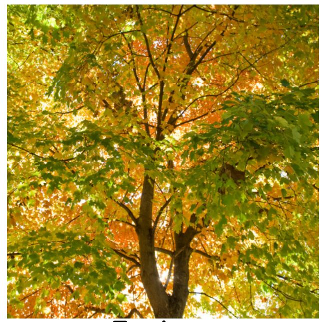
LANDSCAPE MASTER PLAN


Ecology


Technology

City


Collegiate Life

Georgia Institute of Technology®

June 2010

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CONTENTS

FOREWORD

Like the coating of ice that allows us to see the water entrained by a forest, Ecology lets us see the landscape as a web of bio-physical and cultural processes and gives us the insight to shape it sustainably.

Robinson Fisher

EXECUTIVE SUMMARY

Intent
The intent of the Landscape Master Plan was threefold:
- Follow up on recommendations contained in the 2004 Campus Master Plan Update.
- Create a plan based on an ecological approach.
- Develop a document that can guide future development to achieve a livable, sustainable and beautiful campus.

Background
The Landscape Master Plan grew out of the *2004 Campus Master Plan Update (CPMU)*, which highlighted the role of open space in achieving goals of sustainability and livability. It put forth the idea that the landscape could perform valuable ecological work for the Institute, and established the Eco-Commons as a permanent open space in the heart of campus for stormwater management and outdoor recreation. The CMPU defined the landscape as the sum of all open space, including roadways and parking, reasoning that only a comprehensive approach could address its environmental and social objectives.

Goals and Objectives
There are three major goals for the Landscape Master Plan.
- Develop an integrated, ecologically-based landscape and open space system that helps Georgia Tech achieve its goal of environmental sustainability, specifically, a 50% reduction of current stormwater entering the Atlanta sewer system.
- Develop a landscape that enhances the living, working, and learning environment of the Institute.
- Develop a landscape that unifies the campus and gives it a distinct sense of place and expresses the identity of Georgia Tech.

Conceptual Framework
The Landscape Master Plan is based on the concept that the campus represents two landscapes that are one — an ecological landscape, governed by biophysical processes, and a human landscape, governed by the social activities and experience of people. The purpose of the Master Plan is to engender the performance and value of both through a holistic approach, based on Ecology.

Components of the Master Plan
The Landscape Master Plan is an online document that consists of two interlinked parts:

1. Master Plan Map - shows the proposed conditions for the total landscape. With multiple layers of mapped data, it can assist administration, staff, and design consultants in spatial decision-making and development planning. Embedded hyperlinks on the map allow the viewer to access the information contained in the Master Plan Report.

2. Master Plan Report - contains ecological requirements for different zones on campus, design intent for campus corridors, and guidelines for landscape development.

Major Landscape Master Plan Recommendations

- **Ecological Performance**
  The LMP classifies the campus into seven zones and establishes performance values to be achieved by new projects for the following factors:

  Maximum Impervious Coverage - total allowable area of a development site, that may be covered with a surface that is impermeable to stormwater.

  Woodland Area - minimum required area for conserved or planted woodland.

  Tree Canopy Coverage - minimum required site area to be covered by tree canopy.

  Runoff - maximum allowable runoff for a total development site and its parts.

- **Tree Replacement**
  The LMP specifies the quantity and size of trees to be planted, when existing trees are lost. Replacement trees can be located anywhere on campus with the approval of Georgia Tech

- **Design Corridors**
  The Landscape Master Plan defines a grid of movement and open space corridors that represent the most communally-shared part of the campus. While each exists in some part today, many are fragmented or are visually undistinguished. The LMP highlights their potential to unify the campus, give it visual logic, and provide the "street addresses" for Tech's buildings. Based on their cultural history, functions, and visual character, the LMP identifies key attributes for each corridor to inform their design and development. For many, it also defines a role to transfer stormwater to the Eco-Commons.

