

Green from the Ground Up: Ecological Site Design for Master Plans

Rethinking Sustainable Construction 2006:

Next Generation Green Buildings

Sarasota, Florida, USA — 19-22 September 2006

April 14, 2006

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Presentation Outline

1. Principles of Ecology and Sustainability
2. Principles of Master Planning
3. Putting it together: A Case Study at Hillsborough Community College, FL
 - Examining the Site Context
 - Existing Conditions
 - Site Analysis
 - Development Program
 - Organizational Principles
 - Development Concept
 - Concept A
4. Summary

1. Principles of Ecology for Site Planning

Principles of Sustainability

“Interconnected relationships among systems form the web of life”.

- These relationships of the campus to the environment outside its boundaries connect the campus to the rest of its context.

Relation to Campus Master Planning Process:

Examples:

- Bioregional Context
- Transportation systems– public transit, vehicular, bicycle, pedestrian
- Information Systems
- Waste Systems
- Energy Systems

“Throughout nature we find multi-leveled structures of systems nesting within systems. Each of these forms an integrated whole within a boundary while at the same time being a part of a larger whole.”

Campuses are “multileveled structures of systems nesting within systems.”

Most applicable to campus planning are the community systems -

- The region, community, natural environment, campus, sub area, site, building, room.

Relation to Campus Master Planning Process:

- Examples:
- Circulation Systems (train, bus, vehicular, bicycle, pedestrian)
- Utility
- Storm and Sanitary Sewer
- Lighting
- Art
- Site Furniture

2. Nested Systems

“The interactions among the members of an ecological community involve the exchange of energy and resources in continual cycles. The cycles in an ecosystem intersect with larger cycles in the bioregion and in the planetary biosphere.”

Relation to Campus Master Planning Process:

- Examples of the cycles that are present in a campus park include:
- Time and Use: Diurnal, Weekly, Monthly, Seasonal, School Year, Annual, Five Year Plan Update
- Management: Program, Financial Budget, Grant application

3. Cycles

“All organisms are open systems, which means that they need to feed on a continual flow of energy and resources to stay alive. The constant flow of solar energy sustains life and drives all ecological cycles.”

Relation to Campus Master Planning Process:

- Knowledge and Information
- Tuition
- Students
- Faculty
- Energy, telecommunications,
- Water supply, Sanitary Waste, Stormwater
- Air
- Traffic - Cars and People
- Funding, revenues, capital and operating costs

4. Flows

Principle: “The unfolding of life, manifesting as development and learning at the individual level and as evolution at the species level, involves an interplay of creativity and mutual adaptation in which organisms and environment coevolve.”

Relation to Campus Master Planning Process:

- The processes of self-reflection
- Planning Process
- Master Plan Update
- Management
- Phasing Plan flexible to adapt and evolve to changing community priorities.
- Use of the campus as a venue for urban environmental education
- Urban forest succession

“All ecological cycles act as feedback loops, so that the ecological community regulates and organizes itself, maintaining a state of dynamic balance characterized by continual fluctuations.”

Relation to Campus Master Planning Process:

- Communications fora

**Environmental
Policy**

Ethics

Social Science

Biology

Consilience Diagram

from E.O Wilson, *Consilience*

Master Planning Process

- Site Analysis
- Opportunities and Constraints
- Programming
- Site Alternatives
- Master Plan

**Case Study:
Hillsborough Community College Campus
Master Plan**

Site Context

Florida Open Space

- Ecological Greenway Connectivity
- Farmland Reduction





Tampa Bay Watershed

- South Coast Greenway



Ruskin “Comprehensive Plan” – Community Input

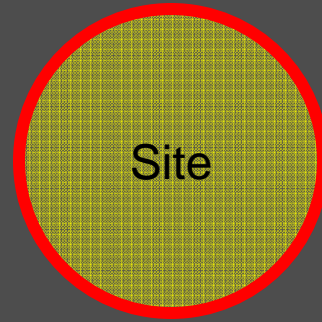
“We wish to become a **destination for eco-tourism**, providing opportunities for the enjoyment of our natural areas, and recreation that treads lightly on the environment.

