CASE STUDY

III: PROJECT TEAM:

Client: Terra Regia Real Estate Company

Urban Planning and Design (Terra Regia):

- Director of Urbanism: Roberto Ramírez

- Urban Image Coordinator: Evelyn Quiroga

- Urban Image Designer: Alexandra Tovar

- Territorial Planning Coordinator: Manuel Valdéz

- Territorial Planning Designer: Joaquín Reyna

Project Management and Engineering (Terra Regia):

- Project Manager: Magda García

- Engineering Project Manager: Miguel Bravo

- Engineering Project Coordinator: Carolina Chávez

Construction and Cost Control (Terra Regia):

- Construction and Cost Control Manager: Araceli Rosete

- Construction and Cost Control Coordinator: Erick Mestiza

- Construction Control Executive: Carolina Villanueva

- Construction Coordinator: Salvador Vargas

Maintenance and Operations (Terra Regia):

- Maintenance Supervisor: Daniel Benitez

- Maintenance Coordinator: Manuel Santos

Community Engagement Specialist (Terra Regia):

- Project Marketing Coordinator: Andrea Mena

Environmental Consultant (Celtis Environmental Consulting):

- Biologists: Roberto González, Daniel Hernández

SITES Certification Consultant (LEAF):

- Consultants: Ana Lucía Granda, Ariana Aponte

IV: SITE CONTEXT: *[i.e., location, climate, pre-design site constraints and opportunities]*

The project is situated in Juárez, Nuevo León, Mexico, in a predominantly semi-warm subhumid climate. The municipality has an annual average temperature of 20-24°C and receives rainfall ranging from 600-900 mm. The primary pre-design constraints included significant ecological degradation, with disrupted grasslands, sparse shrubland coverage, uneven topography, and scattered debris—all present before Terra Regia's acquisition. Historically, the site was used for soil extraction in the early 2000s to support nearby construction, leaving deep depressions across the landscape. Temporary use as a dumping ground for construction materials further contributed to its degraded state.

Despite these challenges, the site's classification as a Greenfield, primarily comprising native shrublands and grasslands, offers notable ecological opportunities. The absence of farmland soils presents a unique potential to enhance native plant species richness, contributing to habitat restoration and increased biodiversity across the area.

V. CHALLENGES AND SOLUTIONS

The project encountered several challenges that were addressed through a collaborative approach among architects, engineers, landscape designers, urban planners, and accessibility experts.

Technical framework:

- Topography and soil: A comprehensive topographic study and soil analysis were conducted at the outset to understand terrain characteristics, enabling efficient earthwork planning and foundational system selection.

- Drainage: A sustainable drainage system was implemented, incorporating rainwater management features such as stormwater channels, which effectively mitigated erosion and flooding risks.

- Utility network: Utility networks for potable water, drainage, and electricity were integrated from the early design phases, ensuring service availability without disrupting landscaping. Coordination with local service providers was essential for maintaining environmental integrity.

Design framework:

- Universal accessibility: Universal design principles were applied from the conceptual phase, ensuring accessible pathways with gentle slopes, inclusive signage, ramps, and user-friendly furniture for individuals with disabilities.

- Landscape design: Native plant species were chosen to minimize water requirements and maintenance, creating zones that enhance biodiversity and aesthetic appeal while providing adequate shade.

- Urban furnishings: Durable, low-maintenance urban furniture made from sustainable materials was strategically placed in essential areas, such as pathways, plazas, and resting spots.

- Social interaction and safety: Design elements were incorporated to foster social interaction, such as picnic areas and public plazas, while prioritizing safety with well-lit spaces, clear visibility, and emergency access points, including panic buttons and security towers.

Engineering framework:

- Structural engineering: Collaboration with specialists from the project's early stages ensured that structures were harmoniously integrated into the environment. Sustainable elements and techniques, including local resourced materials, recycled concrete and certified wood, were used to minimize environmental impact.

- Energy management: Low-energy LED lighting was installed in walkways, common areas, and recreational spaces to enhance energy efficiency.

- Water management: A rainwater collection cistern was established to facilitate the reuse of water for irrigation, promoting environmentally responsible wastewater management.