- **Campus Identity and Sense of Place**
  To imbue the campus with a distinctive sense of identify and place, the Landscape Master Plan identifies four essential signatures for the Georgia Tech campus: *Technology, Ecology, Collegiate Life,* and *City*. The campus should present itself as a place, where Ecology and Technology join to create a sustainable collegiate setting in a modern metropolis.

- **Design Guidelines**
  The Landscape Master Plan contains a compendium of design guidelines and practices for developing the campus landscape. It is intended to be a tool for Georgia Tech staff and design consultants for specific projects, serving as the "Green Book" for Georgia Tech's landscape like the "Yellow Book" is for its buildings and facilities. It addresses a range of landscape elements in the categories of earthwork and water, vegetation, and hardscape.

- **Campus Tree Inventory**
  The LMP includes the 2005 inventory of more than five thousand existing trees on campus, which have been identified, sized, and evaluated. It is in a document to be used by staff and consultants and updated as trees are removed. The inventory forms the basis of a recommended program of tree care and urban forestry.

Conclusion

The Landscape Master Plan establishes a strong vision of a landscape that will be unique to Georgia Tech - a *performance landscape* - that joins technology and ecology to creates great sense of place. The master plan provides the data base, performance standards and design tools for an ongoing process of design, but it is not prescriptive. It encourages creativity and innovation by many to reach sustainable goals.

1. OVERVIEW

The *Campus Master Plan Update of 2004* identified environmental sustainability as a primary goal of Georgia Tech and identified the landscape as one of the principal means to achieve it. The *Campus Landscape Master Plan* is the result. Its purpose is three-fold:

1. **Develop a landscape that helps Georgia Tech achieve its goals of environmental sustainability, including stormwater management.**

2. **Develop a landscape that enhances the living, working, and learning environment of the Institute.**

3. **Develop a landscape that unifies the campus, gives it a distinct sense of place, and expresses the identity of Georgia Tech.**

The Landscape Master Plan is based on the concept that the campus represents two landscapes that are one — an ecological landscape, governed by biophysical processes, and a human landscape, governed by the activities and experience of people. By this notion the landscape is more than confetti of decorative greenery associated with buildings. It is a functional ecological entity—a *Performance Landscape*—that integrates landform, hydrology, soils, and biological communities. It is a landscape where trees shape microclimate and engage the hydrologic cycle, where soils drink in stormwater instead of discharging it into sewers, where biomass sequesters carbon, improves air quality and increases biodiversity. The landscape is also a cultural entity—a *Performance Landscape*— that integrates open space, buildings, circulation and human behavior and experience. The purpose of the Master Plan is to engender the performance and value of both the natural and human dimensions of Georgia Tech's landscape.

The extent of the landscape is defined as the sum of all the open space on campus, including roadways, parking lots and roofs. It is, in fact, everything that is rained on and everything that is seen, because to achieve environmental sustainability, the landscape must be planned holistically in the context of natural processes. To achieve a sense of place, it must be designed in the context of the human experience.

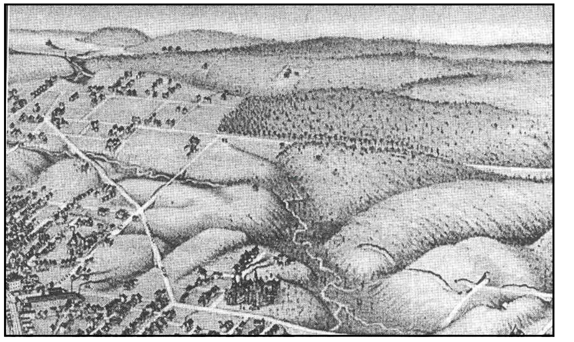


Figure 1-1: In this 19th century view of Georgia Tech the landscape is clearly the product of cultural and natural identities. In the 20th century the natural identity was lost, but in the 21st it can be recovered to shape a new landscape of technology and environment—the sustainable landscape.

