



## **USING ARCHITECTURAL LANDSCAPE TO ENHANCE USERS' ACTIVITIES: A PROPOSED GOLF CLUB FOR AWKA, ANAMBRA STATE**

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### **Abstract**

*Rapid urbanization in Awka, Anambra State, has intensified environmental degradation and reduced the ecological quality of urban open spaces, creating a need for recreational landscapes that respond simultaneously to environmental, social, and cultural conditions. This study examines how architectural landscape strategies can enhance user activities and environmental performance within a proposed golf club in Awka. The study adopted a qualitative Research Through Designing (RTD) approach, combining literature synthesis, comparative analysis of selected golf facilities, environmental and spatial assessment, and thematic interpretation of architectural and landscape precedents. The analysis focused on the relationships among topography, vegetation, hydrology, microclimate, user experience, and indigenous spatial principles. Evidence synthesized from the reviewed literature and case studies informed a three-pillar Hybrid Open Space (HOS) framework comprising Ecological, User-Centric, and Cultural/Aesthetic pillars. The Ecological Pillar integrates Nature-Based Solutions, native reforestation, erosion-control measures, and climate-responsive landscape strategies; the User-Centric Pillar incorporates Active Design, accessibility, multigenerational programming, and restorative landscape elements; while the Cultural/Aesthetic Pillar translates Igbo spatial concepts, particularly the Obi-Ilo relationship, into contemporary recreational architecture. The study demonstrates that integrating ecological processes, human-centred landscape design, and indigenous spatial knowledge can provide a context-responsive approach to golf-club development in rapidly urbanizing environments. It concludes that golf facilities can function beyond conventional recreational purposes by contributing to ecological resilience, user engagement, and cultural identity when designed as multifunctional landscape infrastructures.*

**Keywords:** Architectural Landscape, Biophilic Design, Golf Club, Hybrid Open Space, Igbo Spatial Logic, Nature-Based Solutions, Awka, Anambra State.

### **1. Introduction**

The conception of a golf course center, frequently termed a golf facility, involves a specialized area designed for the game of golf, traditionally comprising eighteen holes that each feature a teeing ground, a fairway, roughs, hazards, and a green containing a flagstick and hole (Paul, 2009). According to the United States Golf Association (USGA, 2021), a golf course is broadly defined as the entire area permitted for play, encompassing both the course and practice facilities, a definition that reflects the multifunctional nature of modern recreational centers. The discipline of golf course design is inherently multifaceted, requiring a delicate integration of landscape architecture, environmental sustainability, and the enhancement of the player experience (Love, 2008). In the complexities of contemporary society, human beings frequently seek natural retreats like golf courses to alleviate tension and reconnect with their surroundings (Ojobo, 2002).

Historical analysis reveals that golf course design has evolved significantly from its 15th-century Scottish origins, where courses were natural extensions of the linksland, utilizing rolling sand dunes and dune slacks with minimal intervention (Rowlinson, 2008). The iconic

Old Course at St. Andrews remains a spiritual anchor for the game, having standardized the eighteen-hole format in 1764 (Jason, 2002). These early links were community-oriented, shared by diverse social classes (EIGCA, 2015). However, the move toward inland courses in the late 19th century introduced artificial features and the mechanical movement of earth to construct playable grounds (Watton, 2002). The "Golden Age" of architecture, led by Alister MacKenzie, Donald Ross, and A.W. Tillinghast, introduced strategic elements where natural hazards challenged players while heightening the landscape's aesthetic (Daley, 2002; MacKenzie, 1920). Ross's courses, such as Pinehurst No. 2, are noted for a playability that requires strategic depth (Bellacollina, 2024), shifting the field from "penal" designs toward "heroic" and "strategic" paradigms (EIGCA, 2024).

In Nigeria, golf was introduced in the early 20th century by British colonialists, with figures like Chief Anthony Enahoro among the first indigenous players (Lere, 2009; PGA Nigeria, 2018). From a single club in Lagos, the sport has expanded to over fifty courses, with the IBB International Golf and Country Club in Abuja setting an international standard (Daily Trust, 2009). Recently, facilities like Smokin Hills Golf Resort have been recognized for their aesthetic value and integration into suburban landscapes (Ojo et al., 2017). Architectural trends now see the golf clubhouse transforming from an exclusive lounge into a technological and lifestyle hub (Alert Golf, 2025; Paul, 2009). Despite these advancements, many Nigerian facilities were constructed hurriedly, leading to structures that lack architectural distinction or environmental sympathy (Ojobo, 2002).

