

Teaching sustainability in metro Orlando: the evolution of the pragmatic liberal arts at Rollins college

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11.1 Introduction

Sustainability is the definitive ethic of our time. Its measure of humanity forces a moral response to the specter of climate change, species extinction, and resource depletion [1]. Sustainability, as put forth in the United Nations' landmark report, *Our Common Future*, imposes "limits to growth" to ensure development "meets the needs of the present without compromising the ability of future generations to meet their own needs." [2] With transportation emissions exceeding power plants as the United States' largest source of greenhouse gases, it is impossible to secure sustainability without addressing automobile dependence [3].

For half a century, Orlando has been one of fastest growing and most car-dependent metropolitan areas in the United States. In return, it suffers the nation's highest death rate for pedestrians and interstate motorists—determining factors the city being named the nation's most "sprawl threatened city" and "angriest city." [4] When factoring automobile dependence as a determinant of economic equity, Orlando ranked last among the nation's 30 most populous metropolitan areas [5]. Finally, this metric led the Sustainable Development Solutions Network to flag Metro Orlando for failing to meet the United Nations Sustainability Goal 11, Sustainable Communities [6]. Since the early 1990s, Rollins College students have prepared scores of projects to advance the tenets of sustainability. Active transportation (walking, biking, and transit) has been a particular emphasis, along with green infrastructure,

ecological restoration, and walkable urbanism (as opposed to drivable suburbanism, a compact mixed-use development pattern makes the car an option) [7]. In 2014, sustainability became a watchword after the Orlando city council adopted a *Greenworks Action Plan* to make Orlando "the green capitol of the Southeast." [8] Rollins faculty partnered with the city's Sustainability and Resilience Office in directing student projects designed to advance the plan. The college's strategic planning took a similar path, and in 2021, Rollins is integrating sustainability into the college curriculum, an initiative inspired by the legacy of its iconoclastic president, Hamilton Holt.

11.2 Common sense education and an ideal campus: Hamilton Holt's legacy

Established in 1885, Rollins College raised civic awareness and cultural aspirations in the small town of Winter Park, Florida, located on the frontier's edge. The stripling liberal arts institution struggled, however, until the 1920s when the advent of middle-class tourism transformed a backwater state into the "Eden of the South," Lewis Mumford wrote, "the desire of the heart and the end of human aspirations." [9] In the midst of the greatest real estate boom in American history, acclaimed journalist Hamilton Holt accepted the presidency of Rollins, "because," he noted, "Florida is the one state where the spirit of progress most prevails and where results follow quickest from effort." [10].

A consummate reformer, the longtime editor of *The Independent*, broke the staid academic formula by marrying pragmatism and the liberal arts. Leading the faculty on “an adventure in common sense education,” he “put less emphasis upon information for its own sake, and more upon linking the subject studied with the life of the individual studying it.” [11] After reforming the curriculum, in 1931, Holt named John Dewey to chair the Rollins College Colloquy on the Liberal Arts, which drew a distinguished assemblage to Winter Park. Dewey called on educators to extend the classroom and embrace “a citizenship of one earth.” Analyzing the workings of nature and society from “outside the school” instilled the lesson that “all studies arise from aspects of the one earth and the one life lived upon it.” [11].

Under Hamilton Holt, Rollins made its name merging pragmatism and the liberal arts. Poetry celebrated the Florida landscape, artifacts of Native American culture were cataloged and analyzed, and unique natural features were assessed. The college also hosted luminaries such as Sinclair Lewis, the first American to win the Noble Prize for literature, and presidents Herbert Hoover, Franklin Delano Roosevelt, and Harry Truman. The town and gown relationship prospered as Winter Park became a welcome partner in broadening the arts, cultural awareness, and eventually social reform.

In 1949, shortly before he retired, Hamilton Holt performed an act of humanism long in coming. An original member of the National Association for the Advancement of Colored People, he had wanted to honor Mary McCleod Bethune, the founder of Bethune Cookman College, at the 1947 graduation commencement, but the board of trustees thwarted him. Two years later, the trustees remained unmoved, but Holt forged ahead. Realizing it would be his last significant act as Rollins President, he bestowed Bethune with an honorary degree. *The Chicago Defender* called the act, “a milestone in human relations.” It was the first time an African American had received such recognition from a white southern college [11].

Holt’s reforming verve also extended to the physical campus. In fact, upon arriving in Winter Park, his first priority was to build an “ideal campus.” [12] His aspiration was aided by the college’s lake front setting in one of Florida’s first planned suburbs. In 1881, Chicago businessmen Loring Chase and Oliver Chapman purchased 600 acres along a rail line to build a town modeled on Riverside, Illinois, the iconic suburb designed by Frederick Law Olmsted [13]. Their 1883 plan was a modified neoclassical grid with radiating concentric circles denoting 5-min walks from a train station in a central park. The town developed at a pedestrian scale and in a context-sensitive manner that employed a variety of building types, heights, and design approaches. Civic institutions occupied key locations, and like Riverside, Winter Park’s compact downtown was

aligned on a principal street, Park Avenue, that paralleled a central park [14].

Lying between the downtown’s southern boundary and Lake Virginia, Rollins College imbued Winter Park with a priceless aesthetic. Holt was determined to build on this foundation and contacted prominent city planner John Nolen, to review his campus plan. Nolen had commissions from Davidson College, the University of North Carolina, Queens College, and the University of Wisconsin, but it was his pathbreaking work in designing the neo-Renaissance new town of Venice, Florida, that excited Holt. Holt was also inspired by Nolen confidant, George Merrick.

A former Rollins student and the developer of Coral Gables, Merrick drew on Winter Park in his plan for the nascent Miami suburb. Coral Gables drew national attention for its unmatched assemblage of Mediterranean Revival architecture. Open courtyards, tiled roofs, stucco exteriors, high ceilings, and arched windows and doorways combined practicality and aesthetics to meet the challenge of Florida’s hot, humid climate. Holt spent a year examining Mediterranean Revival projects in Miami and St. Petersburg before hiring Richard Kiehnel, an Ecole de Beaux Arts trained architect who had designed noteworthy Mediterranean Revival buildings in both cities [15].

Venice and Coral Gables informed Kiehnel’s campus plan that grouped 29 structures to form a neo-Renaissance academic village. It had an axial orientation with the theater and chapel set on a central square, but the plan’s focal point was the library. Envisioned as a commanding 29-story structure, it was the terminus for the central axis that bisected a linear green and a common lawn. Kiehnel played to the lessons of the Italian Renaissance, which had emphasized a new more engaged urban culture where citizens spent much of their free time in public plazas and markets. Renaissance architect Leon Battista Alberti believed these public spaces helped divert young men and women from “the mischievousness and folly natural to their age,” and the Rollins campus is a testament to this tradition [16].