- Transportation and connectivity: Pedestrian paths and sidewalks were designed to efficiently connect the park with its urban surroundings, ensuring seamless integration with public transport through collaboration with municipal authorities.

VI: SUSTAINABLE FEATURES/STRATEGIES

The park's features aim to create a harmonious space that not only serves the needs of current users but also preserves resources for future generations. The following sustainable elements underscore the park's commitment to resilience, inclusivity, and cost-effectiveness:

- Sustainable and locally sourced materials: Durable, low-maintenance materials, such as recycled-content sculptures and concrete benches, were selected for use throughout the park. This approach not only minimizes the need for replacements, reducing waste, but also conserves natural resources. Additionally, approximately 73% of materials were regionally sourced, supporting the local economy and significantly lowering the carbon footprint associated with transportation.

- Native vegetation: The landscaping incorporates native plant species that require less water and maintenance, reducing irrigation water consumption by 51%. By selecting local flora, the park also supports biodiversity, creating habitats for local wildlife.

- Universal access: The park is designed for universal access, featuring gentle ramps, wide pathways, and interactive wayfinding maps to ensure usability for individuals of all ages and abilities. This design fosters inclusivity and social cohesion, encouraging active use of green spaces among children, adults, seniors, and individuals with disabilities. By promoting physical activity and mental well-being, the park enhances the overall quality of life for residents.

- Energy efficiency: The sustainable solutions and accessible design enhance the park's economic viability by reducing long-term operational costs. The implementation of energy-efficient technologies, such as LED lighting for outdoor illumination and site equipment, has significantly reduced energy expenses by over 60%.

- Integrated design team: A diverse team of experts was essential to this project's success. Architects, engineers, biologists, environmental consultants and community representatives collaborated to create a strategic plan that addressed all project phases, supporting our sustainability goals. A long-term maintenance and performance monitoring plan was also developed to ensure the site's lasting functionality.

VII. ENVIRONMENTAL SOCIAL AND ECONOMIC PERFORMANCE BENEFITS

Environmental benefits:

- **Reduction of carbon footprint:** The park's design promotes active mobility—such as walking and cycling—by minimizing car parking and adding bicycle parking, which reduces vehicle emissions. Additionally, using locally sourced materials cuts down transportation impacts, further lowering the park's carbon footprint.

- Improved air quality and biodiversity: The integration of native vegetation serves a dual purpose to enhance local air quality: absorbing CO_2 and filtering air pollutants. Additionally, the careful planting of local species and creation of microhabitats, such as pollinator gardens, promote biodiversity and create habitats that support native wildlife.

- Efficient water management: Vegetated areas planted over a 20 cm layer of topsoil adjacent to impervious surfaces are strategically designed to enhance water retention. This setup reduces surface runoff, filters contaminants to improve water quality, and aids in aquifer recharge, effectively mitigating flood risks through increased infiltration.

Social benefits:

- Inclusion and community building: The park extends beyond being a green space; it represents a place where residents can reconnect with nature and each other. Its inclusive design fosters a sense of belonging, accommodating people of all ages and abilities, while providing safe, well-lit areas that enhance community security and quality of life. By supporting both physical health and mental well-being, the park has become a cherished space that strengthens community ties, invites moments of reflection, and instills local pride. It's more than a recreational area; it's a place where shared experiences and connections with nature enrich the lives of its visitors.

Economic benefits:

- Lower maintenance costs: The use of native vegetation reduces irrigation needs, resulting in long-term maintenance savings.

- Increased property value: The park's strategic location within the Valle Condesa Project, a residential development by Terra Regia Real Estate Company, raises surrounding property values, making the area more attractive for further investment. By serving as a central amenity, the park not only enhances the appeal of the condominiums but also contributes to the long-term economic vitality of the community.

- Health cost savings: By encouraging active lifestyles, the park reduces public health expenses related to sedentary living.

