EXECUTIVE SUMMARY

The Naturalization Action Planning team was born out of an Advancing Sustainability Action Plan (ASAP) retreat held on October 26, 2007. At that retreat one of the strategies, that came out of an examination of land use as an element of sustainability, was to develop and implement a plan to naturalize portions of the Ithaca campus, including the tree canopy and mowed areas. Holding its first meeting on November 12, 2007, the Naturalization team, comprised of volunteers from the ASAP retreat and other important stakeholders, set about defining “naturalization,” brainstorming opportunities and possible assets, and identifying deliverables. As team objectives became clearer, additional stakeholders and subject matter experts were asked to join the effort.

As a part of the planning process, the team concluded that it would be prudent to develop at least two pilot sites to demonstrate the visual effects of naturalization to interested members of the Cornell community. While the sites were being developed, efforts were also underway to map campus trees and the tree canopy and mowed areas. Similarly, a map was developed to show potential areas suitable for future naturalization.

While the team had initially planned to pursue the adoption of an official policy regarding the naturalization of portions of the campus, it ultimately concluded that such a policy would not be necessary. Rather, the development of maps of potential naturalization sites, which could be vetted campus-wide and referenced with the Campus Master Plan, would be appropriate to demonstrate the long-range plans for a more sustainable campus.

Originally included in the scope of the Naturalization team’s efforts was storm water management; it was thought that storm water management areas might lend themselves to potential naturalization sites. However, completion of storm water management studies by engineering consultants was stalled due to the ‘pause’ on capital projects. So that objective was separated from the other naturalization objectives and must await the lifting of the capital projects pause.

I. DEFINITION

Naturalization encompasses a planned and programmatic approach to the design, construction and maintenance of the living landscape (“green infrastructure”) to increase the environmental benefits, i.e ecosystem services, and reduce the input of resources for maintenance without compromising the aesthetic, historic and cultural value of the landscape.

II. OVERARCHING GOAL
Develop and implement a plan to naturalize appropriate portions of the Ithaca campus, including an ongoing procedure for evaluating, implementing and maintaining new and existing naturalization sites.
III. OBJECTIVES

OBJECTIVE #1:
Produce a map of campus trees & tree canopy

RATIONALE:
A well executed map and inventory will allow us to index the quality and quantity of the campus tree population. The quantity and quality of the campus stock of trees is viewed as a direct correlation to the beauty of the campus. In preserving and enhancing the appearance of the campus, trees and the tree canopy play a major role. Further, the presence of trees plays an important environmental role on campus. Strategically located trees reduce air pollution by trapping particle pollutants, absorbing CO₂ and other harmful gases, act as a carbon sink to reduce the atmospheric greenhouse effect, reduce storm water runoff and soil erosion and sedimentation, reduce energy use through shading and windbreaks, and reduce the urban “heat island” effect.

BENEFITS:
- Map will provide baseline of tree population for the campus
- Will identify areas in need of improvements
- Will permit future measurements of changes in the tree inventory
- Map will help determine the quality of our tree inventory
- Map will foster appropriate selection of species for additions/replacements
- Will aid in the management of tree maintenance
- Increasing the stock of trees will promote energy savings, carbon sequestration, and other environmental benefits.
- Maps will add value to academic classes on trees and natural areas

METRICS:

- 2,384 acres on and surrounding the core campus have been mapped
- Categories mapped include building footprint, pavement, water, vegetation and tree canopy
- Tree canopy covers 24% of the campus
- 30 acres of trees inventoried with individual tree size, location and species documented

ON-GOING MAINTENANCE OF MAP:
The inventory of campus trees is forever changing as a result of additions and removals of trees and as a result of additional surveys. See Appendix A for further details regarding tree maintenance, removal, and protection practices. It is expected that at least annually the tree canopy map will be updated through the Campus Planning department.
Program Description

Cornell University, through the Cornell Landscape Improvement Program (CLIPers) committee, is pursuing recognition as a Tree Campus USA university by the Arbor Day Foundation. The Tree Campus USA program recognizes universities that effectively manage their campus trees in coordination with the surrounding community to foster healthy urban forests, and engage their students in service-learning forestry projects. In order to become designated as such, the university must meet the following standards:

Standard 1 — Campus Tree Advisory Committee
A Campus Tree Advisory Committee comprised of members representing the diverse audience of those with a stake in campus trees is established and meets regularly. The Campus Tree Advisory Committee will provide guidance for future planning, maintenance of a comprehensive campus tree plan, education of the campus population as to the benefits of the campus trees, and increasing connectivity with the community. This committee must include a representative from each of the following audience:

- Student (undergraduate or graduate).
- Faculty.
- Facility Management.
- Community (city forester, municipal arborist, community tree board member).

