A. Executive Summary

From the conservation element analysis in the Master Plan approved in January 2003 by the UCF Board of Trustees, the following sub-elements were included: Air Quality, Surface Water Quality, Underground and Above Ground Tanks, Toxic Waste and Hazardous Materials, and Surface and Groundwater Hydrology. Additionally, a section on natural areas was included. This data and analysis section captures the conservation efforts accomplished or needed to achieve the objectives and goals of the Conservation Section of the Master Plan.

The UCF campus contains an abundance of significant natural resource areas, many of which are protected from future development. Areas of interest include the Arboretum, Lakes Lee and Claire, as well as an extensive forested wetland system within the southeastern portion of the campus, which ultimately outfalls into the Little Econlockhatchee River. This campus was designed around a cypress wetland system located at the center of the campus adjacent to the Student Union. The majority of the campus development activity is concentrated in concentric rings around this cypress stand, protecting much of the natural features and beauty of the campus margins, especially on the north and east boundaries of the campus..

Natural areas provide not only habitat to substantial wildlife populations, but also offer attractive campus assets and recreational opportunities. The preservation of both the quantity and quality of these resources is vital to the function of these resources and to ensure the continued attractiveness of the campus.

The University has independently developed conservation strategies for wetlands, floodplains, mitigation sites, water quality, etc., as the need has arisen over the last twenty years. Currently, there are approximately 337 acres of natural uplands and wetland habitats preserved in perpetual conservation easements to the St. Johns River Water Management District. There are approximately 539 additional acres of natural areas on campus that currently have verbal commitments for long-term preservation. These additional acres include upland and wetland areas and wetland buffers. In addition, the campus contains an extensive network of stormwater ponds. These areas, in combination with the large area occupied by wetlands that, for the most part, cannot be developed, constitute a large percentage of the land occupied by the UCF campus.

The University developed a long-term strategy for the management of these natural lands. Objectives for this land management plan include:

1. conserving biodiversity within the myriad of upland and wetland communities on-site;
2. implementing monitoring methods to capture the habitat changes through time;
3. developing approaches to capitalize on the research and educational opportunities afforded by these lands;

4. improving the recreational opportunities and aesthetic benefits of natural lands; and taking measures to ensure the maintenance of a viable interconnected network of natural lands in perpetuity, incorporating ecological principles of connectivity, and avoiding further fragmentation where possible.

To initiate this plan, the University used the following steps. UCF:

1. developed a detailed map of existing conservation lands that depicts natural communities of uplands and wetlands, as well as stormwater ponds and lakes.
2. determined what level of protection for their lands is currently in place, i.e., owned by the St. Johns River Water Management District (SJRWMD), conservation easements in place, verbal commitments from UCF Administration, jurisdictional wetlands, etc.;
3. identified those lands necessary for active use by the Arboretum, for stormwater storage, and connectivity (both hydraulic and dispersal);
4. mapped the extent of habitat occupied by, and suitable for, protected species.
5. defined management strategies suitable for an urban setting, including prescribed fire and mechanical management;
6. mapped the regional linkages of natural communities off of the UCF campus
7. assigned a leader to develop and maintain the conservation strategies needed to accomplish identified goals;
8. organized a committee that includes representatives from UCF Administration, UCF ecologists, environmental interest groups, Arboretum personnel, recreation specialists, planners, and others as appropriate, to outline issues and prepare maps of the overall conservation strategy; and
9. prepared a comprehensive Land Management Plan.

B. **Surface Water Quality**

Although formal water quality monitoring is not required by a specific regulatory agency, the departments of Landscape and Natural Resources and Environmental Health and Safety, have initiated the informal testing of water quality in campus surface waters and compilation of data by students. Data was collected over a 12-month period, beginning in 2007.

The University of Central Florida's water features include 12 constructed stormwater ponds, two natural lakes, and several other natural wetland and stream systems. These water bodies are monitored regularly by Department of Landscape and Natural Resources staff and volunteers to observe the health of each surface water feature. Periodic measurements of pond and lake systems include dissolved oxygen, temperature (both air and water), acidity (pH), conductivity, and turbidity (Table 1).

