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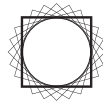
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01

An Interlace of Regenerative Design in Ambulatory Care:

Emerging Practices and Principles of Healthcare Decentralization in Community-Based Design

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Abstract

What design strategies should be used for expanding the boundary of healthcare facilities beyond the conventional norm? How could design practice create a facility that is more than a community wellness center? This paper focuses on the expansion and decentralization of healthcare within a community context. For academics and practitioners, the changing landscape of the healthcare system has offered different opportunities within the built environment to enhance the community's well-being. To establish a point of departure, this study employs the methodology developed in an earlier collaborative academic research based on a series of in-depth and systematic precedents study to investigate and identify the embedded spatial principles underlying social characteristics of a set of selected healthcare cases, generating a repertoire. As a result of this research, design patterns were created to develop a program framework through three lenses of focus: Patterns of Biophilic Design, WELL Building Standard®, and Community-based Design. The methodology extracted from the case studies analysis is mapped into analyzing Piedmont Pinewood Wellness Center. This case study has been selected because of its intent to invest community-based wellness globally by a healthcare system, which offers an inspiration resource related to redefining programs within a medical facility. Its community is addressed via non-medical determinants. The finding unfolds how a facility could holistically operate as a place for the physical, mental health of the individuals and the well-being of the community.

Keywords: *non-medical determinants, regenerative design, community-based health design, patterns of biophilic design, WELL Building Standard®*

1.0 Introduction

This study inquires how the standard healthcare typology can be reshaped to address medical, mental health, and community needs. The healthcare system in the United States is complicated due to many factors, including access to medical services and insurance. Within this context, the decentralization of our medical institutions can offer alternatives to the convoluted healthcare system by giving consumers more options and better care. A CVS Health study found that 72% of Americans believe that the U.S. health care system does

not work for them¹. What is even more appalling is that 23% of Americans say their health care has gotten worse.

This study seeks to outline an architectural framework for wellness, prevention, and early detection to confront these alarming concerns for developing a more holistic healthcare narrative. Within its theoretical and methodological line of inquiry, the research examines integrating regenerative design into healthcare facilities to recreate public spaces and standardize well-being at individual and community levels.

As a case study, the Piedmont Pinewood Wellness Center is reviewed through the design parameters of three lenses: the Patterns of Biophilic Design focused on building human connections with nature through design by William Browning and Catherine Ryan of Terrapin Bright Green; the Wellness Patterns based on the WELL Building Standard®; and lastly, the Community Patterns concentrated on creating walkable living spaces. The article serves as a bridge between earlier academic research and a built project to stimulate restructuring the design process for a more efficient health care service and access.

1.1 Literature Review

We focus on the whole systems approach to study the wellbeing design standards for a deeper understanding of the current healthcare industry. To address the impacts of the built environment on public health, the study expands the focus from the resilient regenerative design for creating sustainable built environments, emphasizing Biophilic Design Patterns and WELL Building Standard®. Guenther argues that "architecture for health is about more than curing human illness. It is also about regenerative design, where buildings become net resource generators rather than resource consumers, and where initiatives are established to prevent the causes of epidemics"². Guenther's work led us to look deeply at social interaction in public spaces and the needs of communities regarding healthcare. To focus on regenerative design within public health, non-medical determinants expand the boundaries of a conventional healthcare setting by offering a new lens that investigates the connections to communities. While this is not a new concept to the health system, it has not been applied and implemented system-wide, hence our inquiry into biophilic, wellness, and community-based design and their possible impacts on the built environment.

1.1.1 Non-Medical Determinants

Non-medical determinants are defined as "those that fall outside the sphere of medical/health care, generally speaking, but that has been shown to affect health status and, in some cases, access to health services."³. Non-medical determinants can be a means

to Regenerative Design within the healthcare industry, as previously mentioned by Guenther. This can be traced in a few hospital systems. Within New York state hospitals, as a case, "some hospitals have developed programs addressing non-medical health determinants—such as access to healthy foods and parks, housing, and employment—by partnering with community organizations and local government. These programs require relatively little investment; they leverage the hospital's key role and relationships in the community to catalyze change"⁴. Non-medical determinants positively impact the overall community, but they benefit from boosting social interaction through various levels of engagement. Valuing non-medical determinants can help optimize urban planning and building healthier communities.