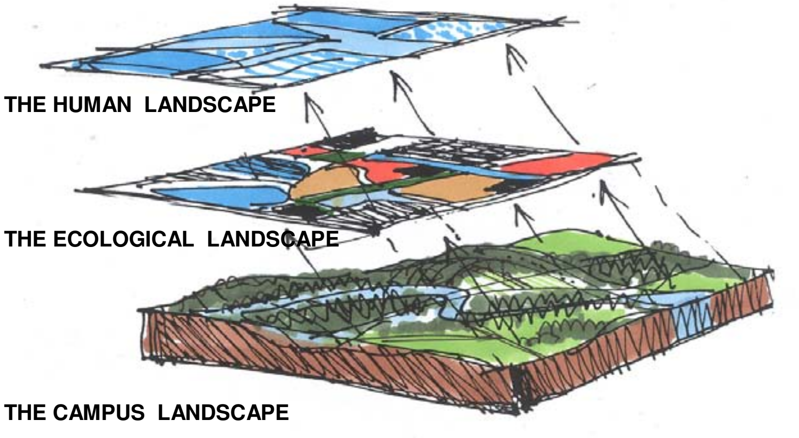


Figure 1-2: Conceptual diagram of the campus landscape.

1.1 THE ECOLOGICAL LANDSCAPE

The Eco-Regions Map of the United States, published by the U.S. Environmental Protection Agency, signifies that regions and the landscapes they contain are place-related manifestations of natural processes. (Figure 1-3) Georgia Tech's campus is no exception, although fifty years of development have removed much of the evidence of it. The campus today is vastly different from when it was a natural landscape. There is more stormwater runoff, less vegetation, less biological diversity, more microclimatic extremes, and more air pollution. While some of these effects are the general product of urbanization, their levels on campus are a result of campus land use. The history of stormwater runoff is particularly relevant at this time because of Atlanta's overburdened combined sewer system. (Chart 1-1) Before settlement, the area occupied by Georgia Tech was covered with forest, by 1892 it was a pastoral landscape of fields and forest (Figure 1-1), by 1912 the city grid crisscrossed it, and by 2003 half of the campus was covered with buildings and paving.

1.1.1 The Eco-Commons and Related Corridors

The *Campus Master Plan Update 2004* recommends that the campus be returned to stormwater levels typical of the campus in 1950, which means a fifty percent reduction of current stormwater runoff entering the Atlanta sewer system. To accomplish this, it establishes the Eco-Commons (Figure 1-4),

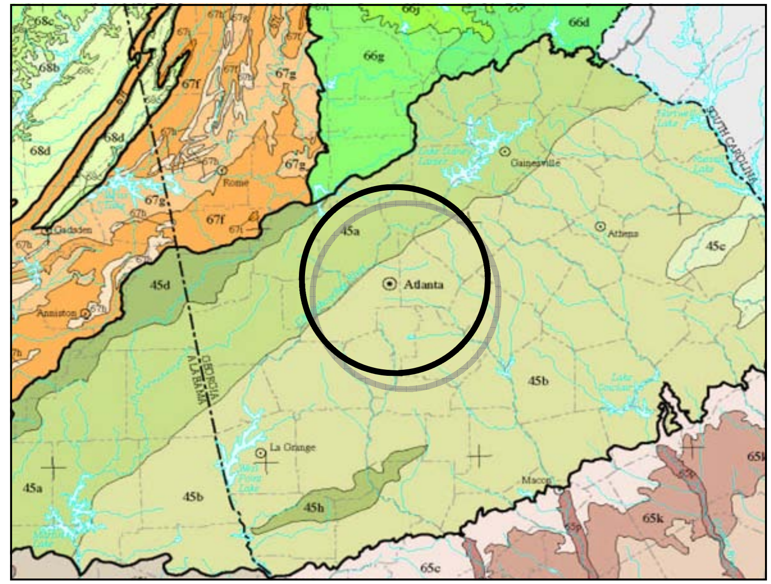


Figure 1-3: Atlanta is located in Eco-Region 45b, the Southern Outer Piedmont.