Table 1: Average Water Quality Data for UCF Water Bodies. Most pond samples were taken at pond outlets. Values represent averages of values from a variable number of sample dates, ranging from 20 to 29 sampling events.

Surface water body	pH	Cond. (µs)	D.O. (mg/L)	NH4 (mg/L)	NOx (mg/L)	Total N (mg/L)	DRP (mg/L)	Total P (mg/L)
1D Pond	7.56	236	7.71	0.072	0.004	0.489	0.012	0.019
2HEX Pond	7.23	186	8.38	0.132	0.052	0.601	0.011	0.015
2H Pond	7.17	211	9.41	0.133	0.087	0.675	0.011	0.017
3A Pond	8.05	223	9.09	0.081	0.091	0.619	0.011	0.031
4L Pond	7.10	228	7.37	0.112	0.265	0.495	0.011	0.027
4M Pond	7.49	159	7.45	0.058	0.013	0.425	0.012	0.015
4R Pond	7.30	160	8.70	0.077	0.003	0.449	0.012	0.012
Bonneville Creek	6.99	129	7.15	0.125	0.077	0.580	0.012	0.020
4B2 pond	6.97	176	5.27	0.128	0.074	0.598	0.017	0.026
Lake Claire	7.37	145	7.76	0.049	0.003	0.457	0.012	0.009
Lake Lee	7.29	118	7.62	0.054	0.010	0.392	0.012	0.010
PGH Pond	7.47	220	8.17	0.056	0.005	0.658	0.014	0.024
W5 Stream	6.90	149	6.09	0.075	0.034	0.474	0.021	0.019
W9 Stream inlet	6.62	328	4.30	0.129	0.633	0.672	0.024	0.025
W9 Stream outlet	6.82	144	6.27	0.067	0.009	0.509	0.024	0.011

C. **Summary of UCF Natural Areas Surveys**

A Natural Areas Annual Report (SEE APPENDIX B) is prepared to summarize results from compliance monitoring and also includes biological surveys of plants and animals, student research projects, compliance reports, and general field operations that are performed each year. An executive summary is provided below on the key factors captured in the 2013 report.

Invasive Species

The Department of Landscape and Natural Resources updated the UCF Weed Management Plan (APPENDIX C) identifying nuisance plant species in the natural lands. All plants list by the Florida Exotic Pest Plant Council 2013 List are monitored, mapped, and chemically treated yearly. Most of these invasive, exotics are being properly managed and are stable or decreasing in coverage.

Threatened and Endangered Plants and Animals

All listed planted and animal species that are observed during annual compliance monitoring and general field observations are documented, mapped and reported annually in the Natural Areas Annual Report (APPENDIX B).

Monitoring

Vegetation monitoring is completed twice a year, in June and December, for compliance monitoring required for environmental permits with the St. Johns River Water Management District. A total of thirty nine (39) vegetation plots are located in the natural areas, and data collected is also used for habitat evaluation and restoration research.

Compliance

Currently the Department of Landscape and Natural Resources is reporting on two mitigation projects and one wetland restoration consent order with the St. Johns River Water Management District. These reports are summarized in the Natural Areas Annual Report (APPENDIX B).

Gopher Tortoises

Gopher Tortoises and their burrows are surveyed and monitored periodically by the Landscape and Natural Resources department using staff and students. A tortoise burrow survey conducted in 2009 showed there was a total of 47 gopher tortoise burrows within the sampling area. A follow-up survey in 2011 showed that the number of gopher tortoise burrows had increased to a new total of 50 burrows and most recently, a 2013 survey indicates an even higher increase, with 78 burrows recorded. Using the FWC gopher tortoise density equation, data from the most recent survey indicates that there are approximately 0.66 tortoises/acre within the sampling area. According to the FWC the tortoise capacity is two (2) tortoises per acre. The current gopher tortoise density is below the FWC standard, and therefore tortoises found at other locations within UCF boundaries may be relocated to these natural areas if needed for mitigation.