Our desire is to see the development of **trails around and through the community with a large loop that meanders along the river connecting with the South Coast Greenway coming south and linking with Shell Point and Simmons Park.**”

- Flood Control
- Water quality



- Adjacent Community
- I-75 Access



Immediate Site Context



Overall Site Issues: DRI Plan

Existing Conditions

Existing Conditions



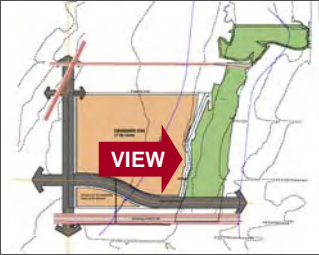
View North from Power Line R.O.W.



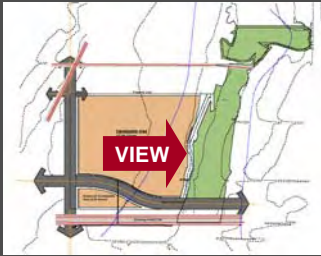
View North from Power Line R.O.W.



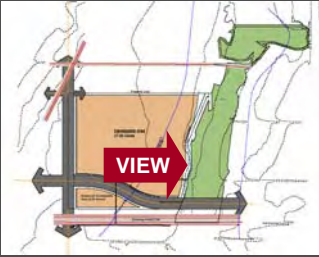
Wetland at Power Line R.O.W.



View Northeast of Cypress Slough



View East of Cypress Slough



Detail of Cypress Slough



View North along Cypress Slough



View Northeast along Cypress Slough



View of High School Construction



- Access
- Setbacks
- Trail Development
- Wetland and Buffer
- Building Footprints
- Parking

Overall Site Issues



- Two drainage areas draining to east and west
- Need for filtration prior to wetland discharge
- Sanitary force main and lift station required
- Water supply t.b.d.



- Wetland forest & invasive species
- Integrity of N-S habitat corridor
- Potential regenerative campus habitat plan

- Electric distribution options
- Chilled water system

Site Analysis

Site Analysis

Development Program

SouthShore Center Space Needs

COFTE Projections:	5 years	10 Years	15 Years	20 Years
	666	1019	1559	2385
Space Category				
Classrooms	8,575	13,757	16,294	24,476
Non-vocational Spaces	8,090	10,918	25,619	32,794
Vocational Spaces	11,515	15,413	21,047	39,182
Subtotal	28,180	40,088	62,960	96,452
INSTRUCTIONAL SUPPORT:				
Library/Study	8,760	12,309	18,249	27,335
Audiovisual	1,343	2,004	3,148	4,823
Auditorium/Exhibition	5,057	10,000	10,000	11,155
Subtotal	15,160	24,313	31,397	43,313
STUDENT SUPPORT:				
Student Services	4,995	7,643	11,693	17,888
Physical Education	10,000	20,000	20,000	21,925
Subtotal	14,995	27,643	31,693	39,813
INSTITUTIONAL SUPPORT:				
Office	8,325	12,738	19,488	29,813
Support Services	3,333	5,239	7,277	10,469
Subtotal	11,658	17,977	26,765	40,282
NON-ASSIGNABLE:				
Custodial Services	733	1,121	1,715	2,624
Sanitation:				
Student Restrooms	999	1,529	2,339	3,578
Staff/Public Restrooms	167	255	390	596
Subtotal	71,892	112,926	157,259	226,658
ELECTRIC & MECH EQUIPMENT	4,314	6,776	9,436	13,599
TOTAL NET SQUARE FEET	76,206	119,702	166,695	240,257
NET-TO-GROSS DIFFERENCE	25,910	40,699	55,676	81,687
TOTAL GROSS SQUARE FEET	102,116	160,401	222,371	321,944

