit increased alpha brain wave activity, which is associated with a state of calm alertness or wakeful relaxation (Hägerhäll, 2015; Taylor, 2021). Environments with fractals feel intuitively “legible,” enabling the brain to orient itself quickly without cognitive strain (Taylor, 2021). Fractal patterns are not limited to vision; they also appear in sound. Birdsong, crackling fire, and flowing water have fractal acoustic structures that the brain recognizes as meaningful and non-threatening (Browning, 2020). Natural water sounds, in particular, capture attention due to their evolutionary significance—access to clean water being critical for survival. Studies show that gentle water sounds outperform other auditory masking noises in supporting memory recall, creative thinking, and cognitive performance (Haapakangas, 2011; Mueller, 2021; Terrapin, 2018).





Closely related to fractals is the concept of organized complexity—features that contain layered variation, hierarchy, and coherent structure across scales (Terrapin, 2018). Natural systems are rarely uniform; rather, they exhibit nested layers, proportion, and dynamic repetition. In architecture, we see this applied in historical structures such as the Taj Mahal in Agra, India, and the Duomo in Florence, Italy, where proportional systems, texture and depth, ornamentation, and curvilinear forms create environments that support perceptual ease (Alexander, 2002; Salingaros, 2012). Organized complexity allows the eye to move smoothly through space, offering micro-restorative moments of mystery and discovery without overwhelming the nervous system. In contrast, environments characterized by flat surfaces, excessive repetition, or sharp, angular lines deprive the brain of meaningful patterns, increasing cognitive load and physiological stress (Bar, 2007; Vartarian, 2013).

Natural materials further illustrate our coherence toward biomorphic forms. Wood grain, stone veining, clay, wool, and other organic materials contain inherent variation, tactile richness, and porousness (Browning, 2020). Their irregularities, patina, and sensory depth provide multisensory feedback that synthetic, uniform materials often lack (Kellert, 2008; Pallasmaa, 2005). Because these materials carry the structural makeup of living processes, the brain recognizes them as familiar and non-threatening. Their presence supports grounding, sensory regulation, and an intuitive sense of authenticity (Browning, 2014).

In summary, the integration of human faces, other living beings like plants and pets, and biomorphic forms—including fractals, natural materials, and organized complexity—within built environments leverages our innate pattern-seeking tendencies. Thoughtful incorporation of these elements fosters restorative experiences, reduces stress, and supports optimal cognitive and emotional functioning, elevating our overall well-being.

sensory alignment

Humans are multisensory beings that seek holistic, embodied experiences to feel safe, connected, and grounded; when disoriented or experiencing sensory misalignment, it can disrupt our command of the environment and undermine these feelings (Sternberg, 2009; Sussman, 2014). The senses are in continual dialogue, influencing one another in subtle and often unrecognized ways.

Cross-sensory interactions are most effective when stimuli are congruent and aligned over the same object of focus; such combinations are processed more fluently and are generally preferred to incongruent ones, which demand greater cognitive effort (Spence, 2020). To foster a full sensory journey, it is essential to engage each of the senses in a manner that complement this preference.

Architecture has historically prioritized visual stimuli, often at the expense of other sensory modalities. Designers are rarely tasked with ensuring that the multisensory attributes of the built environment work in concert to deliver experiences that positively stimulate and support a multisensory experience (Mau, 2018). While sight overwhelmingly shapes perception, contributing to over 70% of the brain's processing effort (Spence, 2020), catering solely to it risks confusion and disassociation.



In modern environments, our visual and auditory systems are typically overstimulated, while the rest of our sensory systems remain under stimulated. This not only leads to disorientation, but it further fatigues us (Weyn, 2025). If other senses are discussed in the design of our environments, it is often regarding the elimination of negative inputs rather than the promotion of positive and balanced engagement. The discussion of sound, for example, often centers on minimizing unwanted noise rather than cultivating soundscapes or enhancing desirable auditory experiences (Spence, 2020). Similarly, the management of odors in buildings tends to focus on the elimination of negative smells, despite evidence that positive olfactory exposure can evoke powerful emotional responses. Pleasing aromas have been shown to reduce blood pressure, slow respiration, and lower pain perception (Connellan et al., 2013).

Instead, we want what we see to be what we hear, smell, and can touch; we seek alignment and embodiment. For example, we are drawn to and fascinated by multisensory non-rhythmic stimuli, such as wind blowing through the trees (which we can see, hear, and feel) and natural materials, such as wood (which offers tactile, visual, modulated auditory, and olfactory feedback). In addition, these materials express age, patina, and human use, enriching our connection to the passage of time (Browning, 2022).