D. Environmental Health and Safety

1. Underground and Above-ground Tanks

The University has a number of above-ground storage tanks associated with diesel generators, lubricant oil, motor vehicle oils, and used oils. The University's regulated diesel generators have double-walled above-ground fuel tanks, with containment as large as 4,500 gallons. The oil and used oil storage tanks are double-walled, ranging from 250 gallons to 1,000 gallons. The University remediated and closed several old underground storage tanks in the 1990s as well as the 140,000 gallon, above-ground heating oil tank in 2003. The current fuel island was installed in 1995 at the Facilities and Safety compound. This underground tank has a capacity of 20,000 gallons and is FDEP-compliant.

The University continues to maintain and update its Spill Prevention Control and Countermeasures Plan. The University inspects and maintains all petroleum storage tanks to prevent oil discharges from occurring. The Department of Environmental Health and Safety provides training to prepare University personnel to respond in a safe and effective manner to mitigate the impacts of discharge to navigable waterways.

2. Hazardous Materials and Waste (received from representatives of the UCF Department of Environmental Health and Safety (EHS)).

By virtue of its academic and research activities, the University is a user of hazardous materials. All such materials are carefully monitored and regulated such that there is no indication of any prior or current toxic waste problems on the campus property.

Environmental Management within EHS is responsible for ensuring the University's compliance with local, state, and federal environmental laws and regulations. Areas covered include hazardous materials storage, hazardous waste management, environmental assessments, site remediation, the investigation and cleanup of contaminated media on state-owned property, storage tanks, environmental health, and regulatory monitoring to track changes to environmental regulations as they relate to environmental compliance.

EHS is responsible for the safe and legal disposal of all hazardous chemicals and wastes generated by the University. Various campus departments, particularly those involved in engineering, science, or health-related research, generate hazardous waste. EHS contracts with licensed and permitted contractors for final disposal of these wastes, after they are collected, profiled, and safely characterized at the Laboratory and Environmental Support Building.

Hazardous material inventory is maintained by laboratory managers and shop managers. The EHS Chemical Safety and Security Coordinator oversees the inventory training, auditing and outside agency reporting.

The UCF Laboratory and Environmental Support Building was built in 1989 at a cost of $214,500. Its original size was 1,824 gross square feet. A laboratory addition of 200 square feet was completed in 1994, and an additional 4,500 gross square feet was added in 2009. The expansion provides storage space for additional materials and waste associated with new research efforts and increased amounts of laboratory space on campus.

Air Quality

The Department of Environmental Health and Safety (EHS) provides monitoring, recordkeeping, and compliance testing in accordance with Air Operating Permit 0950015-009-AO. The University maintains stationary combustion equipment and

pollution controls to ensure emissions are within permitted parameters. The University obtains construction permits for new, stationary combustion equipment.

E. Energy Sustainability and Maintenance and Operations Requirements

Background

To help reduce growing energy costs, promote sustainable energy practices, and help protect our environment, the University of Central Florida has created an extensive energy policy. The policy will be reviewed periodically, with a goal of continual improvement, as public awareness, management techniques, and technology change. The policy will be updated periodically by the Department of Sustainability and Energy Management. The department welcomes comments and suggestions on this policy, and requests that input be submitted to www.energy.ucf.edu.

Maintenance

It is the intent of the departments of Facility Operations, Landscape and Natural Resources, and Facilities Planning and Construction to adopt and incorporate all aspects of the University of Central Florida's Energy and Sustainability Policy into the ongoing maintenance operations programs within Facility Operations and Landscape and Natural Resources. These programs will include modification and renovation to existing buildings or structures, routine maintenance, preventive maintenance, and capital renewal. Incorporation of this policy will enhance the effective and efficient use of all resources needed for operations.