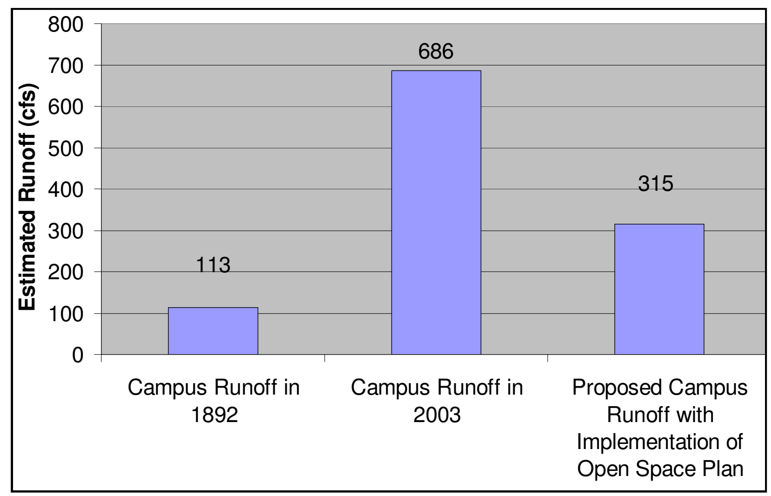


Chart 1-1: Chart showing a six-fold increase in stormwater runoff during the 20th Century and the 50 percent proposed reduction with the implementation of the Campus Landscape Master Plan.

a permanent multi-purpose open space, and recommends runoff performance, tree canopy and woodland coverage. The implementation of the Eco-Commons should be given top priority, so that it can become a functional entity for receiving and storing stormwater. The corridors that tie to it (Figures 1-5, 1-7), such as Atlantic, Hemphill, and Plum have a vital role to play in transferring stormwater to the Eco-Commons and should also have high priority.

1.1.2 Ecological Performance Zones

In addition to the Eco-Commons and the corridors leading to it, the Landscape Master Plan also establishes Ecological Performance Zones for the entire campus, which set requirements for stormwater runoff, impervious area, tree canopy coverage, and woodland area. Meeting these performance standards should be undertaken creatively in a holistic way, whereby landform, hydrology, soils, vegetation, buildings and pavements become a part of a living landscape that is attractive, functional, and educationally informative. Single-purpose design is discouraged. The design guidelines show ways of incorporating ecological performance in design.

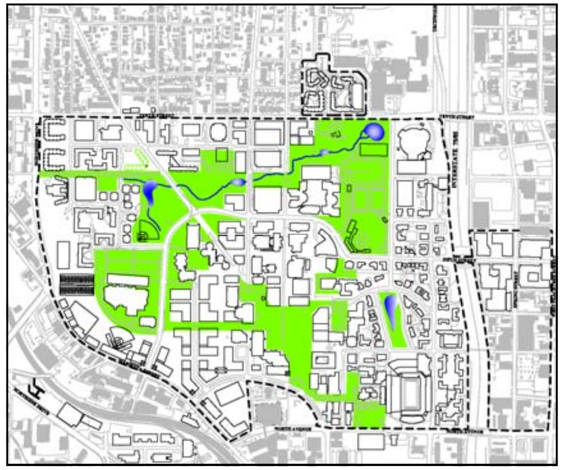


Figure 1-4: Map of Eco-Commons from the Campus Master Plan Update, 2004

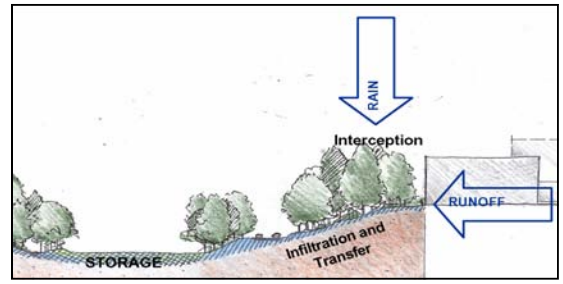


Figure 1-6: Critical drainage interface between the Eco-Commons and other areas of the campus landscape.