Loggias, a staple of Florentine architecture, were paramount. Covered walkways linked the campus, while classrooms and dormitories were set on quadrangles and small courtyards to capture breezes and foster air circulation. “Breezy and cool” was how Holt described the scheme to create the first “open-air college” in the United States [15]. The library was never built to the plan’s monumental dimensions, but Mills Library, a human-scaled three-story structure, did center the campus. Finally, intimate greens and small squares offered places of repose to activate thought and offer an escape from the swirl of campus life. A model of walkable urbanism, the campus was built to a pedestrian scale that respected the human form and celebrated intellectual inquiry.

When Holt retired in 1949, Rollins had taken shape on the lines he envisioned. The interplay between Winter Park and the college was significant. As one writer noted, “the town became a college.” [17] But, Kiehnel’s plan had a glaring omission—there were no parking lots. In 1927, the automobile was an option, but once it became a necessity, the campus’s pedestrian orientation suffered. By the 1970s, the widening and realignment of Fairbanks Avenue severed the central axis running in conjunction with Interlachen Avenue, and parking lots soon covered sites designated for open space. This commitment to the automobile reflected a monomaniacal exercise in road building engineered by the Florida Department of Transportation.

After Walt Disney announced his plans for Disney World, the construction of a series of wide high-speed roads fueled a repetitive suburban pattern across metropolitan Orlando. This dogmatic approach peaked in 1998, when the Orange County Commission rejected federal dollars to build a light rail system (Charlotte garnered the funds and its \$470 million investment in rail spurred a \$1.8 billion return in walkable urbanism in its first 3 years). At the same time, the Orange County Expressway Authority was in the midst of constructing 153 miles of toll roads, which translates into the highest per capita concentration of toll roads in the nation. This investment gave the metropolitan area the shape of a disjointed mutant human body, where the intersections of the maze of toll roads with Interstate 4 (I-4) resemble the tentacles of a freakish octopus attached to the minuscule torso of the downtown [18].

Metro Orlando’s fragmented mass of drivable suburbanism is the antithesis of sustainability. “The real problem with cars is not that they don’t get enough miles to the gallon,” David Owen, author of *Green Metropolis* writes. “It’s that they make it too easy for people to spread out, encouraging forms of development that are inherently wasteful and damaging” [19]. Cities dominated by drivable suburbanism intensify the consumption of land, energy, and water, the production of greenhouse gases and smog-related emissions, and the flow of stormwater pollution (due to extensive paving for roads and parking). In addition, the economic outlay is staggering. Utility extensions are fiscal sinks, highway construction is cost-prohibitive without charging tolls, and funds to maintain bridges and overpasses are increasingly scarce. The indirect costs are wasteful, deadly, and cold-hearted: more driving and pedestrian deaths, higher indices of road rage and obesity, less walking and biking, and the impairment of the human-scaled public realm. In metropolitan Orlando, an eviscerated public realm was indifferent to human life as per capita pedestrian, motorist, and bicycle deaths rank among the highest in the nation [20].

Efforts to mitigate the problems of drivable suburbanism spawned and began to take hold in the early 1990s.

Florida’s counties and municipalities had adopted comprehensive growth management plans mandated by the 1985 Comprehensive Growth Management Act, and investments in sustainability proceeded on two fronts: building bike trails and acquiring natural lands. The passage of the 1992 Inter-Surface Transportation Efficiency Act allocated federal funds for bike trails, while Florida’s Preservation 2000 program provided \$300 million a year for the acquisition of natural lands [21]. Beginning in 1992, seniors in the Rollins College Environmental Studies program (ES) partnered with local government agencies and boards to support active transportation and the acquisition of natural lands. By decades end, they were preparing town plans set to walkable urbanism and informed by the Rollins campus and Winter Park’s historic downtown.

These courses were predicated on project-based learning, the living embodiment of John Dewey’s “learning by doing” approach to education. Shifting the emphasis from teacher-centered instruction to student-centered projects that are presented to a community partner creates a dynamic classroom focused on problem-solving and producing a quality product. Establishing connections to experts and local governing boards, students gain pragmatic and critical skills. In regard to sustainability, they must apply vision, idealism, and knowledge to steward resources and advance the well-being of citizens. Most important, when they present their work to experts versed in sustainability, they gain insight that extends beyond the academic community.

The presentation requires students to own their project. They must be knowledgeable and prepared for questions that require them to think on their feet. This real-world skill is a definitive achievement in an arduous process, and it yields a priceless commodity—intellectual self-confidence. In project-based learning, faculty assume the role of coach, facilitator, and colearner. To make this dynamic work, they spend more upfront time:

1. Assessing the scope of potential projects.
2. Plotting the logistics of meshing theory and analysis.
3. Determining the makeup of the deliverable product.
4. Securing a community partner.
5. Developing a strategy to procure quality presentations [22].

11.3 Bike trails, nature preserves, and green communities

In 1992, project-based learning centered on a capstone ES course where seniors prepared a comprehensive assessment of an abandoned rail corridor designated to accommodate metropolitan Orlando’s first bike trail. Connecting Winter Park and Orlando, the Cady Way Trail drew the ire of adjacent property owners who feared it would attract