Standard 2 — Campus Tree Care Plan
A Tree Care Plan should be adopted that is goal oriented and provides the opportunity to set good policy and clear guidance for planting, maintaining, and removing trees. It also provides education to the campus community, citizens, contractors, and consultants about the importance of the campus forest and the protection and maintenance of trees as part of the growth and land development process.

Standard 3 — Campus Tree Program with Dedicated Annual Expenditures
The University must allocate finances for its annual campus tree program. Evidence should be shown that an annual work plan has been established and expenditures dedicated towards that work plan.

Standard 4 — Arbor Day Observance
The Arbor Day observance can be on the campus or held in conjunction with the community where the campus is located. The event may be held at an appropriate time for the campus.

Standard 5 — Service Learning Project
The Service Learning Project should provide an opportunity to engage the student population with projects related to trees and can be part of a campus or community initiative. The project must be done within the course of the year application is submitted.
OBJECTIVE #2:
Produce a storm water management plan & map

RATIONALE:

Effective management of storm water runoff is a basic sustainable practice. Further, recently-enacted laws require owners and responsible regulating authorities to have and enforce storm water management plans. Because of infrastructure needs, new regulations, and potential development, engineering assistance is required.

ACTIONS:

- Inventory of current campus storm water management practices has been developed; updates are ongoing
- Existing surface features for storm water management that should be mapped (as a layer on campus map) have been identified
- Utilities Dept. has commissioned two engineering studies which would inform the storm water management plan. There is an approved PAR for $500K which authorizes a study of the integrity of the storm and sanitary sewer systems by Stearns & Wheler Engineers. There is also an approved PAR which authorizes work by T.G. Miller Engineers to mathematically model the sewer systems. Included in their work T.G. Miller would identify the storm sewer sheds and investigate select, but not all, scenarios for surface management of storm water. A comprehensive investigation of the surface management for storm water across the entire campus has not yet been commissioned.

Because the engineering work authorized by these two PAR’s has been suspended due to the capital projects “pause,” this initiative, at least temporarily, has been frozen.

- A draft of a Project Initiation Plan for phase 1 (analysis, description, inventory of the existing surface conditions, factors, and features) the Storm Water Management Plan has been completed.

CONCLUSIONS:

This objective has been separated from the other Naturalization objectives. While it would have been ideal to have included the storm water management plan in the planning process for future naturalization sites, the added value of doing so does not outweigh the benefits that can be derived by moving ahead with naturalization efforts this year. That is, efforts can begin immediately to naturalize additional areas of the campus without waiting a year or more for the outcome of the storm water management plan.

Despite the setback caused by the capital project pause, this objective should not be abandoned. However, because the other objectives of the Naturalization Action Team are substantially complete, this objective can be included in the ASAP Land Use Campus Master Plan initiative moving forward. When the capital project pause is lifted, the engineering studies should proceed, and a new project team should be formed to complete
the goals of this objective. In the interim, work on mapping the existing surface features and other tasks identified in the Phase 1 Project Initiation Plan for the objective can and should continue. The data from the Utilities engineering studies and phase 1 will enable the development of a targeted and relevant storm water management plan for the campus.

OBJECTIVE #3:
Produce a map of potential naturalization sites & include storm water management possibilities

MOWED AREAS MAP
Cornell is world renowned as a campus of extraordinary beauty. Some of what contributes to its beauty are landscape features such as the great lawns and quadrangles. Well groomed lawns will always have a prominent place at Cornell and should be preserved despite the pressures that will arise to make room for new buildings, for example. However, as a result of this effort to look more closely at the balance between maintained landscapes and natural areas, it was concluded that some mowed lawn areas do not necessarily contribute to the overall beauty of the campus and that they could be altered without adverse consequences.

A map has been produced which shows those areas of the campus that are routinely mowed. When comparing this map with the map of 190 acres of potential areas that could be naturalized (see objective 4 below), it was determined that mowing could be substantially reduced. The result is that approximately 13 acres of lawn area will have the mowing frequency stretched to once a month. Approximately 91 acres of lawn will be allowed to grow into meadows by having the mowing frequency reduced to twice a year. Further, an additional 22 acres will be allowed to naturalize with no mowing.