Note: 10-15-20 year projections assume that the center will qualify for and be approved as a campus

DRAFT
Working Document

Hillsborough Community College - SouthShore Campus
Space Allocation Model

	Base Year Student HC=1,175 Student FTE=400 Staffing FTE = 41	Target Enrollment A Student HC= 1,428 Student FTE=500 Staffing FTE = 49	Target Enrollment B Student HC= 3,500 Student FTE=1,000 Staffing FTE = 100	Target Enrollment C Student HC= 4,286 Student FTE=1,500 Staffing FTE = 151
SPACE CATEGORY	Guideline ASF	Guideline ASF	Guideline ASF	Guideline ASF
Academic Space				
Classroom & Service	5,355	6,694	13,388	20,081
Teaching Laboratories & Service	9,752	12,190	24,380	36,570
Open Laboratories & Service	1,200	1,500	2,000	2,250
Offices & Service	8,940	9,823	19,647	29,637
Physical Education & Recreation	2,500	2,500	5,700	18,100
Other Academic Space	1,200	1,500	2,000	2,250
<i>Academic Space Subtotal</i>	28,947	34,207	67,114	108,889
Academic Support Space				
Library	3,403	5,259	9,366	14,063
Assembly & Exhibit	1,900	2,500	4,200	5,400
Physical Plant	2,526	3,092	6,191	9,077
Other Administrative Space	800	1,000	1,500	1,500
<i>Academic Support Space Subtotal</i>	8,629	11,851	21,256	30,039
Auxiliary Space				
Student Union	7,050	8,568	21,000	21,430
<i>Auxiliary Space Subtotal</i>	7,050	8,568	21,000	21,430
INSTITUTION TOTAL	44,626	54,627	109,371	160,358

ASF = Assignable Square Feet
HC = Headcount

Academic Space Programming

Development Program

Relative Sizes of Development Program

Development Program Applied to Site

Phase 1 Academic Space Programming

Organizational Principles

- Primary Access from 24th St. at High School Driveway
- Provide strong and positive arrival experience
- Secondary access(es) from Shell Point Road | future phases
- First Phase in northwest quadrant to limit costs
- Allow for logical phased growth over time
- Link campus to open space corridor and public path / greenway system
- Make use of open space for paths, etc.
- Link campus to potential park to north

Site Organization Principles

- Create strong visual identity from 24th Street and Shell Point Road
- Screen and break down parking lot size
- Assume that buildings will be mostly 2 story, with possible 3 story buildings for special conditions
- Assume that parking will be on grade
- Create clear and pleasant path connections linking parking, open space and buildings
- Apply green development standards where feasible
- Orient buildings east-west, when feasible
- Use stormwater management for visual amenity and visible ecological enhancement

Site Organization Principles

Preliminary Concepts Considered

1

2

3



4

5

6

7

8

9

10

Site Organization Concepts Considered

Concepts A, B & C

Concept A: Quadrangle

Phase One : Concept A

Phase One Plan Diagram

Florida Green Development Standards

Green Development Standards

Florida Green Development Designation Standard Application Form

1. Qualification:

	Maximum towards designation		Credit points earned	
Protection	<u>125</u>		<u>90-110</u>	(must be \geq 30)
Circulation	<u>75</u>		<u>30-50</u>	(must be \geq 15)
Utilities	<u>50</u>		<u>10-20</u>	(must be \geq 12)
Amenities	<u>25</u>		<u>0-10</u>	(must be \geq 5)
CDRs	<u>50</u>		<u>30-40</u>	(must be \geq 8)
Education	<u>75</u>		<u>40-50</u>	(must be \geq 15)
	Sum	400	<u>200-280</u>	(must be \geq 200)*

*Add to 200 any points short of category minimums (if you score only 3 in CDRs then total points required will be $200 + (8-3) = 200 + 5 = 205$).