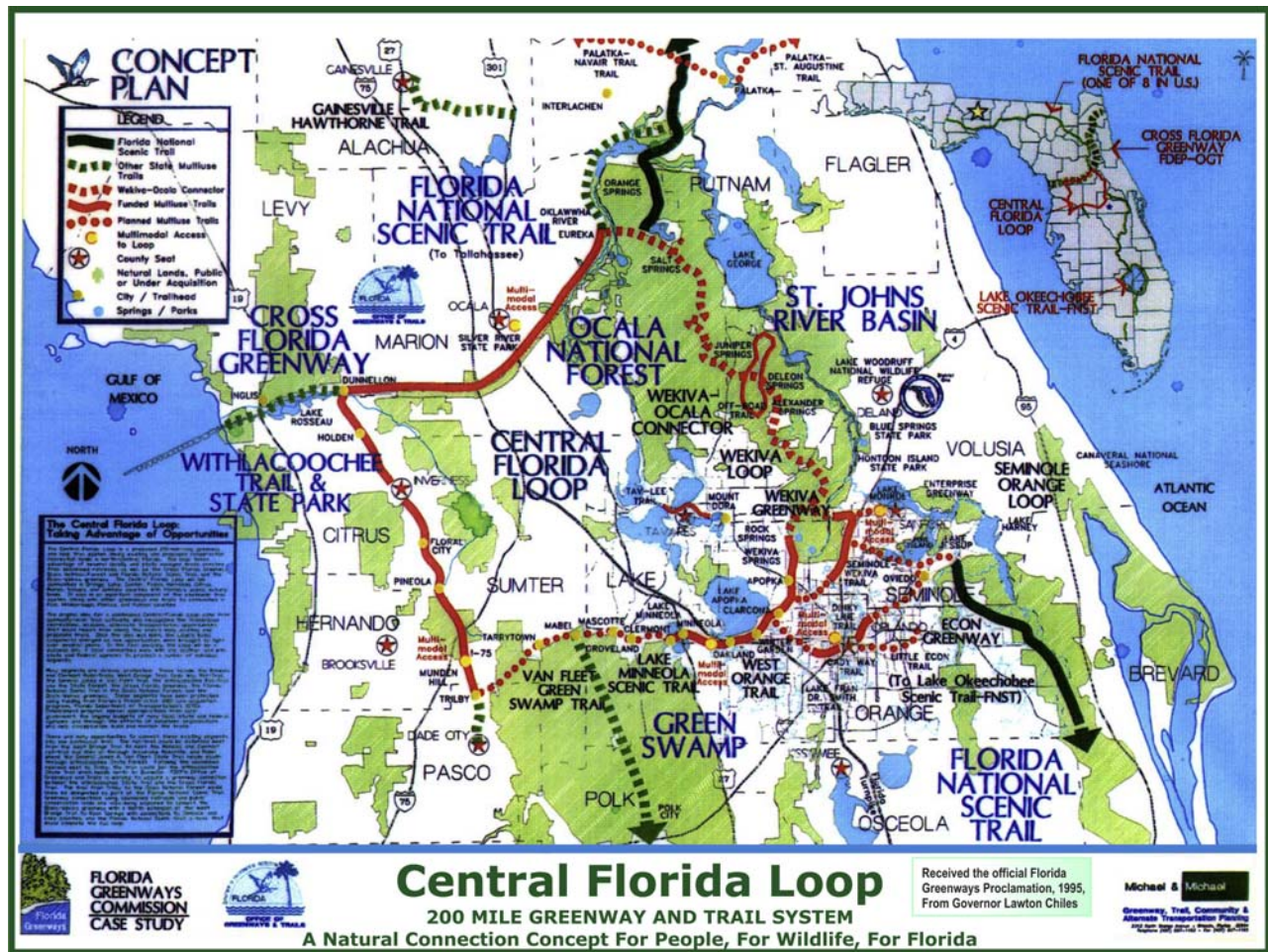


FIGURE 11.1 Central Florida loop (Florida greenways commission, public document) [24].

criminal elements. The same issue had plagued the Pinellas Trail, Florida's first Rails-to-Trails urban bikeway, but concern turned into a love affair once the Pinellas Trail was trafficked by bikers in the densely populated Petersburg–Clearwater metro area [23]. This shift was documented in the ES report, which also presented the health and economic benefits that bike trails engender, potential connections to parks and schools, and a native planting regimen (and costs) for the corridor. Students presented a summary of the 50-page study to the Orlando Parks Board and the project's planners. After the Cady Way Trail opened, opposition soon gave way and plans took form to create a trail network.

After the student presentation, Rollins faculty member Bruce Stephenson and Orlando Parks Board member Forest Michael partnered to plan the Wekiva Loop—a network of bike trails that would connect the Cady Way Trail to the Wekiva GeoPark—which encompasses a vital ecosystem centered on Wekiva Springs. Inspired by Portland's 40 Mile Loop, the Wekiva Loop was part of a larger Central Florida Loop—a 200-mile system of trails and greenways

Michael envisioned. A landscape architect, Michael served on the Florida Greenway Commission, and Governor Lawton Chiles named the Central Florida Loop a planning test case for the Commission, as shown in Fig. 11.1.

Between 1993 and 1996, ES seniors analyzed the three-trail corridors that comprised the remainder of the Wekiva Loop: the Cross Seminole Trail, the Seminole Wekiva Trail, and a portion of the West Orange Trail. Their research extended the scope and detail of plans drawn by the county staffs and their consultants. Today, the Wekiva-Loop is long established and ties into the Cross Florida Trail connecting Titusville (on Florida's east coast) to the Pinellas Trail.

In 1997, ES seniors shifted their focus to prepare a conceptual management plan for High Oaks, a 240-acre priority acquisition for the Seminole County Natural Lands Program. In 1990, Seminole County, a mostly suburban enclave of 350,000, allocated \$20 million for the purchase of natural lands [25]. An advisory committee of field botanists ranked sites based on their corridor potential, prior land use, rarity of habitats, and vulnerability to

development. Working with the state on a joint acquisition program, the county commission purchased over 4000 acres of mostly pristine river and lake front property by 1995. Of the 50-plus sites considered by the advisory committee, High Oaks received the highest ranking. On the county's rural edge, it was bounded by the Econlockhatchee (Econ) River, a designated outstanding Florida waterway that receives special protection. The property also had a definitive mix of xeric, mesic, and hydric habitats.

After analyzing the acquisition criteria that guided the advisory committee, students gained insight into essential ecological concepts such as corridors, biodiversity, and species extinction (see checklist: "An Agenda For Action For Taking Steps Establish Five Goals For The Project").

An agenda for action for taking steps to establish five goals for the project

Through a nominal group exercise, five goals were established for the project as follows (check all tasks completed):

- 1. Maintain the site's ecological processes.
- 2. Restore habitats to their "natural" state.
- 3. Protect endangered species.
- 4. Promote environmental education.
- 5. Promote outdoor experiences with minimal environmental impact.

Mapping, ground-truthing, and defining eight habitats keyed the plan. This work informed a proposed regimen of prescribed burning deemed crucial to maintaining the diversity and function of habitats, restoring degraded habitats, and ensuring the survival of the Gopher Tortoise, the site's keystone species. A series of transect analyses determined the locations and quality of Gopher Tortoise burrows, which are essential for a range of species to survive seasonal fires. This research also informed a fire regimen plan. For instance, an area with a mixture of mesic and scrubby flatwoods with a considerable oak scrub layer and high density of saw palmettos had a high number of abandoned burrows, which made managed fire a priority for this area.

A trail system was delineated to enhance education and highlight the site's premier natural features: pristine sandhill habitat, a grove of xeric Live Oaks, and a span of a large Bayhead swamp accessed by a boardwalk. The highlight was a sandy bluff overlooking the Econ River, where one of two benches designated for the property was sited. Finally, sampling tests of physical, chemical, and biological factors determined that the riparian ecosystem was healthy [26].

A quarter of a century later, the High Oaks property is called the Econ Wilderness Area—an important ecological steppingstone set within a growing matrix of suburban subdivisions. A fire regimen promotes habitat health, and

there is a significant Gopher Tortoise population. Glimpses of bobcats, Bald Eagles, and Ospreys offer a hint of wildness for visitors [27]. Gabby Buendia, a 2019 ES graduate and college valedictorian, revealed the site's unique character in her essay, "The River that Raised Me," in *The Wilder Heart of Florida: More Writers Inspired by Florida Nature*.