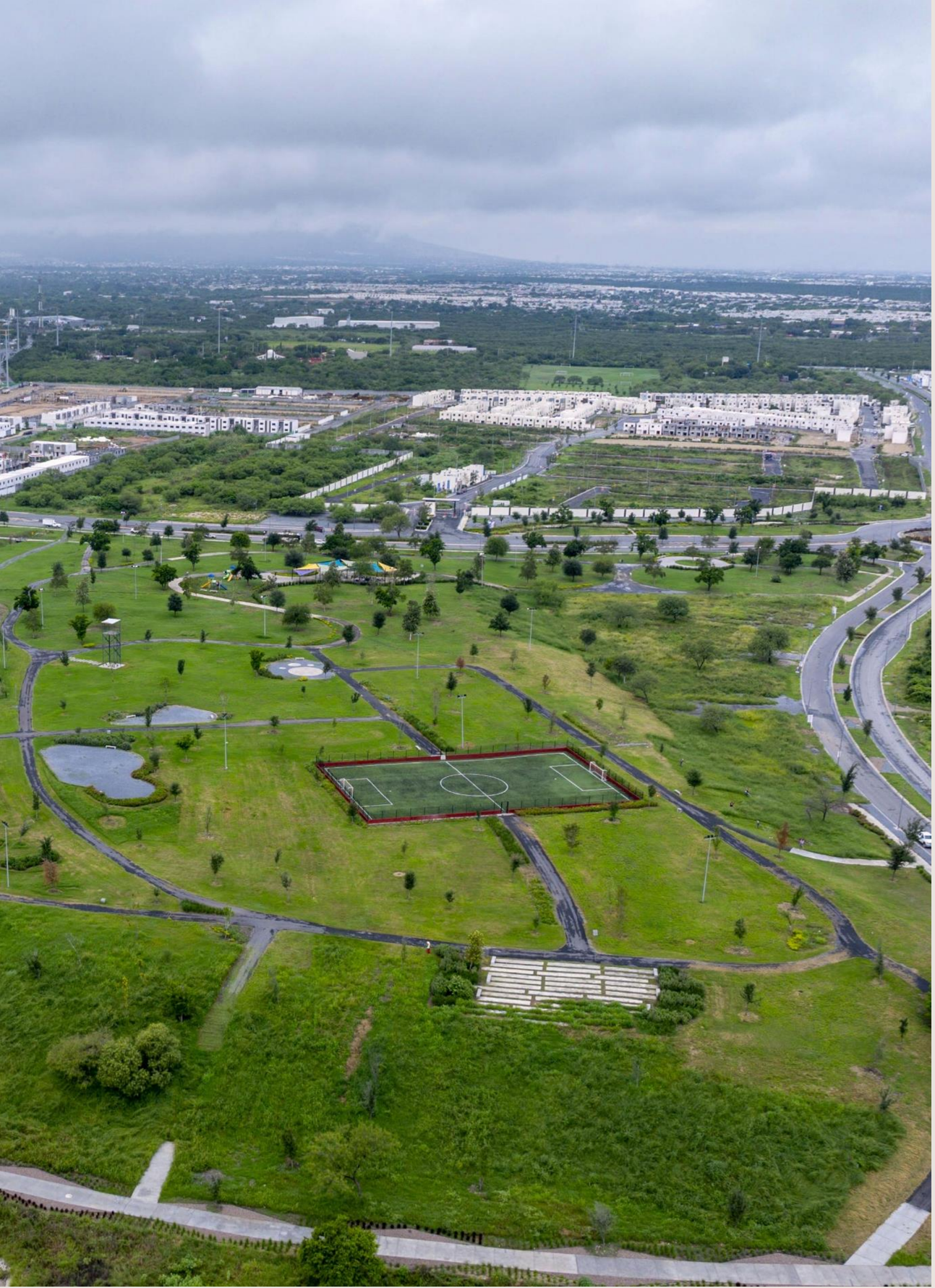
- Job creation and economic growth: The project generates employment, both directly and indirectly, stimulating the local economy.