- A conservative estimate of points appears to yield sufficient points to qualify for designation as a “green development.”

Florida Green Building Coalition, Inc.

Florida Green Development Designation Standard Schedule A - Version 3.0

Green Development Designation Checklist and Application

The purpose of this document is to list the various opportunities for earning credit points towards being designated a green development by the Florida Green Building Coalition, Inc, and to serve as an application form for the designation. The entire green development designation standard of which this is but one part should be read and understood in its entirety before applying. The Green Development Designation applies to the horizontal planning, design and development of the land. Other green standards (Homes, Commercial, Schools) apply to individually permitted parcels and building construction. Each of the items indicated in this checklist is included in a reference guide that is also part of the standard. The reference guide indicates what must be accomplished to earn the credit points and what must be submitted. This checklist indicates whether there are any extra required submittal materials beyond the basic requirements: a detailed site plan, in such scale as to make any required detail for a given credit point clearly visible, and the covenants and deed restrictions. Indicate the points you believe you achieved in the appropriate locations. For questions, contact info@floridagreenbuilding.org and include "development std" in the subject, or call 321-638-1404.

Category 1 - Protect Ecosystems and Conserve Natural Resources

Item #	Item	Extra Submittal Documents	Maximum Points Possible	Credit Points Achieved
P-1	Redevelop an already developed site	yes	40	
P-2	Develop management plan for preserved, created or restored habitats	yes	20	
P-3	Conduct tree, topographical, soil and wildlife surveys prior to design	yes	18	18
P-4	Create conservation areas and nature parks	yes	50	40
P-5	Preserve the most valuable spaces for biodiversity	yes	8	
P-6	On-site conservation plan for a specific wildlife species	yes	15	
P-7	Maintain or provide wildlife corridors	yes	18	18
P-8	Preserve upland buffers to enhance preserved wetlands		12	12
P-9	Preserve or provide aquifer recharge areas in uplands	yes	12	10
P-10	Restore native wildlife habitat	yes	10	?
P-11	Reuse or recycle materials on site	yes	10	
P-12	Treating storm water from neighboring sites or in pre-existing areas	yes	12	
P-13	Conserve land via dry storm water areas that serve as amenities	yes	10	
P-14	Community food plot, garden, passive parks	yes	10	
P-15	Non-listed environmental benefit points	yes	5	
		Total	250	
<p style="text-align: right;">30 Minimum Points required in Category 1</p> <p>Total Protection Category Credit Points Earned For Designation (maximum 125 points)</p>				98

Category 2 - Create a Green Circulation System

Item #	Item	Extra Submittal Documents	Maximum Points Possible	Credit Points Achieved
C-1	Pedestrian structure		12	10
C-2	Road design		6	5
C-3	Street Trees		6	5
C-4	Street Lights	yes	10	5
C-5	Parking	yes	7	5
C-6	Connections	yes	6	
C-7	Orientation		8	5
C-8	Road/trail/parking construction materials	yes	10	5
C-9	Access	yes	20	
C-10	Non-listed environmental benefit points		5	
Total			90	

15 Minimum Points required in Category 2
Total Circulation Category Credit Points Earned For Designation (Maximum 75 points)

40

Category 3 - Green Utilities Practices

Item #	Item	Extra Submittal Documents	Maximum Points Possible	Credit Points Achieved
U-1	Minimize disturbance due to utilities	yes	15	10
U-2	Deliver Green Power	yes	25	
U-3	Supply irrigation system with storm or reuse water	yes	15	5
U-4	Irrigation meter system	yes	5	
U-5	Water irrigation budget	yes	10	
U-6	Submeter parcels by end user	yes	5	
U-7	Non-listed environmental benefit points	yes	5	
		Total	80	
<p style="text-align: right;">12 Minimum Points required in Category 3</p> <p>Total Utility Category Credit Points Earned Towards Designation (Maximum 50 points)</p>				15