Further rectifying improper land use by utilizing non-medical determinants will allow for better health care outcomes. Chen et al. state, "there are multiple health determinants other than medical care, including social factors such as education, poverty, inequality, and the built environment. While it has been estimated that only 10% of the health determinants can be attributed to clinical care, 40% has been attributed to social and economic factors, 30% to health behaviors, and 10% to environmental factors"⁴.

1.1.2 Building Restorative Healthcare

Restorative healthcare focuses on medical centers delivering positive outcomes for individuals and communities. Guenther addresses the state of health care architecture by asking: "Can traditional healthcare organizations be leveraged to catalyze transformation within their walls and in their communities to bend the chronic disease curve, fundamentally reducing the environmental, social, and economic causation of asthma, obesity, and diabetes?"². Guenther makes the case that medical facilities should be able to do more for the communities they serve. The author believes that the healthcare industry is at a significant turning point; the transition will be from green design and high performance to regenerative design and healing buildings. Guenther states that "the healthcare industry is in a pivotal position to lead a reintegration of social, economic, environmental, health, and resource balanced sustainable practices of restoration and

healing. The sector can move beyond a focus on doing 'less harm' to a future that positively contributes to the conditions that foster individual, community, and global health². Taking a restorative approach to health care will transition medical facilities from only doing less harm to providing concrete benefits to the communities these facilities serve.

1.1.3. Biophilic Design Patterns

Patterns of Biophilic Design offer pragmatic applied performative criteria to measure place-making and built environment projects in creating healthy places for humans and living systems⁵. Wilson first popularized the term biophilia in his book *Biophilia*⁶. Wilson proposed that the "tendency of humans to focus on and to affiliate with nature and other life forms have, in part, a genetic basis"⁵. Since Wilson introduced it, the term has been used in various settings and forums depending on the field of study being discussed.

It was not until 2014 that biophilia in architecture was standardized. Browning, Clancy, and Ryan define biophilia simply as "humankind's innate biological connection to nature"⁵. Similar to the Building WELL Standard, biophilia also has measures that are configured into three larger groups. "Nature in the Space addresses the direct, physical, and ephemeral presence of nature in a space or place which includes plant life, water and animals, as well as breezes, sounds, scents, and other natural elements"⁵.

1.1.4. WELL Building Standard®

Dunn is noted as the father of wellness. His paper 'High-Level Wellness for Man & Society'—published in 1959—established the foundation for a more inclusive and innovative approach to healthcare. Dunn argued for healthcare as more than the mere absence of disease; he defined wellness as "an integrated method of functioning, which is oriented towards maximizing the potential of which the individual is capable"⁷. This mode of thinking provided a lasting effect on the healthcare industry. It restructured patient care by establishing personal responsibility as well as correct practices and attitudes. Since 1959, there have been numerous attempts to redefine and reevaluate wellness as a broader concept. Ardell formulated a definition of

wellness that hit on many of the same points as Dunn but provided additional details. He argued that wellness is "self-responsibility, nutritional awareness, physical fitness, stress, and environmental sensitivity"⁸. Today, the WELL Building Standard® is the guideline and tool for measuring wellness in the built environments. The WELL Standard integrated best practices in design and constructions with evidence-based health and wellness interventions. It promotes human health, well-being, and comfort in the built environment. Thus, implementing strategies, programs, and technologies designed to encourage healthy, more active lifestyles and reducing occupant exposure to harmful chemicals and pollutants is the primary objective of this standard⁹. The wellness standards within the Building WELL Standard stress qualities such as Air, Fitness, Water, Comfort, Nourishment, Mind, and Light.

1.1.5. Determinant Community Social Interaction

In professional practice, community designers recognize and resolve specific issues that link social, economic, or political aspects of a community¹⁰. Understanding how community functions and activates their urban space is key to improving social interaction for all involved. At the same time, a framework of non-medical determinants must be created to usher in restorative health care. Non-medical determinants play a crucial role because they rely on community engagement and a diverse number of organizations. An emphasis on cultural identity will advance healthcare design closer to bringing about positive results for individuals and communities. Collier and Thomas have theorized the properties of cultural identity by merging communication and social construction ethnography¹¹. To Collier, cultural identity is self-identification, a sense of belonging "to a particular way of living, including language, religion, art, food, values, traditions, or any other day-to-day practice; associated with the historical experience of a particular group of people"¹². All these factors must be maintained and even enhanced to improve communities.