VIII. COST COMPARISON OF SUSTAINABLE VS. CONVENTIONAL STRATEGIES

- Energy usage: The implementation of energy-efficient technologies, including LED lighting, pumps, aerators, and transformer components, has led to an impressive estimated 60% reduction in energy consumption. This significant decrease not only lowers utility expenses for the park but also contributes to a smaller carbon footprint, reinforcing the park’s commitment to sustainability and environmental stewardship.

- Water consumption: By incorporating native plant landscaping, the park has effectively reduced irrigation needs by 51%. These plants require minimal watering due to their natural adaptation to the local climate, which enhances overall cost savings and promotes environmental sustainability. This strategic choice not only conserves water resources but also lessens the park's reliance on irrigation systems, ultimately leading to lower maintenance costs.

- Impact on property value: Gran Parque Condesa has positively influenced the property values in the surrounding area, attracting both short-term and long-term investments. The park serves as a key amenity within the broader Valle Condesa Project, enhancing the neighborhood’s economic appeal and desirability. Furthermore, obtaining the SITES certification for sustainable practices will likely elevate property values even more, signaling to potential investors the park's commitment to environmental responsibility and community well-being.



IX: LESSONS LEARNED

The experience gained during the development of Gran Parque Condesa has revealed several key lessons that are fundamental to the success of sustainable projects.

1. Importance of interdisciplinary collaboration: Collaboration among various professionals, such as architects, engineers, biologists, community representatives and environmental consultants, allows for the creation of a more robust and efficient strategic plan. Integrating a multidisciplinary design team ensures that all dimensions of the project are addressed, from planning to implementation, facilitating innovation and the achievement of sustainability objectives.

2. Economic benefits of sustainable considerations: Implementing sustainable practices not only positively impacts the environment but can also lead to significant resource and cost savings. Strategies that reduce water and energy consumption, along with the use of low-maintenance construction materials, can result in substantial reductions in long-term operational costs. This translates into a direct benefit for clients, who can enjoy improved services without the burden of excessive maintenance expenses.

3. Choosing local and sustainable suppliers: Prioritizing suppliers who provide urban equipment made from certified or sustainably sourced materials is essential for maximizing the project's environmental and social impact. Using local resources strengthens the regional economy and reduces the carbon footprint linked to transportation, supporting sustainability goals across all project stages. This approach ensures a more efficient lifecycle for materials, aligning with broader ecological objectives and enhancing the project's overall sustainability profile.

4. Benefits of planting native species: One of the most notable lessons is the importance of using native species in landscaping design. These plants are adapted to the local climate and require less water and maintenance compared to non-native species. Furthermore, they contribute to biodiversity conservation by providing habitats for local wildlife and enhancing the resilience of the ecosystem against climate change. This practice not only optimizes resources but also helps establish an ecological balance that benefits the community as a whole.

These lessons emphasize the need to adopt a holistic and sustainable approach in urban development projects, which not only benefits the environment but also improves the quality of life for local communities.

X. MAINTENANCE AND MONITORING:

The Gran Parque Condesa promotes long-term sustainability by implementing strategic maintenance and operations that proactively protect and enhance the environment.

- Water efficiency and irrigation management: To prevent water waste, irrigation systems are regularly inspected for leaks, and schedules are optimized to meet the actual needs of native vegetation. This reduces overwatering and conserves valuable water resources, ensuring efficient water use over time.

- Erosion and soil health: Organic materials, like shredded plant waste, are used as groundcover to stabilize soil and reduce erosion. This practice enriches the soil, supports nutrient cycling, and reduces dependency on external soil additives, promoting a closed-loop system for long-term ecosystem health.

- Native plant maintenance: Using native plants that require less water and upkeep minimizes long-term resource input. The park's commitment to native species ensures a low-maintenance ecosystem that supports local biodiversity and adapts to the local climate.

- Invasive species control: The introduction of invasive or non-native species is strictly prohibited, protecting the ecological balance of the park. This ensures native plants and wildlife thrive without competition, preserving biodiversity and sustaining a healthy ecosystem long-term.

- Performance and quality monitoring: Maintenance logs are reviewed quarterly to track progress toward sustainability goals. Any necessary adjustments to practices are made to ensure continual improvement, keeping the project aligned with its environmental objectives and responsive to ecosystem changes.