Operations

All UCF buildings and facilities, regardless of the sources of funding for their operation, will be operated in the most energy-efficient manner, without endangering public health and safety, and without diminishing the quality of education, research, and service. The University's previous Master Plan Goal, using the 2005-2006 fiscal year, was to reduce energy consumption by 20% in existing Educational and General facilities as a baseline through the 2011 calendar year. This target was met at 22.4% reduction, with a 22% electrical cost increase stated in December 2008. With evolving energy-efficient technologies, evaluation of alternative generation means, and utilizing the best practices set forth by the ASHRAE standards, the University seeks to have a 15% reduction through 2019. With a ~~20% 15%~~ reduction in energy consumption, UCF will save more than 18 million kWh annually, resulting in cost avoidance in excess of $1.6 million per year (using FY 2012 -2013 energy costs**).** Additionally, attainment of a 15% reduction in energy consumption will result in annual carbon dioxide emissions being reduced by approximately 145,000 tons annually. Together, attainment of these goals will both enhance our efforts to achieve energy sustainability and significantly improve our environment.

Indoor Environmental Conditions

To maintain reasonable comfort and lower energy expenditures, the University has established the following standard for cooling, heating, humidity control, and ventilation rates.

OCCUPIED HOURS

- When cooling, normal building temperature setpoints will be 74º F, and upon request, can be lowered, but not below 70º F. When heating, normal building temperature setpoints will be 68º F, and upon request, can be raised, but not above 70º F.
- Thermostat set points for corridors and large common spaces will be set at 78º F when cooling and 68º F when heating.
- Outdoor air ventilation will be set at ASHRAE 62.1 guidelines or such other higher limits as prescribed by state law or regulations.

UNOCCUPIED HOURS

- When cooling, normal building temperature setpoints will be 82º F (or HVAC OFF), and upon request can be lowered, but not below 78º F. When heating, normal building temperature setpoints will be 60º F (or HVAC OFF), and upon request can be raised, but not above 68º F.
- Intermittent operation of the A/C system during humid weather conditions on weekends and holiday periods will be permitted to maintain indoor relative humidity control.
- Thermostat setpoints for corridors and large common spaces will be set at 78º F when cooling and 68º F when heating.
- Outdoor air ventilation will be shut OFF. HVAC system start-up will begin 30 to 60 minutes prior to occupancy in order to flush accumulated air contaminants prior to occupancy.

These rules may be relaxed, as necessary, if special operating conditions, such as scientifically critical areas, so require.

Data processing and server rooms are to be conditioned to within 10% of the maximum recommended space temperature, as stated by the original equipment manufacturer. All new data centers located within the range of the central chilled water distribution loop shall have dedicated chilled water fan coil units to provide adequate space conditioning. If a new data center is not located within the chilled water loop, the space shall be conditioned utilizing a dedicated direct expansion unit without ventilation.

All exterior windows and building doors will be kept closed when cooling systems are operating.

Indoor Lighting

All members of the University community should assume responsibility for turning off lights when leaving a room. Lighting levels inside buildings will always be maintained at an appropriate level in order to ensure security. All lighting, except what is required for security purposes, will be turned off when buildings are unoccupied, such as at the end of the workday. Housekeeping will turn lights back on only for the time actually required for custodial work.

All indoor lighting will be fluorescent or LED type, unless an exemption is specifically authorized for designated low-usage fixtures. All indoor lighting levels will be surveyed and recorded. The lighting levels will be adjusted to the appropriate Illumination Engineering Societies (IES) recommendation for the given task being performed in the space.

Occupancy sensors will be installed in all offices, classrooms, conference rooms and utility rooms to reduce and/or turn off lights in unoccupied areas. New energy-saving fixtures, lamps, and ballasts will be used to replace existing, less efficient lighting wherever appropriate. Existing incandescent lamps for general-purpose lighting will be phased out, and future incandescent lamps will not be installed unless exempted for extremely limited and specialized tasks. Personal desktop task lights should be fluorescent or LED type.

Outdoor Lighting

Outdoor lighting levels will always be maintained at an appropriate level in order to ensure security. Outdoor illumination will be high pressure sodium, metal halide, LED, or fluorescent type, with the efficacy of the lighting system being no less than 85 lumens per watt. Outdoor lighting shall be dark-sky compliant, as indicated by manufacturer. Low wattage landscape and step lighting is exempted from the dark-sky requirement. The average lighting level will be 2 foot candles (FC), and the minimum lighting level will be 1 FC. Purely decorative lights beyond reasonable display lighting, inside or outside, will not be used anywhere on campus.