OBJECTIVE #4:
Establish two pilot site naturalization implementations

RATIONALE:
Having a map of potential naturalization sites will help inform the process of establishing an overall campus strategy for naturalization. In vetting the plan for campus naturalization, it will be important that stakeholders are able to visualize those portions of the campus which are proposed to be changed to more natural states or which portions will be conserved in natural states. Plus such a map will assist in the coordination of siting future storm water management features. Having such a map will also lend detail and credibility to a long-range campus plan. Similarly, it will help raise the awareness about the possibilities for expanding naturalization and may lead to the inclusion of naturalization opportunities in connection with a variety of capital and operational activities.

To give the campus community and other stakeholders a sense for what it means to “naturalize” portions of the campus, a few good examples would help substantially. Thus, the creation of two models for naturalization, plus the identification of [two] other existing models can be readily seen by a large number of interested people, and will be instrumental in garnering understanding and support for the long-range plan.
ACTIONS:

A map has been completed showing existing & potential naturalization areas (layer on campus map)
Existing naturalized areas that were formerly lawns and have been converted to meadows by reducing
the frequency of moving to once or twice per growing season:
   Meadow area north of A Lot,
   Newman Meadows in the Newman Arboretum
   Meadow area behind Africana Studies.
Two pilot sites have been naturalized to illustrate how naturalization can look on the core campus:
  1. Adjacent to the Hans Bethe House on west campus- mowed lawn planted to trees, shrubs and
ground cover
  2. Vicinity of Chilled Water Plant II & south of BTI-storm water basin planted to wildflower
mix, meadow, and trees

The landscape in this area has been designed to increase environmental
benefits and to reflect the university’s campus-wide sustainability goals.
By utilizing the correct plants, soil improvements, and mulches, we
have been able to greatly reduce the need for irrigation, fertilization,
pest control, and mowing.

The result: an attractive landscape with fewer of
our precious resources needed for its maintenance.

Typical signage to be installed at each naturalized site
The map of potential naturalization sites was vetted with the Campus Planning Committee in December 2008.

A public information plan has been initiated to inform/educate the public about the pilot sites.
Report of the Naturalization Action Team

Advancing Sustainability Action Plan

Date 26 May 2009

Pilot naturalized area developed near Chilled Water Plant II, East Campus

METRICS:

- 2,384 acres of campus have been mapped
- 191 acres of potential sites have been identified on the map

In broad terms, naturalization efforts will result in three categories of landscape: 1) Forest – areas dominated by trees, shrubs and similar woody vegetation, or 2) Meadow – areas managed to exclude woody vegetation, or 3) Landscaped- areas to replace turf. Meadow landscapes are appropriate for areas where physical and visual access are desired, such as along roadways or research field plots. Forested landscapes are recommended for
areas adjacent to water courses and natural areas, steep slopes or areas needing screening. Landscaped areas are recommended near areas that are heavily populated.

Naturalization initiatives on specific campus landscapes can be implemented by two general methods: modified maintenance practices, and planting. In areas where a specific aesthetic or environmental function is desired, planting and follow-up maintenance is usually required to establish a sustainable naturalized landscape.

Modifying the maintenance practice on areas currently maintained as lawn is the highest priority as it requires no capital investment and provides immediate benefits in the reduction of time, both labor and equipment, fuel use and emissions, and significant improvements in landscape diversity, wildlife habitat, and water quality. Two levels of modified maintenance are being implemented in spring 2009:

- Reduced frequency cut – mowing once a month
- Meadow cut – mowing twice a year – June and September

Forest landscapes can also be established by modified maintenance i.e. stop mowing, but there is a high probability that the landscape will become dominated by undesirable and/or invasive species. Therefore, planting or seeding to introduce the desired species, coupled with management to suppress invasive species is recommended. Plantings to establish forested naturalized areas is the second level of priority, with selected sites on steep slopes, adjacent to watercourses or where screening is desired being targeted for planting in fall 2009 or spring 2010 depending upon availability of funding.

______________________________________________
OBJECTIVE #5:
Establish university policy/procedure regarding a campus-wide plan for naturalization

RATIONALE:
To undertake changes to the appearance and fabric of this beloved campus is not to be taken lightly. So, efforts to naturalize portions of the campus landscape must be carefully thought out and planned. Only after naturalization plans are thoroughly developed and coordinated with the Comprehensive Master Plan should they be advanced. A significant part of advancing the work involves vetting the plans with stakeholders such as faculty, staff, students, administration, alumni, visitors, and Board of Trustees. Once there is sufficient buy-in for the naturalization plan, the university should officially adopt the plan and enforce adherence to it.
CONCLUSIONS

Rather than writing a separate policy regarding the naturalization of select areas of the campus, it has been concluded that a procedure will be developed that states the expectations for how and when potential sites are to be naturalized, i.e. a Naturalization Plan. The procedure will be included by the Campus Planning Office as a part of the site plan review process, whereby sponsors of capital projects, that encompass mapped potential naturalization sites, will be expected to avoid encroaching on the site and will, in fact, include the work to naturalize the site as part of their capital project.