Ultimately, the thoughtful integration of multisensory elements—including congruent stimuli, non-rhythmic experiences, and natural materials—can offer a sense of place, enhance orientation, and promote overall well-being. We can utilize these features to create a full sensory journey through space; one that invites people in, encourages them to explore and engage, and fosters meaningful connections.



Circular spatial configurations resonate deeply with both biological and cultural patterns of human interaction (Porges, 2011).



hearth-like spaces

In considering the intrinsic qualities of a welcoming environment, the configuration of space emerges as a critical factor in fostering community and social cohesion. Spaces designed with hearth-like characteristics of circular arrangements play a role in promoting collaboration, nurturing a sense of belonging, and enhancing prosocial behaviors. Such layouts encourage supportive interactions and collective engagement as well as facilitate greater visibility and reduce hierarchies among individuals (Falout, 2014; Marx, 1999).

Circular spatial configurations resonate deeply with both biological and cultural patterns of human interaction (Porges, 2011). From an evolutionary and neurobiological perspective, face-to-face arrangements organized around a shared center support social attunement, trust building, and emotional regulation. Research in social neuroscience suggests that mutual visibility of facial expressions and body language enhances empathic accuracy, activates mirror neurons, and supports oxytocin-mediated bonding—all of which contribute to feelings of safety and affiliation (Porges, 2011; Rizzolatti & Craighero, 2004; Zak, 2012). Circular formations also minimize dominance hierarchies by reducing spatial cues associated with authority or control, distributing attention more evenly and supporting reciprocal listening and turn-taking (Hall, 1990; Sommer, 1969).

Circular spaces, especially when centered around a focal point like fire or food, have long served as foundational settings for storytelling, knowledge transmission, and collective decision-making. Across Indigenous, ancestral, and communal traditions, these spaces function as both a spatial and symbolic equalizer, representing continuity, relational accountability, and shared stewardship (Basso, 1996; Cajete, 1994). Further, these spatial practices support oral traditions, intergenerational learning, and shared meaning-making, reinforcing norms of respect, attentive listening, and collective responsibility and embedding social and cultural values directly into the built environment (Tuan, 1977; Wilson, 2008).

When translated into a contemporary context, hearth-like circular spaces reintroduce deeply rooted biological and cultural cues, signaling psychological safety and shared ownership. In doing so, they create conditions that invite practices of sharing, listening, and storytelling—core mechanisms through which trust is built, dignity is affirmed, and social cohesion is sustained (Pallasmaa, 2012; Scannell & Gifford, 2014).





prospect & refuge

The design of spaces that support intuitive wayfinding and mental mapping is deeply rooted in human evolutionary tendencies. Biologists categorize humans as a “thigmotactic” species—a term denoting our instinctual wayfinding strategy of staying close to walls, edges, and perimeter objects such as hedges and trees (Sussman, 2014). This primal preference leverages the visual, auditory, and tactile cues offered by borders, helping individuals define the limits of an environment and identify potential escape routes (Kallai, 2007). This phenomenon is clearly observable in plazas and public squares where people naturally congregate along the periphery rather than occupying central open areas (Sussman, 2014). We also see this behavior commonly displayed in a preference for booth seating along the edge of a restaurant over open tabletops in the center of the space.

This preference mirrors what early humans sought in nature, remaining at the edge of open plains with tree lines at their backs offering safety and orientation (Appleton, 1977). Research indicates a visual preference for moderately complex, savannah-like environments (Balling & Falk, 1982; Joye, 2007), where scattered patches of trees provided early humans with both opportunities for protection from predators and vantage points for surveying the plains (Appleton, 1975; Joye, 2007).

Empirical studies have found a correlation between increased anxiety and heightened thigmotactic tendencies, suggesting that individuals who experience greater anxiety are more likely to seek out the security of edges (Kallai, 2007; Walz, 2016). Conversely, those who can rapidly construct mental spatial maps—an ability linked to prefrontal cortex activity—are more apt to venture away from the periphery and navigate the central areas of a space (Sussman, 2014).

This tendency reflects the architectural principle of prospect and refuge, as articulated by Christopher Alexander in *A Pattern Language* (1977). Within the prospect-refuge theory (Appleton, 1975), prospect refers to the evolutionary need for expansive and clear views of the surrounding environment, offering orientation and enabling individuals to locate essential resources such as home, community members, food, and water; one can easily identify their opportunities and challenges, establishing command of the space (Appleton, 1975; Joye, 2007). The need for refuge refers to spatial conditions that offer a sense of enclosure, protection, and retreat, allowing individuals to feel sheltered while remaining connected to their surroundings (Appleton, 1975). Spaces that provide sightlines with partial enclosure—such as alcoves, overhangs, and nooks—reduce cognitive and physiological stress by limiting unpredictable stimuli and reducing our vulnerability from behind (Porges, 2011; Ulrich, 1984). When individuals feel protected, they are better able to rest, reflect, be introspective, and engage voluntarily in the surrounding activities.