The primary architectural problem lies in the difficulty of achieving a seamless integration between built form and the natural landscape (Doak, 2020). In Awka, this is compounded by a 74% loss in forest cover and a 64% reduction in shrublands since 1993 due to unplanned development (Nwozommuo, 2021). This depletion increases surface runoff and exacerbates gully erosion on the porous Nanka Sandstone (Ezenwaji et al., 2013). Existing recreational centers in the Awka Capital Territory (ACT) often suffer from a deficit of equipment and infrastructure (Dung et al., 2023). There is a notable lack of biophilic design elements, such as natural light and organic textures, that are known to improve exercise immersion and psychological resilience (Lee and Park, 2025).

This study aims to highlight the architectural landscape's role in enhancing user activities by integrating natural elements and functional zones in a proposed golf course for Awka. The objectives include identifying landscape features that influence activities, examining evidence on biophilic contributions to user comfort, evaluating domestic and international benchmarks, investigating the influence of Igbo cultural motifs like the "Ilo" (village square) and courtyard systems, and proposing a landscape-based framework.

The significance of this study is found in its environmental impact as a "soundscape refugium" and a mitigation tool for the Urban Heat Island effect (Tabassum and Park, 2025; Ezenwaji et al., 2013). Architecturally, it provides a benchmark for using biophilic design to enhance "exercise immersion," which can increase behavioral engagement by 51.1% (Lee and Park, 2025).

The scope of this investigation is geographically limited to the Awka Capital Territory, situated between latitudes 6°11'N and 6°17'N and longitudes 7°02'E and 7°08'E. It focuses on the architectural design of an 18-hole golf club, routing strategies, and the integration of biophilic elements, while excluding detailed civil engineering of irrigation systems. The research asks: what landscape features promote diverse activities, how biophilic elements influence golfers, what lessons can be learned from "Gold Signature" sanctuaries, how Igbo cultural motifs can be adapted, and what components are essential for an optimized framework.

## 2. Literature Review and Theoretical Framework

The conceptual framework of this study is predicated on the synergistic interaction between the architectural landscape and the psychological drivers of user engagement, examining how spatial and ecological variables serve as pre-institutional factors for human behavior (Chen et al., 2020). The framework follows a psychological chain where Activity Involvement, defined by Attraction, Self-Expression, and Centrality of Life, directly influences Place Attachment (Chen et al., 2020; Fotiadis and Vassiliadis, 2016). A high-quality landscape acts as a catalyst for "Exercise Immersion," divided into Cognitive (focus) and Behavioral (physical commitment) dimensions. Empirical data suggests biophilic design components account for a 51.1% mediation effect on behavioral immersion (Lee and Park, 2025). Furthermore, the study utilizes the Hybrid Open Space (HOS) model, which transforms "Closed Open Spaces" into multifunctional landscapes through active edges and visual porosity (Garcia et al., 2024).

### 2.1 Theoretical Framework

The theoretical foundation is constructed from several pillars:

1. Green Theory: Postulated by Robert E. Goodin (1992), it provides an ecocentric vision that prioritizes healthy ecosystems as a prerequisite for human well-being. This theory supports the use of golf courses as "managed green spaces" for climate adaptation (Millington et al., 2018).
2. Attention Restoration Theory (ART) and Stress Recovery Theory (SRT): ART, by Stephen and Rachel Kaplan (1989), explains how natural environments restore mental fatigue through "soft fascination". Ulrich's SRT (1983) suggests nature exposure reduces physiological stress markers like blood pressure (Ulrich, 1983; Korpela, 2002).
3. Prospect-Refuge Theory: Jay Appleton (1975) identifies a human preference for environments offering both prospect (views) and refuge (protection), which in golf architecture informs the framing of fairways and tree massing (Dosen and Ostwald, 2013).
4. Biophilia Hypothesis: Edward O. Wilson (1984) posits an innate human bond with life and life-like processes. Biophilic design translates this into architecture through direct and indirect natural elements (Choe et al., 2019; Russo and Andreucci, 2023).
5. Behavioral Science (Jon Lang): Lang (1987) advocates for an interdisciplinary approach merging behavior and theory, emphasizing usability and psychological comfort.