The Econ Wilderness Area was Buendia's first nature experience, a short hike at the age of 16 stirred her senses and led to regular exploratory visits. Five years later, she set out on a final hike before leaving Central Florida. Departing from the sandy trailhead, she made her way to the bluff overlooking the Econ River that she had never experienced it in the summer, when the river runs high. The site was familiar yet different. "It was absolutely full—its banks felt as if they were swelling with freshwater and a new flow," she writes. The moment was accompanied by "a sudden flash of gratitude," she writes:

From my first hike ever to this ceremonial parting hike, the river helped me rise into adulthood and showed me the values of patience, exploration, and flexibility. It taught me that there is a wide diversity of benefits in getting to know the outdoors, and that everyone can find a sense of place and belonging in our natural landscapes [28].

The idea of integrating nature into daily life infused the plan for the Winter Springs Town Center, as shown in Fig. 11.2. The ES analysis of the Seminole-Wekiva bike trail identified a 240-acre parcel, midway between the Econ Wilderness Area and Wekiva State Park, which was ideal for integrating active transportation and urbanism. The property was adjacent to Winter Springs High School, within walking distance of Lake Jessup, and it contained a mix of quality natural habitats. A suburb of 25,000 people, located north of Orlando, Winter Springs, Florida, lacked a focal civic point; and, in 1998, the city council hired Dover-Kohl, a New Urbanist planning firm; and, Michael Design Associates, a greenway design firm, to design a town center scaled to active transportation [29].

ES students supported the team. To prepare for the experience, they analyzed both the Rollins campus and Venice, Florida, to create a set of civic design principles. Focusing on spaces, connections, and buildings, the goal was to inform place-making that infuses civic awareness into the daily walk of life:

1. Set within a compact urban form, building height is regulated to provide a subtle but defined focus on educational or civic ideals.
2. Physical design secures natural benefits and uses nature to highlight urbanism.
3. A variety of uses are integrated in a proportional and balanced manner.



FIGURE 11.2 Winter springs town center plan (winter springs planning and zoning, public document) [30].

4. Spaces are aligned to enhance civic buildings and visual perspectives.
5. Beauty and function are synergized to celebrate learning and/or civic virtue.

A series of interconnected parks, natural areas, and trails defined the Winter Springs town center, as shown in Fig. 11.2. In contrast to surrounding developments, where parks are relegated to low quality, “left-over” land, sensitive upland habitat was preserved and linked to wetlands on either side of the site. Development was concentrated on a degraded pasture in a pedestrian oriented design. Neighborhood shopping, parks, and civic buildings were placed within a 10-min walk of residences. The plan provided the basis for a \$4.98 million from grant from Preservation 2000 to purchase the proposed greenspace system. Usually, such

grants are allocated for land lying within large natural systems, but the state agency felt the Winter Springs Town Center provided a model for the state. “The plan,” the Florida Department of Environmental Protection contended, “is based on traditional town planning principles such as more compact urban form designed to the human scale—the pedestrian rather than the auto.” [29].

The Winter Springs Town Center broke ground in January 2002 [31]. The urbanism did not take hold as planned, but the mix of parks linked to a bike trail offers a more sustainable pattern than the surrounding suburban landscape. While sustainability is multifaceted, it hinges on using resources in a more efficient manner. Protecting sensitive habitats and offering a mix of transportation modes is the first step. The obvious question is whether

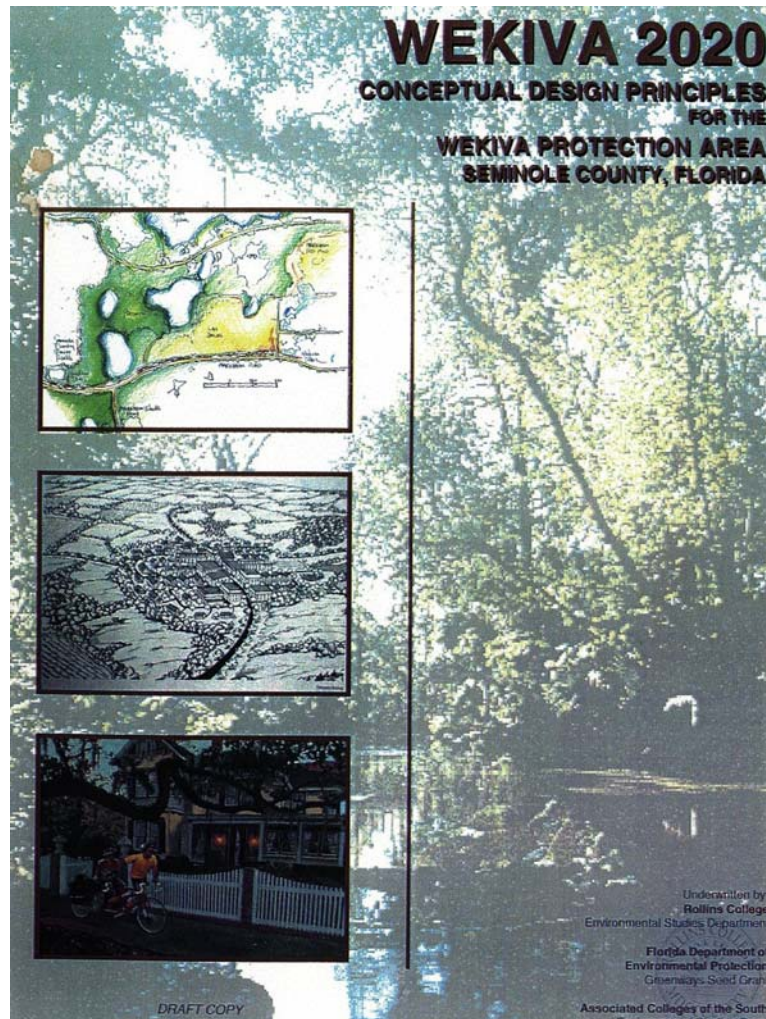


FIGURE 11.3 Wekiva 2020: conceptual design principles for the Wekiva river protection area: seminole county, Florida (produced by author) [32].

Floridians will choose to live closer together with less private space and more public amenities and connections.

The Winter Springs Town Center informed a follow-up project, *Wekiva 2020: Conceptual Design Principles for the Wekiva River Protection Area: Seminole County, Florida*, as shown in Fig. 11.3.