Prospect and refuge also play a critical role in supporting autonomy and dignity. The ability to choose when and how to engage as well as withdraw from social interaction is a key component of perceived control (Altman, 1975; Evans & McCoy, 1998). It allows individuals to remain present within a community, assess their choices, and decide upon their level of participation, offering a dignified alternative to total isolation or forced exposure. This balance is particularly important for individuals with traumatic histories, sensory sensitivities, or who are neurodivergent.

Translating these insights into architectural practice, the intentional incorporation of “places of pause” (Hoffman, 2019)—such as window seats, hallway nooks, social stairs, and sidling spaces on the edges of communal areas—can greatly impact legibility, comfort, and attachment to the spaces we inhabit, thereby supporting both individual and collective well-being.



the outdoors

No amount of interior architectural biophilic design intervention will ever negate our need to spend time outside in nature, so the highest order of business for the biophilic designer—and truly society—is to create spaces that draw people out and keep them there for more than a few minutes each day.
McLennan (2019)



As McLennan (2019) emphasizes, “A key principle to establish under the framework of nature immersion is that any design that can get people outside, for as long as possible—using porches, covered walkways, courtyards, balconies, etc.—will always greatly outdistance anything that can be done inside a building. These types of design features prolong our exposure to nature, drawing down that 95%. No amount of interior architectural biophilic design intervention will ever negate our need to spend time outside in nature, so the highest order of business for the biophilic designer—and truly society—is to create spaces that draw people out and keep them there for more than a few minutes each day.” (p 15).

The outdoors effortlessly contains the elements that support our biological selves, including daylight, living beings, living systems, biomorphic forms and fractal patterns, multisensory features, and instinctual wayfinding strategies. With little to no curating, it offers essential elements for supporting self-regulation and stress recovery in ways that interior spaces cannot fully replicate. Exposure to natural light, fresh air, vegetation, and changing weather patterns has been shown to reduce cortisol levels, improve immune functioning, support circadian rhythms, and enhance mood and cognitive restoration (Kaplan, 1989; Kuo, 2015; Ulrich, 1984). Even brief or passive contact with outdoor nature—such as sitting on a porch, walking through a courtyard, or observing greenery from a shaded cover—can activate restorative processes that support both mental and physical health (Kaplan, 1989). These effects are most effective when outdoor spaces are perceived as safe, comfortable, legible, and offer relief from harsh elements.



Outdoor spaces also play a critical role in shaping social life and community cohesion. Semi-public and communal exterior environments—such as courtyards, gardens, pet amenities, and stoops—create low-pressure opportunities for informal and flexible social interaction and casual surveillance of the shared space. Research in environmental psychology and urban design suggests that these spaces support social connectedness by facilitating chance encounters, reinforcing social norms, and strengthening place attachment (Gehl, 2011; Scannell & Gifford, 2014; Whyte, 1980). When designed with care, outdoor spaces reinforce a sense of belonging and continuity, anchoring individuals within both social and ecological systems (Hayden, 1997; Tuan, 1977).

In addition, the equitable provision of high-quality outdoor environments is increasingly recognized as a matter of public health and social justice. Disparities in access to safe, well-maintained outdoor spaces are closely linked to inequities in physical health, mental well-being, and social opportunity (Jennings et al., 2012; Kuo, 2015). Designing outdoor environments that are accessible, inclusive, and responsive to diverse needs affirms the dignity of all users and supports sustained engagement over time. When outdoor spaces are thoughtfully integrated into the everyday rhythms of life, rather than treated as optional amenities, they become powerful places for resilience, connection, and long-term well-being.

Clearly, the environments we occupy play a critical role in our well-being. It is unrealistic to expect positive health outcomes in environments that are malnourished. If our goal is to achieve better health and life outcomes for ourselves and our community, our surroundings must actively support these objectives.

connection to dignified design

The principles explored throughout this paper—including daylight, biomorphic patterns, multisensory integration, hearth-like spatial configurations, and the balance of prospect and refuge—align closely with the core tenets of Dignified Design. Dignified Design advocates for environments that support and foster health—“The health of individuals, neighborhoods and communities, and, ideally, all living things. It acknowledges that nothing we design is neutral and that the places we inhabit shape our ideas about who we are and what we deserve. As an ideal, Dignified Design aims to create places that protect, promote, and celebrate the dignity of life” (Brisson et al., 2025, p. 1).