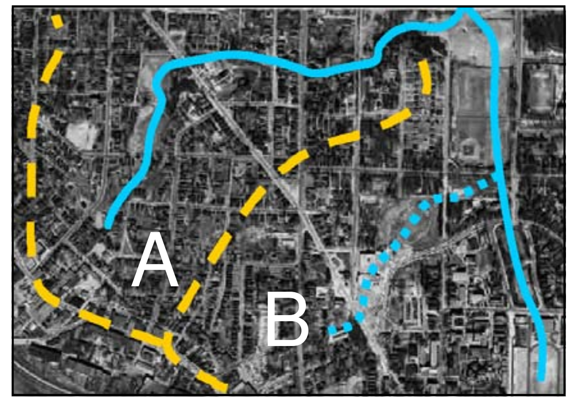


Figure 1-7: c1950 air photograph showing the street grid and two drainage basins, A and B. Dashed lines are the top of the watersheds with Marietta Street being the one on the left.

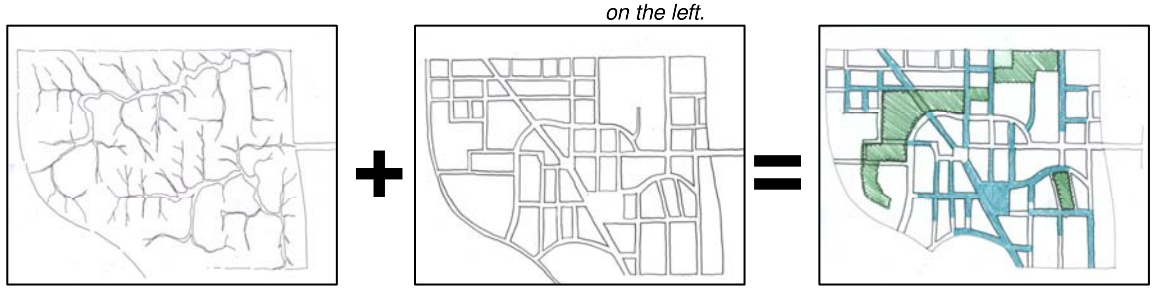


Figure 1-5: The overlay of the original drainage pattern by the grid of street corridors highlights some excellent opportunities for combined corridor functions.

1.2 THE HUMAN LANDSCAPE

Georgia Tech's human landscape is the product of its history, people, and cultural patterns. During recent decades, the campus drifted toward a typical American development character influenced by the automobile and suburban behavior. Many aspects of Tech's cultural landscape were lost or emasculated. Recent development, however, has reversed this drift and there is a new emphasis on historic preservation and place-making. The revitalization of the Hill, the development of Tech Square, and limitations on the automobile are notable achievements in this vein.

To imbue the campus with a distinctive sense of identify and place, the Landscape Master Plan identifies four essential signatures for the Georgia Tech campus:

- *Technology*
- *Ecology*
- *Collegiate Life*
- *City*

The Tech campus should present itself as a place, where ecology and technology come together to create a sustainable environment in a residential collegiate setting in the heart of a modern metropolis. *Ecology* should be expressed as functioning landscapes, not horticultural collections. *Technology* should be expressed with clarity of form and function to emphasize environmental integration.