In 1999, Governor Chiles issued a development moratorium for the Wekiva River Protection Area after the Seminole County Commission approved a series of projects that violated the Wekiva River Area Protection Act's mandate that projects have a "rural character" and be designed to limit "culminate ecological degradation." [33] Grants from the Florida Department of Environmental Protection and the Associated Colleges of the South Environmental Studied funded Wekiva 2020, which established design standards and applied them to a vacant 80-acre parcel to illustrate a sustainable pattern of rural development (see checklist: "An Agenda For Action For Taking Steps To Identify Six Design Principles").

An agenda for action for taking steps to identify six design principles

Building on the winter springs Town Center Plan and Randall Arendt's *Rural by Design*, the student team identified six design principles, as follows (check all tasks completed):

- _____ 1. Harmonize growth patterns with regional ecosystems.
- _____ 2. Maintain ecological integrity of rural forests.
- _____ 3. Maintain an interconnected system of green corridors.
- _____ 4. Minimize conflict between conservation and recreation on the seminole-wekiva trail.
- _____ 5. Establish edges to development and utilize vernacular architecture to maintain rural character.
- _____ 6. Cluster development to create greenway-oriented communities in the form of a rural village.

The final two points in the preceding checklist informed of a plan for a rural village employing vernacular architecture modeled on Haile Plantation Village, a New Urbanist neighborhood in Gainesville, Florida. A network of linear parks preserved sensitive natural areas and a provided a pedestrian-bike connection for three neighborhoods and a village center. Development was clustered on degraded pastureland with lots ranging from 40 feet by 100 feet in the village center to more secluded 70 foot by 100 foot “view lots” overlooking wetland buffers. A civic green highlighted the village center, which was a short walk from the Seminole-Wekiva Trail.

A 30-page report, *Wekiva 2020*, was the springboard for a Visioning Charrette the ES Department hosted to initiate discussion and aid in determining the path for future study and planning in the Wekiva River Protection Area. Free of the pressures of a public meeting, over 30 environmentalists, smart growth advocates, bike trail advocates, private developers, consultants, and representatives from the state, region, and local planning agencies initiated a robust discussion. After 4 hours, the concept of unifying bike trails, nature preserves, and traditional town planning drew a consensus, which read: “Land use policies which would require clustered multiuse development in harmony with the natural systems while providing linkages with existing development and habitat.” [34].

Following the charrette, Seminole County hired Randall Arendt to help its planning staff draft policies and design guidelines for its rural—suburban interface. Both Seminole and Orange initiated small area studies within the Wekiva River Protection Area, which informed overlay districts that both county commissions adopted to meet the requirements of the Wekiva River Protection Area [35]. Clustering development within a network of greenways not only helps secure the region’s water supply, this sustainable development pattern also informs the planning agendas for Florida’s other springshed districts [36].

11.4 Winter park: sacrosanct space and active transportation

At the same time, the Vision Charette was meeting at Rollins, the college and Winter Park were championing walkable urbanism. Dover-Kohl was hired to redesign Park Avenue, and it was a significant project: utilities were buried, the avenue narrowed and bricked, sidewalks extended, and a street tree regimen added. By 2000, automobile traffic had slowed, pedestrian traffic had increased, sidewalk cafes appeared, and business vacancies dropped [37]. Rollins College commissioned Chael Cooper and Associates, in affiliation with Dover Kohl, to design the McKean Gateway and the Rinker Admissions Building at the entrance to the campus on Park Avenue. These

architectural gems established a definitive terminus and signaled the willingness of both the college and city officials to restore a pedestrian-scaled environment based on historic plans [15].

In 2000, Winter Park took another step in this direction when the city commission hired Michael and Stephenson to draft a master plan for Central Park with the goal of keeping the historic park “sacrosanct.” [38] Inspired by Frederick Law Olmsted, the design team was aided by ES students in preparing a plan that refashioned the historic park on traditional and sustainable lines. The results were significant: a two-acre parking lot was greened, a rose garden (with a mix of native plants) modeled on the work of Gertrude Jekyll was established, a native garden with a drought-resistant landscape took form, green sections that once defined Morse Boulevard were recreated to protect pedestrians, and a train station to serve the new SunRail commuter line was sited, built to historic style, and framed to a human scale.

After the city commission adopted the Winter Park Master Plan in 2002, the Elizabeth Morse Genius Foundation (EMGF) hired Stephenson to lead the ecological restoration of the Genius Preserve—a 50-acre conservation easement set between three lakes in the heart of historic Winter Park. An interdisciplinary team led ES students in inventorying and envisioning the preserve. The outcome was a management plan with the goal of “restoring and preserving a glimpse of an earlier generation’s aesthetic ideal, while providing a working laboratory in ecological restoration.” [39]

The management plan identified areas dominated by exotic canopies that became the focus of restoration work. Faculty led students in designing restoration plans (including plant acquisition costs) for designated sites. The EMGF oversaw the removal of exotics and students planted a regimen of native species. Once a site was restored, students monitored the area and devised management plans that evolved as conditions changed and information was collected. In 2006, an illustrated 70-page field guide was completed, and 2 years later, 6 acres of Mesic Oak Hammock and Hydric Hammock had been restored [39]. In 2008, 1000 Friends of Florida recognized Rollins College and the EMGF with its Community Betterment Award. “This is a well-planned and implemented effort to restore and protect an important piece of open space in an urban setting,” Charles Pattison, President of 1000 Friends, noted, “It shows what a committed group of people can accomplish with vision and a workable plan.” [40].

The EMGF provides stipends for ES students to manage the restored sites. The Genius Preserve’s lessons, however, extend to a range of classes—art, philosophy, literature, and biology—outside ES. A prime ecological steppingstone in Metro Orlando for migrating species, the property is a repository for native flora with 195 plant species, including

124 native, 41 noninvasive exotics, 30 nonnative exotics, and three listed plants. Given that the majority of the nonnative species are planted cultivars that define the historic landscape, the flora biodiversity is unique for a site in an urban area [41].

In 2013, an Environmental Protection Agency Sustainability Curriculum Grant infused sustainability into the Rollins curriculum. A series of linked interdisciplinary classes informed the grant-funded study, *Sustainable Enterprise: Activating SunRail in Winter Park*, as shown in Fig. 11.4. In 2012, planning for the SunRail commuter rail line intensified after it received state and federal funding, and Winter Park was projected to be the prime destination. A richly illustrated report, *Sustainable Enterprise*, presented a series of plans and initiatives to improve pedestrian and bicycle access to the new SunRail Station.

It was presented at the Rollins SunRail Forum in 2014, where 250 citizens, activists, and experts gathered to share

the benefits the new commuter rail would offer when it opened. “Before you know it, SunRail will be here, and that’s why we’re gathered here today – to make sure we’re ready,” declared Rollins professor Rick Foglesong, the program moderator [43].