### 2.2 Theoretical Studies and Strategic Design

Golf architecture is categorized into penal, strategic, and heroic paradigms. While the penal paradigm punishes inaccuracy, the strategic paradigm, refined during the Golden Age by architects like MacKenzie, emphasizes width and choice (Johnson, 2020; Doak, 2020). Max Behr's "Line of Charm" encourages players to take risks for shorter distances (Andrew, 2024). Theoretical discourse has also introduced the "Fourth Nature," where designed landscapes restore ecological processes while supporting urban life (Hunt, 2000; Perez Cambra, 2024). This paradigm views sports facilities as integrated systems providing ecosystem services (Teodorescu et al., 2022).

Biophilic design is seen as essential for "spatial vitality" (Yuan et al., 2023). This is complemented by eco-acoustics, where golf courses act as "soundscape refugia" to mask urban noise with biophony like birdsong (Tabassum and Park, 2025). Furthermore, cultural identity is crucial; in Nigeria, architecture reflects community societal norms (Izomoh, 1994; Susilowati, 2024). In the Igbo context, the "Obi" (family house) and "Ilo" (village square) are vital components that facilitate social interaction and cultural memory (Ikebude, 2022; Aniakor,

2012; Agboola and Zango, 2016).

### 2.3 Empirical Studies

Empirical research provides evidence-based insights into the performance of landscape elements and user engagement mechanisms. Studies focusing on landscape features identify topography and vegetation as primary variables influencing play strategy and safety (Ezenwaji et al., 2013). In urban sports parks, terrain-led movement has been shown to support intergenerational activity more effectively than segregated sports zones (Lai et al., 2026). While flat sites rely on contours to signify "naturally interesting terrain," steep sites like the Awka-Orlu cuesta require natural platforms and ledges for functional and economic advantages (EIGCA, 2025). Vegetation analysis reveals that urban golf courses exhibit surface temperatures 4-6°C lower than industrial zones, with tall trees (over 10m) being the most significant cooling factor (Gregory, 2020).

Statistical investigations into sports facilities confirm that biophilic design components account for a 51.1% mediation effect through behavioral immersion, directly predicting a user's intention to continue exercise (Lee and Park, 2025). This is complemented by efficient circulation; for instance, research in Enugu shows that separated functional areas in a layout reduce sedentary behavior compared to open-plan designs (Ezezue et al., 2021). Psychologically, soundscape management is also critical; studies at the "Two Ponds" Golf Course found that 63% of players evaluated the environment positively when birdsong masked urban noise (Tabassum and Park, 2025).

Evaluations of existing facilities like Smokin Hills Golf Resort highlight social benefits, including a 90% indigenous workforce (Ojo et al., 2017). Internationally, the Old Collier Golf Club serves as a benchmark for stewardship by using brackish water and seashore paspalum to save \$20,000 annually in maintenance (LAF, 2010). Furthermore, the El Rodeo Golf Club demonstrates spatial innovation through the "Fifth Façade" approach, using origami-inspired roofs to minimize visual impact on the landscape (Garcia et al., 2024). Integrating cultural motifs like the "Obi" and "Ilo" further enhances environmental sustainability and cultural relevance in the Nigerian context (Morakinyo et al., 2024).

Table 1: Comparative Assessment of Selected Golf Facilities and Landscape Strategies

| Case Study Category | Example Facility       | Key Strategic Outcome      |
|---------------------|------------------------|----------------------------|
| Domestic            | Smokin Hills (NG)      | Socio-economic integration |
| International       | Old Collier (USA)      | Environmental stewardship  |
| Domestic            | IBB International (NG) | International standard     |
| International       | El Rodeo (COL)         | Urban integration          |

Source: Researcher's Construct, 2026,

### 3. Methodology

This study adopts a qualitative, humanities-based "Research through Designing" (RTD) architectural research design (Groat & Wang, 2013). RTD utilizes the process of architectural

design synthesis as a scientific inquiry tool to resolve complex environmental, spatial, and cultural challenges. The study employs a descriptive-analytical precedent approach, combining literature-derived empirical benchmarks with contextual site synthesis to formulate a conceptual landscape framework (Ojobo, 2002; Stessens et al., 2024).