Biophilic design and Dignified Design intersect through a shared emphasis on providing sustaining, life-affirming places that support human well-being and self-regulation, foster connection, and signal the intrinsic worth of individuals through the built environment. Biophilic design focuses on strengthening our relationship to our biological selves through access to nature, natural analogues, space configurations, and sensory experiences that reflect natural systems. Dignified Design similarly centers the human experience but expands beyond physiological and psychological safety to address personal autonomy, belonging, respect, and self-worth. Together, these approaches recognize that design bears an impact, whether it be positive or negative; it actively shapes how people feel, behave, heal, and connect with themselves, others, and their surroundings.

Both biophilic design and Dignified Design support trauma-informed principles by acknowledging the stress of everyday life and prioritizing environments that support regulation and well-being. Biophilic strategies have been shown to lower stress levels, promote restoration, increase immune function, improve mood, and enhance cognitive functioning. These outcomes directly reinforce the core Dignified Design principles of creating spaces that foster safety through comfort, community, and control, particularly for individuals who have experienced chronic traumatic stress and/or marginalization (Wilson et al., 2025). When integrated thoughtfully, biophilic elements can help create environments for dignity to be experienced and sustained.

While biophilic design provides evidence-based strategies that support health and well-being, Dignified Design additionally promotes a lived-experience approach that seeks the input of community experts to guide how those strategies are selected, implemented, and evaluated (Brisson et al., 2025). Together, these approaches move beyond shelter as the minimal standard of care toward the creation of communities that are not only healthier but more humane, inclusive, and responsive to the human experience.



dignified design attributes

The Dignified Design attributes of sensory engagement, nested layers, and identity anchors—which afford for the core principles of safety, comfort, community, and control—closely intersect with central biophilic design principles.



sensory engagement

Sensory engagement resonates with biophilic design’s emphasis on the need for an aligned, multisensory journey while one inhabits and moves through space. Biophilic principles encourage dynamic, sensory-rich experiences through elements such as natural light variation, vegetation, water features, natural sounds, and porous materials. Similarly, Dignified Design’s focus on modulated, enriched, and generous environments emphasizes opportunities for people to actively engage with, receive positive feedback from, and care for their surroundings.

nested layers

Nested layers emphasize the importance of spatial relationships, gradations of privacy, and opportunities for choice as individuals navigate between personal and communal environments. This attribute intersects with biophilic design principles that emphasize spatial variability, prospect and refuge, hearth-like spaces, and the creation of diverse environmental experiences. Natural environments rarely present as singular or static; instead, they are composed of layered systems that allow individuals to seek out whatever they need in the moment. Translating this into built environments supports choice, autonomy, and safety—key goals of Dignified Design (Wilson et al., 2025). When biophilic spatial patterns are intentionally integrated into these layered environments, they support both psychological restoration and dignity by allowing individuals to exercise meaningful choice in how they experience their surroundings (Browning, 2020).

identity anchors

Identity anchors connect strongly with biophilic design’s focus on place-based and culturally responsive relationships with nature. Biophilic design increasingly recognizes that preferences for distinct natural settings are not universal but are shaped by individual experiences, cultural norms, and shared community narratives. Identity anchors reinforce this by embedding a constellation of resonant touchpoints throughout an environment through elements such as art, materials, language, ritual spaces, symbolism, and opportunities for personalization that reflect the community’s ecological, historical, and cultural values. These place-based references help individuals form emotional attachments to their surroundings, strengthening a sense of belonging, social cohesion, and collective resilience (Manzo, 2006; Scannell, 2010).

Together, these intersections demonstrate how biophilic design and Dignified Design are mutually reinforcing. Biophilic principles provide evidence-based pathways for enhancing health and well-being, while the Dignified Design attributes ensure these strategies honor the inherent value and worth of those who occupy these environments.

conclusion

The comprehensive exploration of biophilia, biophilic design, and Dignified Design throughout this paper underscores **a life-affirming orientation to the built environment—one that intentionally promotes and enhances human health and dignity.**