In the ensuing 5 years, Winter Park invested over \$2,000,000 in projects from the report: the redesign of Denning Drive for pedestrians and bicyclists, the SunTrail bikeway sited in conjunction with the rail right-of-way, and a bike share program housed at the Winter Park Library. A proposal to create a pedestrian underpass inspired by Frederick Law Olmsted’s example at Central Park at the troublesome intersection at Fairbanks and Interlachen (the point where the Rollins graduation procession once crossed into Winter Park) was presented to the Winter Park Planning Commission, but the concept eventually stalled. In 2014, a gateway was built next to the project’s campus terminus. Inspired by the Harvard Gates, the structure marked the end

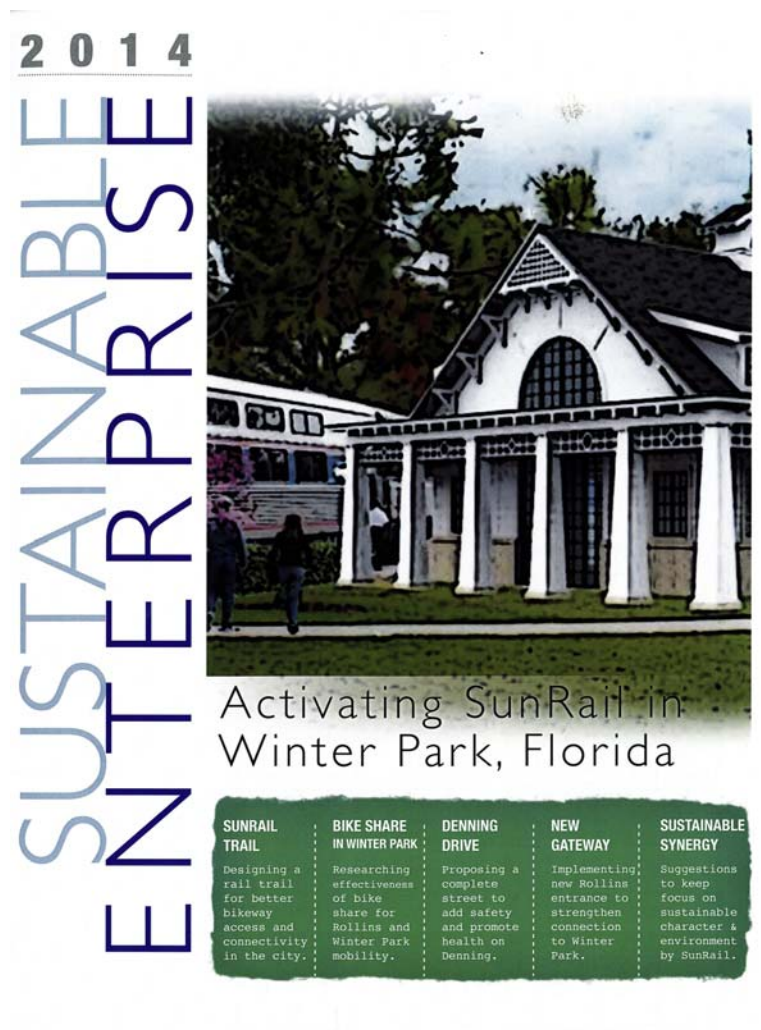


FIGURE 11.4 Sustainable enterprise: activating SunRail in winter park (produced by author) [42].

point of a new walkway that reestablished the historic central axis that centered on the Mills Library and defined Hamilton Holt's plan. Aligned with a new pedestrian crosswalk and traffic signalization system, the gateway enhanced the connection between the campus and community. At the same time, the Olmsted-inspired underpass is a reminder that Hamilton Holt's legacy still informs the vision of an ideal campus for the 21st century [44].

11.5 Greenworks action plan: making Orlando the greenest city in the Southeast

Sustainable Enterprise coincided with the drafting of the Orlando *Greenworks Action Plan*. Orlando Mayor Buddy Dyer had championed SunRail, and in 2013, he established a Sustainability Task Force. At the first meeting, he announced, "Our goal is to make Orlando the most sustainable city in the region, the Portland of the Southeast." [45] The Task Force's *Greenworks Action Plan* mirrored Portland's prototype climate action plan. Livability, Energy/Green Buildings, Solid Waste, Water, Local Food, and Transportation were the components. Key to Orlando becoming "the greenest city in the Southeast" was ending "the heavy reliance on conventional private automobile," and called for creating 25 "quality walkable villages" to enhance Livability and meet the 2040 Transportation goal of active transportation being the mode for a majority of trips [45].

After the city council adopted the *Greenworks Action Plan*, the sustainability director and his staff traveled to Portland to study its accomplishments. A year later, Stephenson did the same, selling his car and taking up residence in the Pearl District (the focal point for the first streetcar system built in the United States in 50 years) to document the future the *Greenworks Action Plan* envisioned [46]. The result was *Portland's Good Life: Sustainability and Hope in an American City*, a book that helped secure a grant from the EMGF to advance sustainability both in the Rollins classroom and in the community.

The grant funded a 3-year faculty workshop, "Teaching Sustainability: Portland and Orlando," to promote teaching sustainability across disciplines and with community partners. A trip to examine Portland centered the workshop. Before the excursion, faculty attended three public forums led by experts who addressed a component of the *Greenworks Action Plan*. Next, workshop participants formulated a course project to advance a component of the plan. In Portland, they spent 5 days meeting with specialists and examining sustainability initiatives. In addition, Stephenson partnered with Orlando Sustainability and Resilience officer Chris Castro to model how to meld sustainability and project-based learning.

Building on the *Sustainability Enterprise* initiative, the ES senior capstone required students to prepare an illustrated project booklet that addressed a component of the *Greenworks Action Plan* and three United Nation's Sustainability Goals. Next, student teams identified three precedents to set the foundation for original research that included four original charts, drawings, and/or plans. In addition, the booklets included a set of findings, including projected costs, benefits, and an implementation strategy. After completing their booklet, student teams gave separate 7-min presentations that highlighted their original research to Castro and ES faculty.

The classroom operated like a consulting office, as the instructor worked with students to turn visions into illustrated project booklets. Student research informed the process, which led to concise proposals informed by precedents and data. By midterm students owned their projects, which were increasingly professional in look and substance. A week was devoted to preparing for presentations that had the students fine-tune their work. The presentations revealed when students mastered the material, as the give and take with their audience heightened confidence and empowered them to share their knowledge. Most importantly, students recognized the opportunity to foment change as Castro shared the top projects with Mayor Dyer and other department heads.