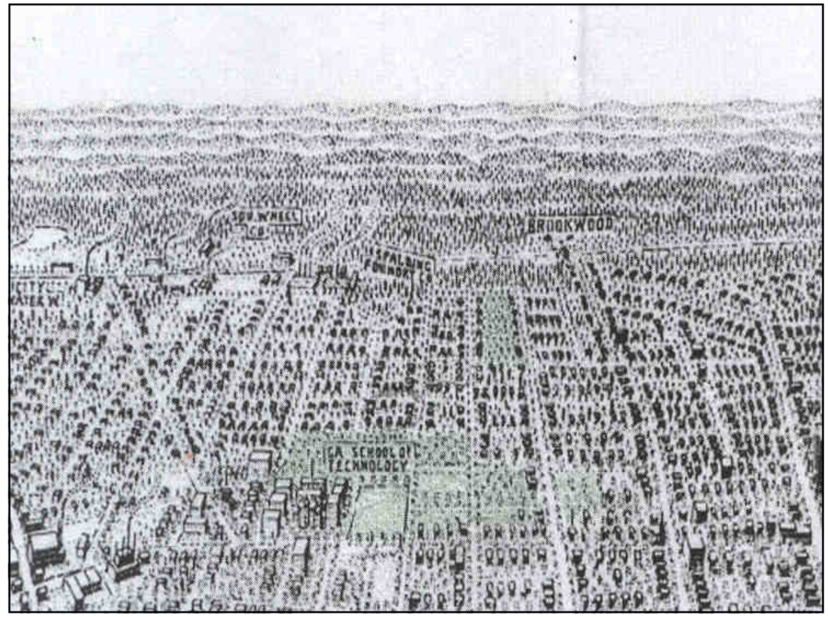


Figure 1-8: 1912 Map of Atlanta showing the street grid extending over the campus.

Collegiate Life should be manifest as a community of scholars. *City* should be expressed as the interaction and diversity of people. All of these place-making signatures exist within a grid of public corridors which have historically overlaid the campus and connected it to Atlanta. (Figure 1-8) While some of these corridors fell victim to the suburban mindset of the 70's, 80's, and 90's, the grid pattern is largely intact .

1.2.1 Corridors

The *Campus Master Plan Update, 2004* uses the campus's corridor grid to structure development and circulation. It holds the campus together and represents the most communally-shared part of the campus. The corridors are more than streets and pathways. They are three dimensional volumes of outdoor space that contain the community life of the campus—portals to buildings, gathering places, venues for activity, and many modes of travel. Some are wide, others narrow, some busy, some not, but all are a part of the campus's common landscape and should interconnect and provide positive human experience. Beyond the corridors, there is open space associated with specific building complexes and tied to specific architecture and function. This space is outside the scope of the Landscape Master Plan, except for conformance to its Ecological Performance Requirements.

1.2.2 Design for Experience

A "pattern language" in the vein of Christopher Alexander has guided the outlines of the human experience expressed in the Landscape Master Plan. (Figure 1-10) It informs critical dimensions, relationships, location of elements, and the basic morphology of outdoor space. The design guidelines further elaborate these considerations. Ultimately it is the attention to the human experience that allows the design of a memorable landscape. Every project on the Tech campus should meet this test and contribute to the design experience of the whole campus. (Figure 1-9)