Convenience Appliance Use

Portable electric heaters and fans are prohibited in UCF facilities, unless specifically required by occupants because of medical conditions, failure of the building heating, ventilating or air conditioning systems, or when building heating, ventilating or air conditioning systems cannot be adjusted to achieve minimum comfort levels within the provisions established by the indoor environmental conditions requirements. If a member of the campus community feels that a space heater is necessary for adequate warmth, this may indicate that the central heating system needs repair. Facilities Operations and Sustainability and Energy Management should be notified through the work order system if the central cooling or heating system is incapable of meeting comfort requirements.

All staff and faculty members are requested not to use personal refrigerators. Departmental refrigerators should be located in common areas, eliminating the need for individual units in personal offices. All other personal appliances, such as coffee pots, clocks, radios, and all other peripheral office items should be kept to a minimum and turned off or unplugged at night and during weekends and holidays. UCF community members are asked to take personal responsibility for turning off and unplugging all appliances when not in use.

Office Equipment

All faculty, staff, and students should turn off personal computers when they are to be left unoccupied for extended periods of time. Additionally, all personal computers shall be configured to engage automatically low-power sleep mode in times of inactivity. Directions for implementation of this procedure are available at www.energy.ucf.edu. All peripheral computer items should be left in the OFF position until needed. Computers should be shut down over the weekends, evenings, and holidays.

All new office equipment must meet or exceed the Energy Star ratings for high efficiency operation. Remaining legacy equipment should be replaced with energy-efficient equipment as funding becomes available.

Monitoring of Energy Consumption

Energy conservation programs will be most successful if progress is monitored on a regular basis. Most buildings on campus have metering devices installed. Meter readings can be used to track utility consumption to locate problem areas, as well as to determine if conservation goals are being met.

Additionally, each member of the UCF community has the opportunity to view on-line energy consumption data for specific buildings on campus through the Open Energy Information System. Each new building on campus will include a monitoring system which can be viewed on the Open Energy Information System. The Department of Sustainability and Energy Management will maintain appropriate monitoring of all energy consumption throughout the campus.

Space Scheduling

Scheduling of all spaces on campus is controlled through the Space Resource Allocation Office. During the weekends and holiday periods, there is an opportunity for significant reduction in energy consumption on campus by setting back comfort settings. Buildings which are not occupied should be placed into a set-back mode. In the set-back mode, lighting levels are reduced to minimal safety levels, and set points for cooling, heating, and ventilation systems are adjusted to a less energy-intensive level.

The Space Resource Allocation Office shall strive to consolidate classes and meetings to only core campus locations, especially during weekends and holiday periods. Classroom and meeting assignments should be made in such a way as to maximize the use of a few buildings, while leaving the majority of buildings unoccupied and available for set-back conditions.

Alternative Fuel Vehicles

Alternative Fuel Vehicles (AFVs), as defined by the Energy Policy Act of 1992 (EPAct), include any dedicated, flexible-fuel, or dual-fuel vehicle designed to operate on at least one alternative fuel. Alternative fuel vehicles come in a variety of vehicle models, such as sedans, pickup trucks, sport utility vehicles, vans, shuttle buses, medium-duty vehicles (such as delivery trucks), heavy-duty buses, and heavy-duty trucks. As vehicles are purchased, the University is required to purchase a new vehicle fleet with at least 75% being AFV. When replacing existing fleet vehicles or adding to the fleet, the University shall seek out alternative fuel, flex fuel or hybrid fueled vehicles. The Department of Sustainability and Energy Management will maintain a list of appropriate vehicles which meet the State of Florida mandates for such purchases. The list can be found at www.energy.ucf.edu.

Awareness and Education

The Department of Sustainability and Energy Management will foster and support the establishment and continued growth of heightened energy awareness on campus. Educational publications, promotional materials, updated websites, and programs for faculty, staff, and students will keep the entire UCF community involved in the ongoing efforts of energy conservation. The department shall solicit and evaluate feedback from faculty, staff, and students to monitor the effects of energy conservation efforts. Training on new energy management concepts and programs will be provided, as necessary.