The ES sustainability projects covered a wide range and were often ingenious. They included identifying and modeling metrics for siting locally sourced food hubs in food deserts, detailed plans to invest in active transportation in Orlando's Main Street neighborhoods, turning a major arterial into a complete street, utilizing public health data to identify investments in pedestrian and bicycle improvements, developing a native landscaping ordinance and modeling it on a typical neighborhood lot, producing a feasibility analysis and strategy for a commercial recycling program in a Main Street District, intersecting a major arterial with a green street, reclaiming a vacant downtown lot by planting a fruiting orchard, turning a grassy expanse at City Hall into a rain garden, creating a sustainable moss lawn in a busy downtown park, and prioritizing neighborhoods for city subsidized tree planting. An especially inventive project proposed greening a section of Orlando's Bridge District, a plan to turn a linear five-block section underneath I-4 into a series of parks.

In 2015, the Florida Department of Transportation initiated Ultimate I-4, a \$2.1 billion "makeover" of a 21-mile stretch of the nation's most dangerous interstate that runs through downtown Orlando. The Bridge District is ambitious, it would place soccer fields, basketball courts, tennis courts, playgrounds, a splash park, a bocce court, a dog walk, a civic plaza, and a retail district under a new elevated section of I-4. Officials recognize the proposal is highly conceptual. There is scant precedent for humans

enjoying recreation under noisy, traffic-laden interstates, and some cities are instead opting to remove downtown freeways and replace them with surface-level boulevards. No one knows if the Bridge District will become a destination, but it could enhance livability and a space's vitality. A naturalistic environment designed for human movement fomented what Frederick Law Olmsted called "recreation," the clearing of the mind from the psychic strain of urban life [47]. This principle informed a student project to green the Bridge District's eastern edge, the Parramore Gateway.

The plan proposed turning the 50-foot wide and 300-foot-long span of asphalt lying 26 feet below I-4 into a greenspace integrating water flow, native vegetation, and a bike-pedestrian path. Directing stormwater runoff from the overpass into a series of rivulets structured the alignment of a bike-pedestrian path that curved through a mix of shade-tolerant native hydric and mesic plant species. Creating this naturalistic environment would require excavating 12,000 square feet of impervious surface, laying out 36,000 cubic feet of soil, and planting 200 grasses, shrubs, and trees. In return, the network of green would filter approximately 325,440 gallons of water a year that would have flowed into sewer drains [48]. Greening the Parramore Gateway would not only be good for the environment, it would imbue a destitute impervious underpass with a beauty and tone conducive to contemplating art and recounting a forgotten history.

The Bridge District Plan calls for lining this section with murals that depict the history of Parramore, the historic African American neighborhood I-4 severed. Greening the Parramore Gateway could be a foundational piece in a network of green that would be a unifying thread in a community degraded by disinvestment and heavy-handed urban renewal [49]. Prioritizing equity is essential for sustainability, and in Portland, Rollins faculty experienced this reality.

11.6 Sustainability's challenge: affordable housing and homelessness

The workshop participants relied solely on active transportation during their 5-day stay. Immersed in walkable urbanism, they encountered complete streets centered on streetcar lines, the integration of affordable and market housing, and a model green infrastructure—restored wetlands, eco-roofs, bioswales defining green streets. In addition, the mix of uses—grocery stores, drug stores, medical offices, and eateries—placed everyday needs close at hand. "I understood the concept of sustainability, especially from a global perspective," one faculty member noted:

but the workshop was especially valuable in expanding my knowledge of local initiatives in Portland, from zoning laws that encourage density, to the design of public parks, to the

creation of nature preserves, to innovative transportation infrastructure, to architectural design. It was fascinating to see Portland's progressive policies in all of these areas, which have successfully stimulated economic development and revitalized the city [50].

The group also encountered concentrations of the homeless and soon learned that homelessness and affordable housing are intertwined. This issue has bedeviled Portland since October 2016, when Mayor Charles Hales issued a state of emergency to confront a "crisis of affordable housing and homelessness." In response, zoning codes were densified and voters approved a \$258.4 million bond measure to support affordable. \$20 million from the sale of housing bonds went to Right to Return, the first funded initiative in the United States to rectify displacement in African American communities. Portland also pioneered tax increment financing to spur urban renewal in the Pearl District, and this policy was extended to procure affordable housing in a range of underserved neighborhoods [51]. For Rollins faculty, Portland illustrated the rewards and challenges of sustainability, especially in regard to affordable housing, which is a pressing issue in Central Florida.

A 2019 study by the National Low Income Housing Coalition found Metro Orlando's provision of 13 affordable units per 100 families who need them to be the worst in the nation [52]. In response, Mark Brewer, the CEO of the Central Florida Foundation, announced the creation of a \$100 million "affordable housing gap fund." [53] Parramore was a focal point. A Sustainable Communities Grant from the Obama Administration funded the *Parramore Comprehensive Neighborhood Plan*, which articulated an affordable housing strategy. In 2019, over 200 units came online, and a program to subsidize home ownership secured another 41 units. At the same time, the Central Florida Foundation formed the Central Florida Regional Housing Trust to build mixed-income housing in Parramore to set a prototype, where residents negate a significant real estate expense by only paying for the cost of housing [54].

Affordable housing was a constant in the Rollins sustainability courses, which art professor Josh Almond's Applied Design Solutions class exemplified. Almond's students examined sustainability through the lens of the tiny home movement. First, they designed their own unit, and then they collaboratively built a tiny home. The course's hands-on nature helped them learn skills and trades that are applicable outside the classroom. "This class allows us to discuss big concepts like homelessness and sustainability," one student stated, "while also teaching us how to hammer a nail into wood, how to downsize our material possessions, and how to digitally render buildings." [55] Tiny homes range from 96 to 400 square feet, and the Rollins' students' 96 foot square, "Tumbleweed Salsa Box," was designed to be mounted on an 8-by-12-foot trailer and features a kitchen, shower, compostable toilet,

loft bed, couch/futon, and porch overhang with a living garden [55].

At the conclusion of the workshop, the faculty cohort moved to share their experience. Procuring a grant from the EMGF, they joined with the college administration to plan a symposium, “Equity the Key to Sustainability,” for the fall of 2021. A workshop devoted to teaching sustainability will precede an expert panel, including Chris Castro and Mark Brewer, which will share their experience in a public forum. Finally, Cat Goughnour will deliver the keynote. A graduate of the London School of Economics, her sustainability-focused Right 2 Root initiative sought to readdress the root causes of gentrification in Portland and capacitate African Americans to leverage planning tools, public interest design, and community assets to create healthy, innovative places [56].

Sustainability is a new strategic initiative at Rollins, and the symposium will deliver criteria to infuse sustainability into the classroom aided by a network of mentoring and collaboration. The symposium will not only inform Rollins faculty and students, but a consortium of Central Florida colleges and universities that are committed to teaching sustainability [57]. Ideally, the Rollins Symposium will be the first in a series of yearly events hosted by the consortium’s members.