The procedure for the preservation and implementation of naturalization sites should be encompassed by the Facilities Stewardship policy, which covers the physical aspects of the campus including buildings, grounds, and infrastructure including utility and transportation systems.

IV. RECOMMENDATIONS

A. Officially adopt the tree canopy map and the potential naturalization areas map and designate them as an element in the Campus Master Plan.
B. Modify our contract language to require contractors to provide us with digitized as-built information for landscape improvements such as tree plantings or removals so that the tree canopy map can be easily updated.
C. Officially approve a procedure that states the expectations for how and when potential sites are to be naturalized.
D. Seek Tree Campus USA Designation and fulfill the following requirements:
   a. Establish a Campus Tree Advisory Committee
   b. Compile a Campus Tree Care Plan
   c. Formalize a Campus Tree Program with dedicated annual expenditures
   d. Establish an annual Arbor Day Observance
   e. Coordinate a Service Learning Project
E. As soon as there is relief from the capital project freeze, move ahead with the completion of storm water management plan.
F. Constitute a steering committee to oversee the completion of the storm water management plan, consisting of representation from, at least, the Campus Planning Office, the Environmental Compliance and Sustainability Office, and Utilities and Energy Management.
G. Fund student internship to survey/inventory the remainder of the trees on the core campus over the summer
Appendix A. Tree Maintenance Practices

Tree Maintenance
• Staffs from the Grounds Department and the Plantations conduct a visual survey of campus trees annually to assess preventive maintenance pruning needs. Preventive maintenance pruning is conducted on an as needed basis at this time.
• Pruning and maintenance requests can be made by campus customers, which are then followed up by an inspection of the trees by the staff arborist. The arborist determines the type of pruning to be performed and whether it can be accomplished by staff or contractor.
• Every attempt will be made to clean up dropped limbs or significant tree debris within the same day, depending on the severity of the storm and the extent of the tree damage.
• Tree mulching—every two years for trees up to approximately 6”. Periodically, drip lines of larger trees and tree groupings are mulched extensively with waste wood chips.

Fertilization and Pest Management
• Cornell utilizes an integrated pest management approach to monitor and control pests in the campus urban forest. Trees are treated for pest problems as needed. Current pests that are new to or getting close to campus are the Hemlock Wooly Adelgid, and the Emerald Ash Borer.
• There is no regular tree fertilization beyond treatment received as a result of fall lawn fertilization. Specimen or high-value trees may receive prescription fertilization when severe nutrient deficiencies are diagnosed.

Tree Removals
• Live trees are generally removed only when required to protect the public safety or are detracting from the quality of the landscape.

Storm Response and Recovery
• Storm response and recovery are generally accomplished in-house. In a crisis, the first priority is to remove
tree debris that blocks campus thoroughfares, disrupts campus operations, or poses hazards to the campus community. Trees requiring specialized equipment not available in-house are addressed by outside contractor. Once these critical needs are addressed, a prioritized recovery plan is implemented during which unsalvageable trees are systematically removed and salvageable trees are pruned to restore their health and structure.
• As the tree planting budget permits, lost trees are strategically replaced to restore the structure and function of the campus urban forest in a reasonable time frame.

Protection and Preservation Procedures
Preservation During Design Phase
• Site development guidelines are prepared for all major capital projects by the Campus Planning Office. Significant contextual and campus-wide considerations, including landscape and environmental concerns, are identified early in the project planning phase.
• Tree protection zones shall be established for all trees to be preserved in a construction site. Appropriate protective fencing or other measures shall be required consistent with Cornell University Design and Construction Standards.
• Avoid locating the general construction site around low and high priority trees where possible by planning all construction activities including new utility corridors, staging areas, new sidewalks and new roads for a minimum clearance of 15 feet away from the base of trees, and not within the edge of the canopy drip line. Greater distances are desirable.

Tree Damage Assessment, Enforcement, and Penalties
Tree damage assessment is generally performed by arborists within the Grounds Department or the Plantations. High profile trees may be assessed by an outside consultant (such as Bartlett Tree Experts). Enforcement of protection measures is performed by project managers and on-site engineers.