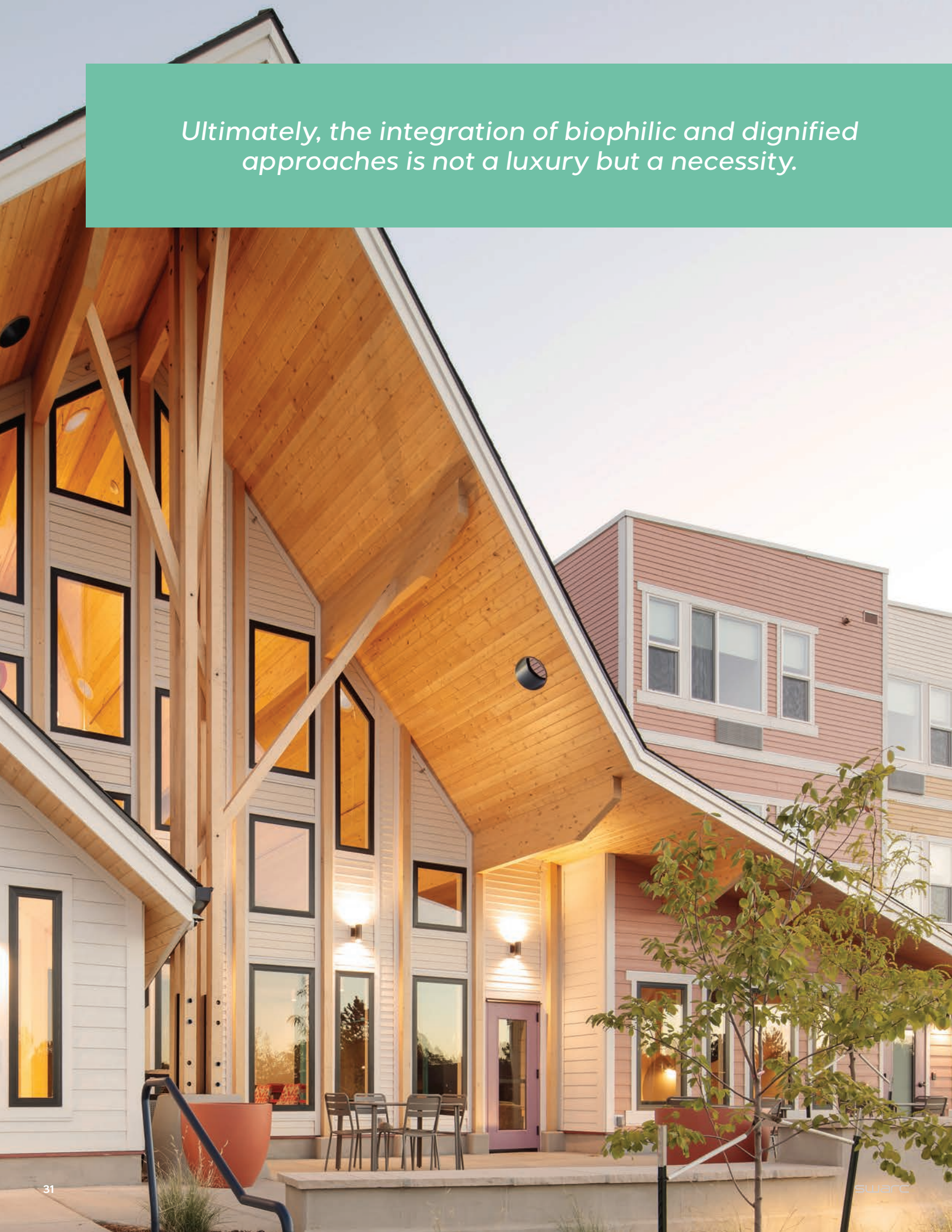
By recognizing our instinctive bond to nature and the profound influence of our surroundings on physical, mental, and social health, we affirm the necessity of integrating biophilic and nature-infused elements into the spaces we inhabit.

Biophilic design provides an evidence-based framework for reconnecting people with nature, particularly in urban and low-income housing contexts where access to restorative environments is often limited. The reviewed research reveals that the thoughtful application of natural elements can promote emotional regulation and foster resilience, benefits that are particularly critical for individuals and communities facing biological, psychological, environmental, and social trauma.

Dignified Design builds upon these foundations by emphasizing equitable, contextually nested, and experientially informed principles. The attributes of sensory engagement, nested layers, and identity anchors ensure that biophilic strategies build upon biological need to become sources of health, healing, social value, and dignity.

Ultimately, the integration of biophilic and dignified approaches is not a luxury but a necessity—especially in the context of affordable housing and environments bearing a historic legacy of disinvestment, stigma, and harm. These frameworks empower designers, developers, and other stakeholders to strive for restorative, inclusive, and deeply life-affirming design; they challenge us to move beyond mere shelter toward environments that actively nourish our biological selves. In doing so, we lay the groundwork for lasting health, equity, and dignity within our communities.

Ultimately, the integration of biophilic and dignified approaches is not a luxury but a necessity.



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