The consortium is not merely an academic endeavor. Faculty participated in the East Central Florida Regional Planning Council’s resilience collaborative. Integrating equity and sustainability defines the *East Central Florida Resiliency Action Plan*, which seeks to reduce the region’s carbon footprint and vulnerabilities to climate change. Completed in May 2021, it parallels the *Portland Climate Action Plan* and the *Orlando Greenworks Action Plan*, and like its counterparts, the plan is visionary yet defined by research [58]. For a century, the pragmatic liberal arts have plied the same path. If the goals of sustainability are transcendent, reaching them is grounded in nature and reality. “If you have built castles in the air,” Henry David Thoreau wrote, “that is where they should be. Now put the foundations.” [59]

11.7 Summary

Sustainability is a watchword for smart cities and a buzzword on college campuses. John Dewey’s community-based “learning by doing” brand of pragmatic education has a significant history, and it inspired Rollins College faculty teaching sustainability. Project-based learning requires that faculty share their expertise with both community partners and their students. Faculty research not provides a model for student projects, it is the basis of a common bond that turns the classroom into a laboratory for producing a quality product for the

community partner. When students present their projects to a local governing board or agency, they gain invaluable real-world experience and provide, ideally, consultant quality work to their client. At Rollins College, initial project-based learning projects were relatively simple: rails-to-trails initiatives and management plans for natural lands. In the next phase, students analyzed walkable urbanism on the campus and in Winter Park to inform their plans for towns, villages, and neighborhoods incorporating active transportation. After Orlando adopted a sustainability plan, faculty and students worked in concert with the Sustainability and Resilience Office to illustrate investments in sustainability in the areas of livability, transportation, solid waste, local food, and water resources. Such partnerships are essential not only for educating the campus and the community but accelerating the pace for achieving sustainability. In 2021 Rollins made sustainability a strategic priority, and faculty versed in project-based learning are leading the effort to infuse sustainability into the curriculum. This initiative not only documents the evolution of project-based learning since John Dewey visited the campus 90 years ago, it also marks the generation that will envision and build smart cities.

Finally, let us move on to the real interactive part of this chapter: review questions/exercises, hands-on projects, case projects, and optional team case project. The answers and/or solutions by chapter can be found in Appendix G.

11.8 Chapter review questions/exercises

True/false

1. True or False? Sustainability is a measure of humanity’s moral response to the specter of climate change, species extinction, and resource growth.
2. True or False? Efforts to mitigate the problems of drivable suburbanism spawned and began to take hold in the early 1980s.
3. True or False? In 1992, project-based learning centered on a capstone Environmental Studies (ES) course, where seniors prepared a comprehensive assessment of an abandoned rail corridor designated to accommodate metropolitan Orlando’s first bike trail.
4. True or False? In 1997, Environmental Studies (ES) seniors shifted their focus to prepare a conceptual management plan for High Oaks—a 350-acre priority acquisition for the Seminole County Natural Lands Program.
5. True or False? After analyzing the acquisition criteria that guided the advisory committee, students gained insight into essential ecological concepts such as corridors, biodiversity, and species extinction.

Multiple choice

1. A _____ was delineated to enhance education and highlight the site's premier natural features: pristine sandhill habitat, a grove of xeric Live Oaks, and a span of a large Bayhead swamp accessed by a boardwalk
 - a. Ecological system
 - b. Habitat system
 - c. Trail system
 - d. Econ wilderness system
 - e. Freshwater
2. The idea of integrating _____ into daily life infused the plan for the Winter Springs Town Center.
 - a. Society
 - b. Infrastructure
 - c. Wilderness
 - d. Nature
 - e. Urbanism
3. A network of _____ can preserve sensitive natural areas and provide a pedestrian-bike connection for neighborhoods and a village center.
 - a. Linear parks
 - b. Vernacular architectures
 - c. Wetland buffers
 - d. Environmentalists
 - e. Bike trail advocates
4. The hope is that _____ will draw a consensus, which should read like: Land use policies that would require clustered multiuse development in harmony with the natural systems, while providing linkages with existing development and habitat.
 - a. Holistic integration planning
 - b. Traditional town planning
 - c. Smart cities planning
 - d. Smart counties planning
 - e. Rural-suburban planning
5. Clustering development within a network of greenways not only helps secure the region's water supply, this sustainable development pattern also informs the planning agendas for Florida's other:
 - a. Urban districts
 - b. Significant projects
 - c. Street tree regimens
 - d. Business vacancies
 - e. Springshed districts

Exercise

Problem

How can data skills be taught using a more unified and practical approach, which facilitates application of skills in genuine, smart city contexts?

Hands-on projects

Project

Do research: Design and validate a questionnaire for teachers on the knowledge and use of smart city concepts and their usefulness in online learning during the COVID-19 pandemic, based on a sustainable approach at different educational levels.

Case projects

Problem

How can a massive open online course be used to engage citizens in learning about smart cities and teach them how to cocreate a smart cities project in their community?

Optional team case project

Problem

Describe the relationship between Smart Cities and how the applicability of Machine Learning (ML) techniques is carried out with the aim of optimizing sustainability.

References

- [1] McKibben B. *Falter: Has the human game begun to place itself out*. New York: Henry Holt, 2019; Elizabeth Kolbert, *the sixth extinction: an unnatural history*. New York: Henry Holt; 2014.
- [2] World commission on environment and development, *our common future*. New York: Oxford University Press; 1987.
- [3] Newman P, Kenworthy J. *Sustainability and cities: overcoming automobile dependence*. Washington D.C.: Island Press; 1999. p. 334.
- [4] Club S. *America's most sprawl threatened cities*. San Francisco: Sierra Club; 1999.
- [5] Leinberger C, Rodriguez M. *Foot traffic ahead*. Washington D.C.: Smart Growth America; 2016.
- [6] Lynch A, Anna LP, Fox C. *Sustainability cities report: the 2019 US cities sustainable development report*. New York: Sustainable Development Solutions Network; 2019.
- [7] Leinberger C. *The option of urbanism*. Washington D.C.: Island Press; 2010.
- [8] Orlando office of sustainability (OSO)vol. 4. *Greenworks Orlando: Community Action Plan Orlando: OSO*; 2014.
- [9] Lane J. *Rollins college centennial history: a story of perseverance, 1885-1985 Orlando, FL: story farm*, 2017, pp. 1-324; Lewis Mumford. *The intolerable city: must it keep on growing*. National Humanities Center. *Harper's Monthly*. Sections: I-IV February, 1926:292.
- [10] Hamilton H. *Ideals for the development of Rollins college*. Rollins College Archives and Special Collections (RCASC); June 1926.
- [11] Stephenson B. *Rollins college and winter park: exemplars of the American renaissance, precedents for the future*. In: Maurice O'Sullivan Bruce Stephenson, editor. *Florida's golden age*,