Category 4 - Amenities

Item #	Item	Extra Submittal Documents	Maximum Points Possible	Credit Points Achieved
A-1	Neighborhood parks		4	
A-2	Regional park		2	
A-3	Community pool, developments with single family residences		4	
A-4	Compost/Mulch facility	yes	3	
A-5	Golf Course is Audubon International certified or excluded	yes	6	
A-6	Landscape criteria and management plan for common areas and amenities	yes	6	5
A-7	Non-listed environmental benefit points	yes	5	
		Total	30	
<p style="text-align: right;">5 Minimum Points required in Category 4</p> <p>Total Amenities Category Credit Points Earned For Designation (Maximum 25 points)</p>				5

Category 5 - Covenants and Deed Restrictions

Item #	Item	Extra Submittal Documents	Maximum Points Possible	Credit Points Achieved
CDR-1	Green construction standards		40	30
CDR-2	No language that prohibits green practices		5	5
CDR-3	Non-listed environmental benefit points		5	
		Total	50	
8 Minimum Points required in Category 5				
Total CDRs Category Credit Points Earned For Designation (Maximum 50 points)				35

Category 6 - Provide Educational Information to Help Achieve and Promote Green Living Practices

Item #	Item	Extra Submittal Documents	Maximum Points Possible	Credit Points Achieved
E-1	Staff training	yes	14	10
E-2	Dedicated on-site specialists for parcel owners	yes	16	
E-3	On-site "Green" buyer training	yes	8	
E-4	Environmental education in marketing material	yes	5	5
E-5	In-house green practices	yes	10	
E-6	Demonstration green buildings	yes	4	4
E-7	Outdoor environmental education signs	yes	22	20
E-8	Green web site	yes	7	7
E-9	Monitoring program	yes	9	
E-10	Non-listed environmental benefit points	yes	5	
		Total	100	
15 Minimum Points required in Category 6 Total Education Category Credit Points Earned For Designation (Maximum 75 points)				46

Summary of all points listed

600

Florida Green Development Designation Standard Pre-Submittal Application Form

Use this form for committing to meet the designation and having FGBC assign a contact person to answer questions regarding verification and submittal materials.

1. Development Information:

Development Name: _____ County: _____

Legal Address of Property: _____

Developer Name: _____ Developer Address: _____

Developer Phone/ fax: _____ Developer E_mail: _____

Pertinent development team members and their organizations (e.g., project manager, engineers, landscape architects, etc.). Use more paper if necessary. Indicate key green advocate if there was one:

Planned type of development by acreage e.g., residential, commercial, etc: _____
 Total Acreage: _____

2. Application Fee:

Base fee = \$1000

Per acre fee: \$1 x _____ = _____
 total acres

Total application fee (max. \$5000): _____

Minimum deposit for Pre-Application Submittal is \$500

Please make check out to Florida Green Building Coalition, Inc

Deposit Paid At This Time = _____

3. Agreement:

I have read the entire standard and will abide by the policies it contains. I understand that this deposit allows FGBC to assign a project evaluator to provide information regarding documentation needed to verify points. I plan to submit the necessary documents indicated in the reference guide for any credit points I am claiming. Failure to complete the development or to meet the requirements of the standard will not be grounds for refunding of the deposit. I have authority to sign for the developer.

Name (print or type): _____ Title: _____ Company: _____

Phone/fax: _____ EMail: _____

Signature: _____ Date: _____

Send to: FGBC, Inc., c/o Florida Solar Energy Center, 1679 Clearlake Rd., Cocoa, FL 32922

Comparisons

	Concept A	Concept B	Concept C
Cost			
Image			
Access			
Parking			
Utilities			
Open Space			
Phase-ability			
Green Potential			

Comparisons



Summary - Discussion

Summary

- Principles of Ecology and Sustainability
- Master Planning Process
- Lessons Learned