Community patterns explore how people are connected to the area and environment around them. The community patterns focus on Walkability + Connectivity, Quality of Life, and Quality of Design. Specifically, creating walkable spaces is important in community design. Creating a walkable community allows residents

to have greater access to their local facilities and places of business.

Additionally, walkable spaces creates opportunities for residents to interact with others to develop healthy relationships. Streets should be designed in a pedestrian-friendly way to facilitate walking and bike riding. An ideal urban space would have many mixed-use facilities. This creates diversity in all life facets; residents would be near individuals of different backgrounds, socioeconomic status, and cultures. A community designed in this way provides benefits to the residents, businesses, developers, and the local government. A walking-friendly urbanscape will allow people greater access to businesses, shops, and restaurants. Developers would benefit due to a proliferation of mixed-use projects in the area, which can increase property values. Municipalities will benefit from cost savings; there would be less use of roads, improved health of residents, and a healthy and vibrant overall community. This community would emphasize aesthetics and ample green space so that residents can maintain a healthy lifestyle in their day-to-day lives

2.0 Design Framework and Methodology

Architectural researchers and practitioners have often relied on qualitative research methods applicable to the architectural profession and academia. Qualitative methods employ non-numerical strategies such as case study research to investigate research questions¹³. Case study research, as a strategy of inquiry, has been utilized for this research methodology. The study reports on a qualitative method for analyzing the built environment applied previously in an academic setting for a comparative morphological evaluation of selected case studies across the world on a wide array of climate zones. Within the cases' analysis, a qualitative inquiry of defined standards was explored to understand each case in-depth in its context. The design patterns combine the research results authors accumulated in earlier collaborative research at the Eco-Morphology Lab focused on three core areas as drivers to influence the design process: Patterns of Biophilic Design, WELL Building Standard®, and Community-based Design. The research investigated a series of analytical case studies and precedents parallel to the theoretical literature resulting in overlapping design standards and patterns to advance wellbeing and community connectivity, as shown in Figure 1.