### **3.1 Area of Study and Population**

The study area is Awka, Anambra State, located between latitudes 6°10'N and 6°17'N and longitudes 7°02.4'E and 7°07.2'E. Awka sits on the Awka-Orlu upland cuesta, a rugged topographical formation approximately 300m above sea level (Ezenwaji et al., 2013; Nwozommuo, 2021). The geology consists of Imo Shale and Nanka Sandstone, the latter being friable and 90.9% sand, which makes it highly susceptible to gully erosion (Okoro et al., 2010). The climate is tropical wet and dry (Aw) with an annual rainfall of up to 1,900.5mm. Built-up areas have increased by 383% since 1993, while forest cover decreased from 45.8% to 11.9% (Quest Journals, 2023).

In accordance with qualitative architectural research methodologies, the “population” was defined as the theoretical and architectural domain of relevant facilities, master plans, and scholarly literature (School of Postgraduate Studies, 2019), comprising architectural precedent strata, which included established domestic 18-hole golf facilities in Nigeria, such as IBB International, Smokin Hills, Port Harcourt, Kano, and Kaduna, alongside selected international stewardship models, such as Old Collier, USA, and El Rodeo, Colombia, as well as documentary strata, which comprised peer-reviewed literature, environmental reports, and regional mapping datasets addressing biophilic design, microclimate regulation, gully erosion dynamics, and Igbo vernacular architecture.

### **3.2 Sampling Framework**

The study uses a stratified, non-probability purposive sampling technique to select representative precedent entities based on criteria relevant to the Awka site:

1. Domestic facilities illustrating Nigerian climatic responses and social circulation layouts (IBB Abuja, Smokin Hills Ilara-Mokin).
2. International facilities exemplifying ecological stewardship, advanced water management, and the Hybrid Open Space model (Old Collier USA, El Rodeo Colombia).
3. Traditional vernacular archetypes representing Igbo spatial organization (Obi homesteads and Ilo village squares).

### **3.3 Data Collection Protocols**

Data collection relied on qualitative secondary source analysis and architectural archive retrieval:

- Environmental and Spatial Datasets: Climatological, geological, and land-use literature for Awka retrieved from NIMET, regional planning authorities, and peer-reviewed studies (Ezenwaji et al., 2013; Nwozommuo, 2021).
- Architectural Precedent Matrices: Analytical extraction of spatial configurations, routing layouts, material palettes, and stewardship initiatives from published architectural case studies and design documentation (Ojobo, 2002; Garcia et al., 2024).

### **3.4 Data Analysis**

Data analysis followed a multi-stage qualitative coding and conceptual synthesis process using a "Generative-Critical" decision-support approach:

1. Thematic Coding: Qualitative extraction of recurring design issues across literature (e.g., thermal discomfort, erosion vulnerability, social exclusion, biophilic immersion).
2. Spatial and Environmental Synthesis: Overlaying architectural design principles against Awka's site constraints (steep cuesta slopes, Nanka Sandstone friability, rainfall intensity).
3. Framework Translation: Translating synthesized literature parameters into a three-pillared design framework comprising Ecological, User-Centric, and Cultural components.

#### **4. Results and Discussion**

The findings demonstrate that the architectural landscape is a functional determinant of user movement and ecological resilience.

##### **4.1 Landscape Features and User Activities**

Synthesizing literature benchmarks demonstrates that site topography, vegetation, and hydrology are primary determinants of facility routing and functional performance:

- Topography-Led Routing: On steep cuesta landforms, such as Awka's maximum slopes, contour-led routing must position tee and green complexes on natural topographical benches. This minimizes costly earth-moving while leveraging natural elevation changes to create strategic "heroic" risk-reward holes over natural ravines (Andrew, 2024; EIGCA, 2025). Routing from high points to low points optimizes natural surface drainage, preventing ponding during heavy tropical rains (Scott Macpherson, 2024).
- Vegetation and Microclimate Regulation: Dense stands of native trees (>10 m height) provide measurable cooling buffers. As established in global microclimate literature, mature urban green canopies can lower localized surface radiant temperatures by 4–6°C relative to built-up surroundings (Gregory, 2020). For Awka, re-establishing native canopy trees (e.g., Iroko, Chinese Hackberry) rebuilds lost carbon sinks while creating visual separation and wind protection along fairway corridors (Nwozommuo, 2021; Okoro et al., 2021).
- Hydrological Systems and SuDS: Water bodies must function as Sustainable Urban Drainage Systems (SuDS). Integrating detention basins, bioswales, and check dams captures intense storm runoff, mitigating downstream erosion on friable Nanka Sandstones (Ezenwaji et al., 2013; Stefanidis et al., 2024). Furthermore, as demonstrated by the Old Collier benchmark, adopting salt-tolerant turfgrasses (seashore paspalum) and utilizing non-potable or recycled irrigation water provides a proven stewardship model capable of generating substantial annual operational savings (LAF, 2010).