The Department of Sustainability and Energy Management will maintain the Energy Sustainability Plan, and notify the UCF community when significant changes occur. Suggestions for additional energy saving initiatives can be submitted at www.energy.ucf.edu.

Building Construction and Renovation Requirements

Background

As a leader in higher education, the University of Central Florida has made a commitment to being excellent stewards of environmental resources. The construction of new facilities, renovation of existing facilities, and continued maintenance operations must demonstrate high standards of environmental stewardship. Therefore, the

requirements outlined below represent the minimum acceptable standards for any UCF facility in order to achieve desired levels of energy stewardship.

Implementation

It is the responsibility of the architect/engineer (A/E) to insure the requirements established within the "Construction Requirements" of the Energy and Sustainability Policy are achieved. It is expected that the A/E be both knowledgeable of, and in full compliance with, the "Construction Requirements." The A/E should contact the Department of Sustainability and Energy Management to review these requirements and to address any questions.

The A/E should identify and make recommendations to incorporate construction design, techniques, products, or other design or construction-related methods and principles which will further enhance operational sustainability and reduce energy consumption of the construction project. The A/E will forward any recommendations to the Department of Sustainability and Energy Management, which will then coordinate a review with the ice President (VP) and Associate Vice President (AVP) of Administration and Finance, the Director of Facilities Planning and Construction, the Director of Landscape and Natural Resources, the Director of Environmental Health and Safety, and the Director of Facilities Operations to determine which recommendations, if any, will be incorporated within the design.

At the completion of schematic design, conceptual design, 50% construction document and 90% construction document phases, the A/E will provide UCF with a comprehensive report detailing the accomplishment of the "Construction Requirements" within each phase of the design process. In preparing the report, the A/E will follow the format provided by Facilities Planning and Construction.

The A/E will forward the report to the Department of Sustainability and Energy Management, which will coordinate a review of the report with the VP and AVP of Administration and Finance, the Director of Facilities Planning and Construction, the Director of Landscape and Natural Resources, the Director of Environmental Health and Safety, and the Director of Facilities Operations. Where the report is incomplete or the "Construction Requirements" are not fully incorporated within the design phase, the A/E will (at their cost) complete the report and make revisions to the design phase being reviewed, incorporating any missing items in the "Construction Requirements."

All new construction shall be registered with the US Green Building Council (USGBC) and meet a minimum Leadership in Energy and Environmental Design (LEED) Silver rating, utilizing the NC 2.2 rating (or the most current). Once the project is completed, it must receive a minimum of Silver certification.

Furthermore, the following LEED credits are required (not optional), as they have been identified as crucial to meeting UCF's goal to construct more energy-efficient and sustainable buildings:

1. Credit SS 6.1 Stormwater management, rate, and quantity
2. Credit SS 6.2 Stormwater management, treatment
3. Credit SS 7.2 Heat island effect, roof
4. Credit WE 1.1 Water efficient landscaping
5. Credit WE 1.2 Water efficient landscaping
6. Credit WE 3.1 Water use reduction 20%
7. Credit WE 3.2 Water use reduction 30%
8. Credit EA 1 Optimize energy (minimum 5 points must be achieved)
9. Credit EA 3 Additional commissioning
10. Credit EA 5 Measurement and verification
11. Credit IE 1 Carbon dioxide monitoring
12. Credit IE 7.1 Thermal comfort
13. Credit IE 7.2 Thermal comfort, permanent monitoring

The remaining credits needed to achieve the Silver rating will be determined by the design team for each project, and approved by the Department of Sustainability and Energy Management.

Facilities Operations plays a vital role in the implementation and maintenance of the standards and practices established by the Energy and Sustainability Policy. Inclusion of these standards and practices for design and construction specified within the policy will ensure attainment of energy and sustainability standards throughout the process of building modifications or renovations performed as minor projects or Facilities Improvements projects. The use of proactive, routine maintenance, preventive maintenance and capital renewal programs will enhance and continue the benefits derived from energy and sustainability practices incorporated by this policy.