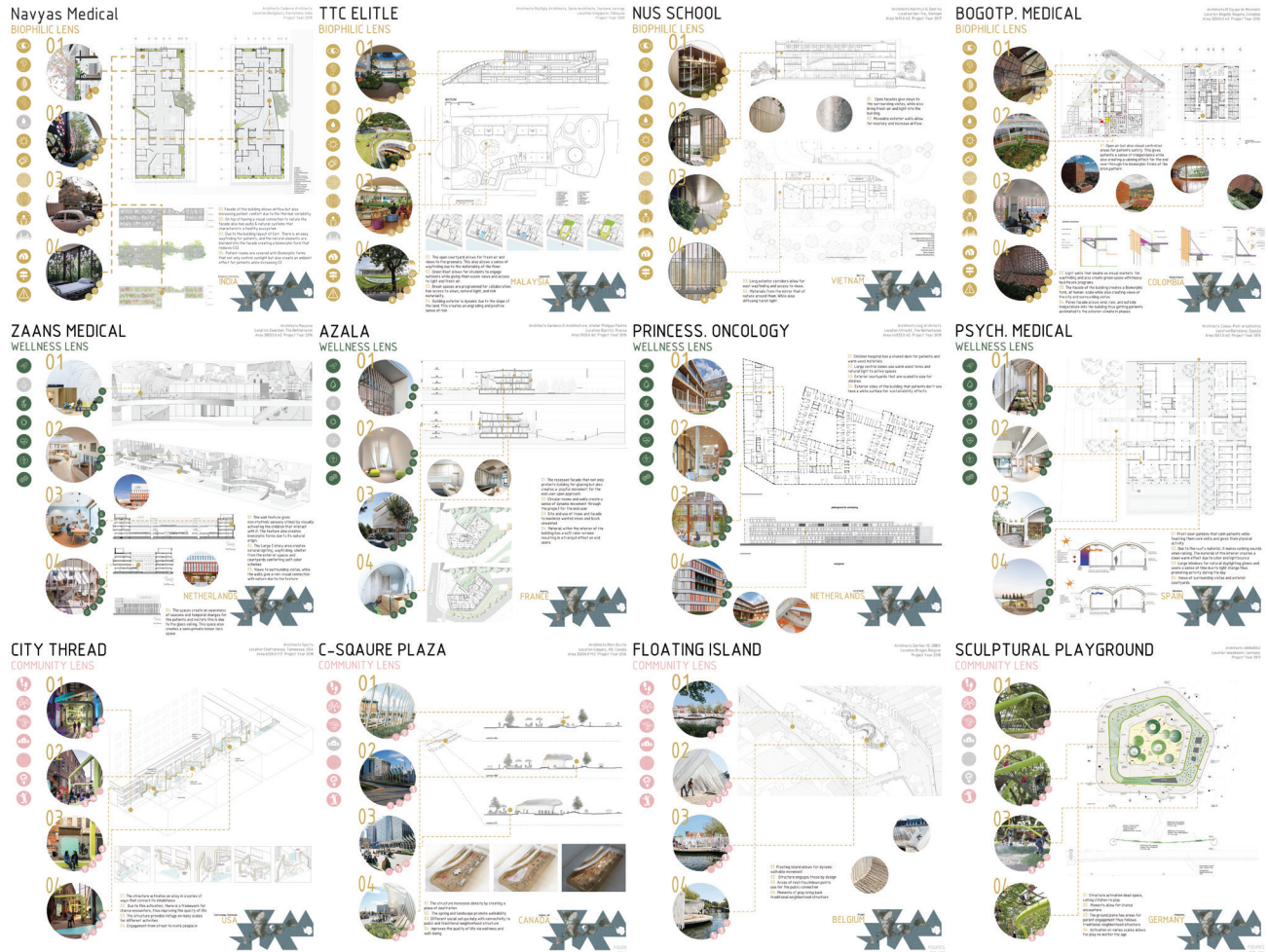


Figure 1: A brief selection of cases from the comparative analysis and qualitative research conducted at the Eco-Morphology Lab

3.0 Research Case Study

Prominent for its medical care, Piedmont Healthcare has recognized the critical role of prevention and invests profoundly in the notion of wellness in the community. Their Fayetteville, Georgia facility, known as Piedmont Wellness Center, has been selected as an intriguing case for this study. Opened in October 2019, the two-story facility offers more than 60,000 square feet for containing functional fitness spaces and healthcare spaces for medical professionals. As a medically integrated wellness center, the center intertwines the Piedmont Fayette Hospital, Pace Lynch Corporation, and Pinewood Forest area. Pinewood Forest, a

235-acre master-planned residential and mixed-use development, is about 30 minutes south of downtown Atlanta. The walkable town was designed with several green features as the country's first geothermal and solar energy-powered micro-home village.

3.1. Biophilic Design Patterns

Through the lens of Biophilia patterns, a review of the Piedmont Wellness Center highlights human connections with nature on multiple levels, as shown in Figure 2. There is a clear focus on material, biophilic form and visual connection with nature. In the Center, the active spaces

BIOPHILIC LENS



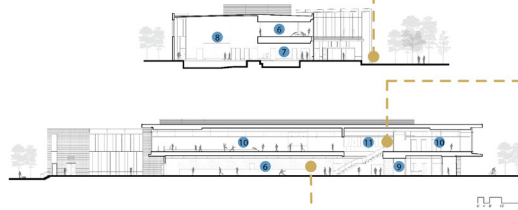
01. Abstracted tree limbs served as the muse for the design of feature wall graphics.



02. It blends different materials to create pops of colors that brand the clients' message and showcases the community-the wall serves as a wayfinding element throughout the building.

Section North-South
Section East-West

- 6 D1 Sport Fitness
- 7 Therapy Pool
- 8 LAP Pool
- 9 Lobby/Reception
- 10 Open Fitness
- 11 Physical Therapy



01



02



03. The community stairs blend materiality, cross-function, views, and daylight into one node.



03

Figure 2: Through the lens of the biophilic design patterns.

are oriented to provide a constant visual connection to nature with maximum transparency. The design team incorporated boot camp-style workout areas with floor-to-ceiling doors that open during more excellent weather. There is a constant emphasis on views of nature and the transition between exterior and interior space. The building layout and facades enrich multiple patterns of visibility and accessibility across interior/exterior boundaries, as presented in Figure 4.

Structural wood decking is utilized in critical areas to further that connection to the surrounding environment, while environmental graphics blend the mission of Piedmont Healthcare with natural visual forms. Beyond the building, the facility users will be able to take advantage of activity lawns and miles of trails being developed as part of the community. Hiking trails run through a grove of trees just beyond the building's footprint. Walkers will find art installations along the way to promote visual therapy-based psychological and physiological healing

WELLNESS LENS



01. Within the nested breakout spaces, the corridor has seating along the exterior glass to connect with the grove.

02. The physical therapy gym has natural daylight and views of the groves. The use of interior glass intentionally created a sense of transparency between the inhabitance and the therapist.