##### **4.2 Spatial Layout and Biophilic Design**

The synthesis of architectural spatial parameters indicates that biophilic elements and cultural spatial logic significantly optimize user comfort and facility vitality:

- Biophilic Immersion: Incorporating natural daylighting, visual landscape views, timber louvering, and local stone finishes establishes strong sensory connections to nature. In empirical modeling by Lee and Park (2025), biophilic features achieved up to a 51.1% statistical mediation effect on user behavioral immersion, directly supporting exercise continuation and psychological restoration.
- Spatial Circulation: Efficient spatial layouts require strict functional segregation of player circulation, service logistics, and community event flows to avoid operational congestion (Barbieri, 2024). Utilizing a "Hub-and-Spoke" master plan allows the central clubhouse to

command panoramic prospect views over starting and finishing holes (Paul, 2009; Oakville, 2024).

- Integration of Igbo Obi–Ilo Spatial Logic: The spatial logic of the traditional Igbo homestead provides a culturally rooted blueprint for public-private facility layout. Translating the domestic Obi (central gathering hall) into the primary clubhouse lounge creates an open, naturally ventilated social heart featuring dwarf walls and high-pitched ceilings (Aniakor, 2012; Okoye and Ukanwa, 2023). Translating the public Ilo (shaded village square) creates a central landscaped plaza framed by mature shade trees, serving as a multi-generational community gathering node (Agboola and Zango, 2016; Alabi, 2024).

Table 2: Evidence-Based Landscape Strategies and Expected Performance Outcomes

| Spatial Element       | Architectural Intervention                         | Expected Outcome / Literature Benchmark                                                   |
|-----------------------|----------------------------------------------------|-------------------------------------------------------------------------------------------|
| Clubhouse Massing     | High-pitched roofs, deep overhangs, louvered skins | Microclimatic cooling and reduced AC energy loads (Szokolay, 2014)                        |
| Courtyard (Mbara Ezi) | Central green courtyard within clubhouse core      | Enhanced natural stack ventilation and passive thermal relief (Okoye and Ukanwa, 2023)    |
| Communal Plaza (Ilo)  | Open public square framed by native canopy trees   | Enhanced social interaction and place attachment (Agboola and Zango, 2016)                |
| Material Palette      | Locally sourced timber, stone, rammed earth        | High thermal mass, reduced carbon footprint, biophilic grounding (Morakinyo et al., 2024) |

Source: Researcher, 2026.

4.3 Case Study Synthesis and Deficiencies

Domestic evaluations of IBB International and Smokin Hills highlight their role in regional progress and indigenous employment. International benchmarks like Old Collier and El Rodeo show the benefits of using brackish water and the "Fifth Façade" (origami-inspired roofs) for environmental integration (LAF, 2010; Garcia et al., 2024). Deficiencies in Nigerian designs include generic glass-and-steel forms that feel alien to the context. Successful designs must incorporate indigenous motifs to strengthen the sense of locality (Morakinyo et al., 2024).

Table 3: Summary of Precedent Benchmark Inferences

| Precedent Entity            | Core Strength                                 | Design | Identified Limitation                 | Strategic Application to Awka Framework                   |
|-----------------------------|-----------------------------------------------|--------|---------------------------------------|-----------------------------------------------------------|
| Smokin Hills (Nigeria)      | High landscape integration on rolling terrain |        | High maintenance resource reliance    | Adopt native forest buffering for microclimate regulation |
| IBB International (Nigeria) | Premier networking hub and central location   |        | Congested internal circulation layout | Implement clear "Hub-and-Spoke" path hierarchies          |

|                           |                                           |                     |                                  |            |                                                      |                            |
|---------------------------|-------------------------------------------|---------------------|----------------------------------|------------|------------------------------------------------------|----------------------------|
| Old Collier Club (USA)    | Salt-tolerant and recycled use            | turf water          | High infrastructure investment   | initial    | Integrate retention ponds and non-potable irrigation | SuDS                       |
| El Rodeo Club (Colombia)  | Hybrid Open Space and "Fifth Façade" roof |                     | Partial privatization boundaries | spatial    | Apply porosity and public edges                      | visual and active boundary |
| Igbo Vernacular Archetype | Obi-Ilo logic and cooling                 | spatial and passive | Material limitations             | durability | Synthesize geometry with modern materials            | Obi hall with durable      |

Source: Researcher, 2026.

#### 4.4 Critical Evaluation of Environmental & Social Trade-offs

A balanced academic assessment requires evaluating the potential environmental and social trade-offs inherent in golf facility developments:

- **Water Demand vs. Municipal Security:** Traditional golf courses consume large volumes of water for turf irrigation, which could strain local supplies in water-stressed regions. **Mitigation:** The Awka design framework mandates 100% rainwater harvesting via retention lakes, paired with drought-tolerant native turfgrasses (seashore paspalum), eliminating reliance on municipal potable water (LAF, 2010).
- **Agrochemical Leaching vs. Sandstone Friability:** Applying synthetic fertilizers and pesticides on the highly porous Nanka Sandstone risks contaminating local groundwater aquifers. **Mitigation:** The framework incorporates organic turf management practices, bio-filtration swales, and vegetative buffer strips to filter runoff prior to aquifer infiltration (Ezenwaji et al., 2013; Deljouei et al., 2026).
- **Land Consumption & Social Exclusion:** Standard private golf clubs represent exclusive enclaves that privatize large urban land parcels. **Mitigation:** Adopting the Hybrid Open Space (HOS) model introduces active public edges, peripheral walking/jogging trails, and multi-use community zones, ensuring public accessibility and land-use equity (Garcia et al., 2024).

#### 4.5 Proposed Landscape-Based Design Framework

The proposed design framework synthesizes findings into three interrelated operational pillars:

##### 4.5.1 The Ecological Pillar: Nature-Based Solutions and Microclimate Stabilization

1. **Soil and Erosion Stabilization:** Implements terraced landscape grading, check dams, and bio-engineering slope stabilization (using vetiver grass and deep-rooting native shrubs) to bind friable Nanka Sandstones along cuesta gradients (Ezenwaji et al., 2013; Deljouei et al., 2026).
2. **Native Reforestation and Canopy Cooling:** Establishes native reforestation corridors (target planting of 400–1,000 indigenous trees annually) to restore carbon-sink capacity and lower local ambient temperatures (Gregory, 2020; Quest Journals, 2023).
3. **Eco-Acoustic Management:** Structures dense multi-layered tree buffers along site perimeters to create "soundscape refugia" where natural biophony masks urban traffic noise (Tabassum and Park, 2025).

#### **4.5.2 The User-Centric Pillar: Active Design and Multi-Generational Programming**

1. Active Design Integration: Incorporates attractive, continuous pedestrian trails, stairways, and outdoor sports nodes to promote physical movement and reduce sedentary behavior (Center for Active Design, 2010; Ezezue et al., 2021).
2. Multi-Generational Zoning: Delineates specialized activity zones:
  - Children / Youth: Interactive play environments and introductory sports zones (Lai et al., 2026).
  - Adults / Young Professionals: High-intensity sports corridors and social networking terraces (Ojo et al., 2017).
  - Seniors: Gentle walking loops, shaded meditation gardens, and passive relaxation pockets (Lai et al., 2026).
3. Hybrid Open Space Accessibility: Eliminates continuous opaque perimeter walls, replacing them with active edges, permeable fences, and public access corridors to integrate the facility into Awka's broader green space network (Garcia et al., 2024).

#### **4.5.3 The Cultural and Aesthetic Pillar: Obi-Ilo Spatial Logic and Regional Tectonics**

1. Spatial Hierarchy: Formulates the primary clubhouse layout around the Obi spatial concept—a grand, naturally ventilated central pavilion serving as the facility's social heart (Aniakor, 2012; Okoye and Ukanwa, 2023).
2. Communal Gathering Node: Designs an adjacent outdoor plaza based on the Ilo concept, shaded by mature canopy trees to host cultural events, community gatherings, and open-air exhibitions (Agboola and Zango, 2016; Alabi, 2024).
3. Regional Tectonic Identity: Utilizes local building materials—compressed earth blocks, timber sun-screens, and local stone cladding—complemented by contemporary interpretations of traditional Uli artistic patterns on secondary sun-shading skins (Morakinyo et al., 2024; Onwudinjo, 2024).