03. The natatorium has both views of the surrounding nature and warm wood tones in the ceiling, absorbing sound and creating visual cues for the swimmers.

Figure 3: Through the lens of the biophilic wellness patterns.

3.2. Wellness Patterns

This facility provides patient-centered care where convenience, care, preventive methods, and programs are significant factors. Having an exam and walking 20 feet to the pool, spa, or yoga makes healing easy and enjoyable. There is an importance placed on preventive care at Piedmont, thus creating a path for clinical spaces to be nestled into the center's program.

The graphic art on the primary diagram connection within the building supports the standards of wellness. Branding and visioning, based on clients' vision and mission, introduced the 10 dimensions of wellness: physical, emotional, spiritual, career, intellectual, environmental, social, mind, community, and innovation. The ideas are represented as photos and patterning on the walls that serve as a spine that connects the entry and classrooms to the therapy and lane pool at the

furthest end of the building—reminding the inhabitants that surrounding the environment and personal efforts play into their wellness. The swimming area contains a therapy pool and a lane pool with direct views of nature and daylight, as presented in Figure 3.

Using passive and active sustainable design strategies, the building's placement alongside a grove of old-growth trees provides shade in the summer while exterior green screens reduce solar heat gain. The design team has utilized research knowledge and environmental understanding to support design ideas such as daylighting and access to fresh air flow. Education is woven into care and the idea of a sense of joy in a daily routine

3.3. Community-Based Design Patterns

The Pinewood Forest residential and commercial development is situated on 234 acres, including mixed-use retail, office/commercial/retail, hotel rooms, multi-family, live-work units, townhome units, and single-family residences. The Wellness Center was in large part designed to service this rapidly growing community and movie industry types alike. The facility is part of the "new urbanist" Pinewood Forest community which includes miles of nature/walking trails. The design seeks to heighten the idea of communal wellness by strengthening the connection between people and nature while bringing the community together in a simplified building form, which is situated adjacent to the distinguishing natural feature of Pinewood Forest known as The Grove, as shown in Figure 4.

In the center, hundreds of different wellness programs and exercise equipment are available to the community and Piedmont patients. The 54,000 square foot medically integrated health and fitness centers are composed of the following features: 1,300 square feet of outdoor exercise area; child care, massage therapy and personal training; group exercise studios (including aerial yoga,

boxing, etc.); full-service locker rooms; upscale cardio, functional training, and resistance equipment; aquatics area with 6-lane lap pool and warm water therapy pool; immersive bicycle experience; heart-rate based group training areas; and a human performance area. While the facility acts as a place for holistic physical and mental health and well-being, education is at the root of Piedmont's wellness philosophy. Test kitchens promote nutrition, and classrooms allow for meditative teachings.

The Wellness Center engages with the outdoors outside a wall of glass, connecting with a central park, an open-air elevated exercise platform, activity lawns, and more than 15 miles of integrated trail and path systems that meander throughout the mixed-use neighborhood community and nature preserve areas. Access to community and clarity of wayfinding has been ranked walk scores of above 80 by Active Design.

3.4. Design Patterns Overlay: Evidence-Based Design (EBD)

A significant component of the project concept was based on Evidence-Based Design (EBD) research. It stemmed from an extensive review of biological and behavioral responses within the practice of EBD. The project design team utilized findings to support design moves and actions such as daylight and circadian light, views to daylight and nature, and the connections to walking paths through the local community. The exterior becomes an extension of the building, displaying biophilic design patterns. Simultaneously, the distinctive branding elements and materiality of main nodes in the Center highlight wellness patterns. Finally, the projects' location, overall massing, and programmatic breakdown demonstrate the community patterns.

Within the intersection of health and wellness, the facility provides patient-centered care where convenience, care, and preventive methods and programs are promoted to help set this project apart.