### **5. Conclusion**

#### **5.1 Summary of Findings**

This study established that architectural landscape planning provides a powerful framework for addressing urban ecological degradation, user activity needs, and cultural preservation in Awka:

1. Contour-led routing on steep cuesta landforms optimizes natural site platforms, minimizing ecological disruption and earthmoving costs.
2. Literature-derived benchmarks confirm that managed green canopies in golf facilities can reduce surface radiant temperatures by 4–6°C and provide eco-acoustic soundscape refugia.
3. Biophilic design elements account for up to a 51.1% statistical mediation effect on user behavioral immersion, directly enhancing user engagement and exercise continuation.
4. Converting exclusive sports grounds into Hybrid Open Spaces (HOS) through active edges and visual porosity resolves traditional land-use exclusion.

5. Adapting traditional Igbo Obi-Ilo spatial logic creates culturally authentic, microclimatically efficient public-private gathering spaces.
6. Nature-Based Solutions (bioswales, terracing, native re-vegetation) effectively stabilize friable Nanka Sandstone soils against severe gully erosion.

## 5.2 Conclusion

This study demonstrates that recreational infrastructure in rapidly urbanizing African cities must move beyond isolated, single-purpose enclaves. By adopting a landscape-led design approach, golf club developments can function as multifunctional ecological assets that mitigate Urban Heat Island effects, manage extreme storm runoff, foster physical health, and express local cultural identity. Synthesizing Nature-Based Solutions with traditional Igbo Obi-Ilo spatial logic yields a context-responsive model for sustainable urban development in Southeastern Nigeria.

## 5.3 Implications of Findings

- For Architectural Practice: Highlights the necessity of expanding architectural practice from isolated building design to comprehensive site landscape urbanism, using biophilic metrics to drive spatial quality (Ola-Adisa et al., 2021; Lee and Park, 2025).
- For Urban Planning Authorities: Demonstrates how municipal authorities (such as ACTDA) can utilize Hybrid Open Space guidelines to ensure private recreational developments contribute to citywide green infrastructure and urban resilience (Garcia et al., 2024).
- For Environmental Policy: Advocates for integrating nature-based soil stabilization mandates into capital development approvals across erosion-prone geological zones in Southeastern Nigeria (Ezenwaji et al., 2013).

## 5.4 Limitations of the Study

1. Conceptual Framework Nature: As a conceptual "Research through Designing" study, the proposed design framework relies on literature-derived empirical benchmarks rather than primary physical measurements collected from built human subjects on-site.
2. Geographic Specificity: Environmental parameters (Nanka Sandstone friability, cuesta relief, tropical savanna rainfall) are tailored to Awka, requiring calibration before applying the framework to differing geological or climatic zones.
3. Simulation Constraints: Detailed computational fluid dynamics (CFD) airflow modeling and quantitative water balance calculations were beyond the qualitative scope of this study and warrant future empirical testing.

## 6. Recommendations

1. Mandate Nature-Based Erosion Control: Planning authorities in Awka should require institutional and recreational developments on cuesta slopes to integrate terracing, bioswales, and deep-rooting native vegetation for stormwater management.
2. Institutionalize Hybrid Open Space Models: Development approval boards should incentivize private recreational developers to incorporate permeable perimeters, public jogging loops, and multi-use community zones to enhance public access.

3. Adopt Sustainable Water Stewardship: Facility developers should implement closed-loop rainwater harvesting and drought-tolerant turfgrass varieties (such as seashore paspalum) to eliminate reliance on municipal potable water.
4. Promote Culturally Responsive Tectonics: Architects practicing in Southeastern Nigeria should systematically integrate traditional spatial logic (Obi-Ilo concepts) and local low-carbon materials into contemporary recreational building design.
5. Establish Eco-Acoustic Buffers: Site master plans should mandate multi-tiered native tree buffers along major road boundaries to reduce urban noise intrusion and foster restorative environments.

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