COMMUNITY LENS

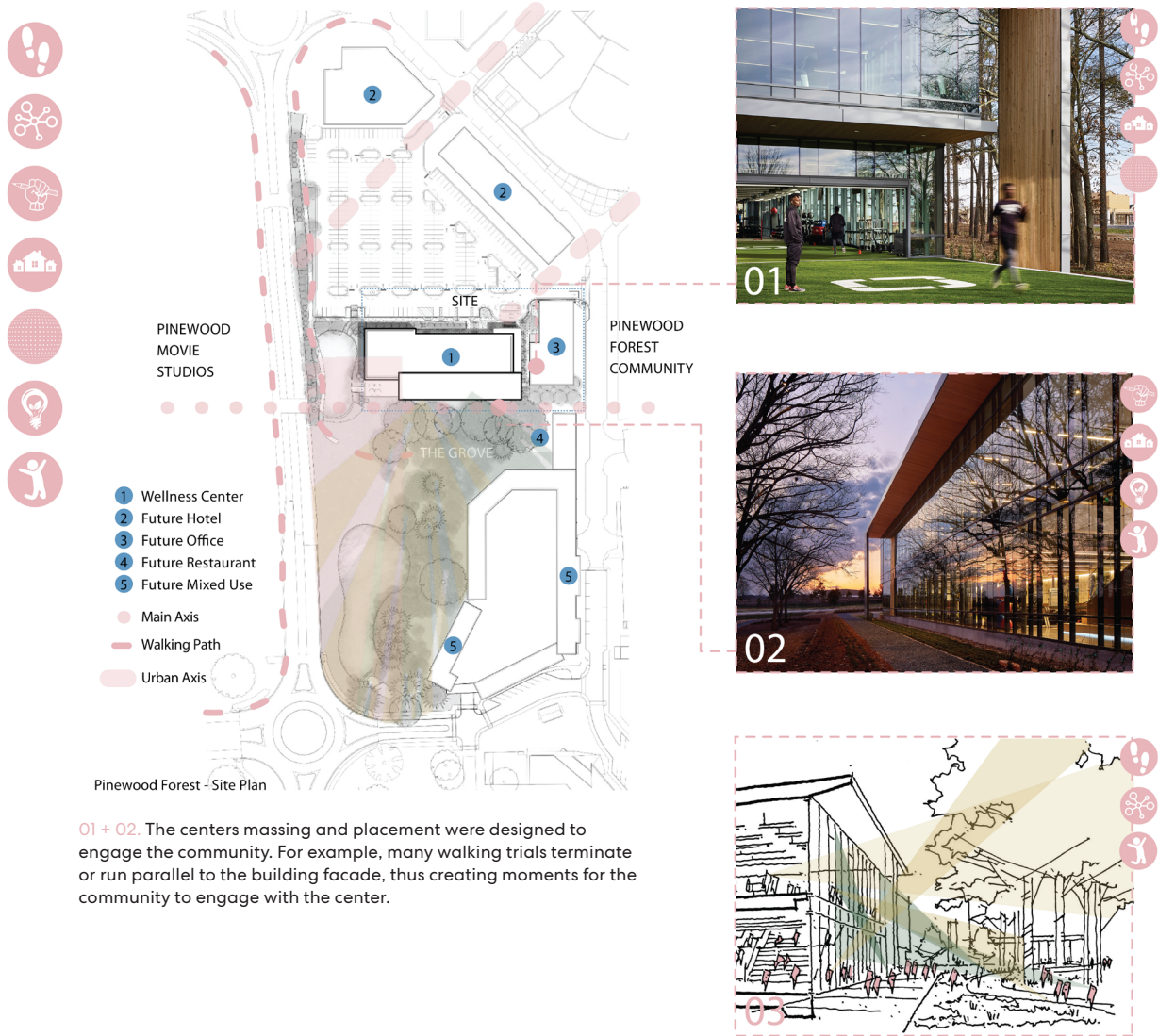


Figure 4: Through the lens of the Community-Based Design Patterns.

4.0 Conclusion

Academics and practitioners have offered sustainable design strategies, standards, and tools for advancing well-being throughout the built environment design, research, and practice over the past decades. Integrating research into the design practice, this study applied a qualitative methodology to investigate emerging practices and principles in community-based design and wellness. Using the three design patterns, a framework was developed to contextualize the case of the Piedmont Pinewood Wellness Center facility, which serves patients, clinicians, and communities. In doing so, the Center holds the potential to holistically set new programs and blend medical spaces with community spaces. A post-occupancy review will be conducted three years following the building's full operational use to seek users and community feedback. Based on the review result, we will deepen our study to test the research outcome and relevance for future projects underlining how design could interlace medical care and community wellness.

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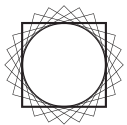
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