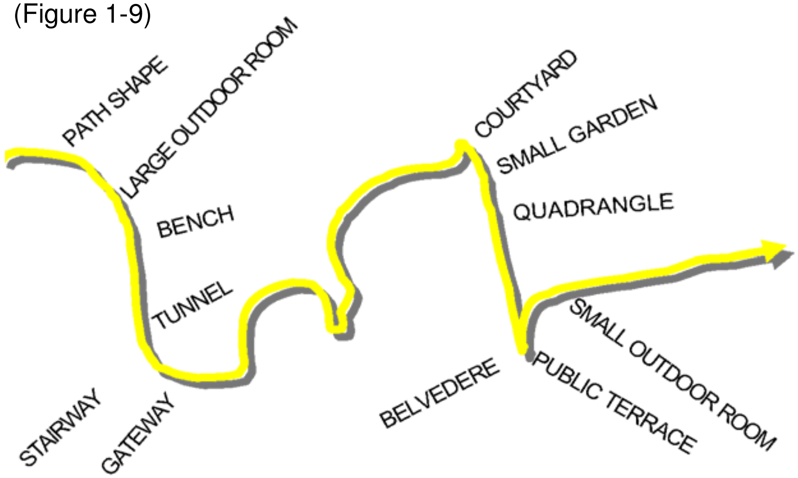


Figure 1-9: Example of an experience sequence.

Figure 1-10: Sample of pattern language for the human landscape.

1.3 THE LANDSCAPE MASTER PLAN

To achieve its goals the Landscape Master Plan must integrate the ecological and the human landscape. It is conceived as a layered document (Figure 1-11) that can inform a variety of activities that shape the landscape—from comprehensive policy and overall planning, to specialized activities and site development. How layers relate to one another is critical knowledge affecting the total landscape. This may be as simple as knowing where underground utilities are before planting a tree or as complex as computing the stormwater impact of a development activity.

Figure 1-11: Layered Master Plan Concept

1.3.1 Parts of the Master Plan

The master plan consists of four parts:

– Master Plan Map
– Ecological Performance
– Corridor Design
– Design Guidelines

<u>1.Master Plan Map</u>

Using the *Campus Master Plan Update, 2004 as the base,* this map is an Autocad document, which is dimensionally accurate and shows proposed conditions, which affect the campus landscape, including stormwater, vegetation, and hardscape. It also contains layers showing the Ecological Performance Zones, Corridors, Utilities, and the Tree Inventory, and has place-specific notes and hyperlinks to other parts of the master plan document.

<u>2. Ecological Performance</u>

This section contains the specific requirement for several critical factors applied to seven Ecological Performance Zones on the campus, which are shown on the Plan Map.

<u>3. Corridor Design</u>

The Landscape Master Plan defines a grid of movement and open space corridors that represent the most communally-shared part of the campus. While each exists in some part today, many are fragmented or are visually undistinguished. The LMP highlights their potential to unify the campus, give it visual logic, and provide the “street addresses” for all of Tech’s buildings. Based on their cultural history, functions, and visual character, the LMP identifies key attributes for each corridor to inform their design and development. For many, it also defines a role to transfer stormwater to the Eco-Commons.

<u>4. Design Guidelines</u>

The fourth part of the master plan is a compendium of design guidelines and development procedures, which address design issues pertaining to (1) earthwork and water, (2) vegetation, and (3) hardscape. Where specific campus applications of guidelines are especially relevant, they are hyperlinked to the Plan Map.

1.4 Who Should Use the Plan

The Campus Landscape Master Plan is designed to be used by a number of audiences that have interest in or influence the Georgia Tech campus:

– Administration—responsible for setting priorities and policy for all matters of things affecting both the sustainability and livability of the campus.
– Capital Planning and Space Management—responsible for campus planning.
– Facilities—responsible for developing and managing the Institute’s buildings, utilities, and grounds.
– Consultants retained by the Institute for planning and design of projects.
– Georgia Tech’s operations and facilities departments that affect the landscape.
– Georgia Tech Athletic Association—responsible for intercollegiate athletic ven-

ues and events.
- Greek Sector and Campus Ministries—responsible as private property owners on campus.
- Students, Faculty and Staff—parties interested in actions affecting the shared campus environment .
- Alumni, Friends, and Supporters—interested in campus development and projects of special interest and support.

1.5 How to Use the Master Plan

Simply stated, the Campus Landscape Master Plan should be used as a reference by Georgia Tech and Design Consultants to guide decision making in project planning and implementation for the development of the campus.

As stewards of the Landscape Master Plan, Georgia Tech administrators and staff should use the Landscape Master Plan to help determine the true scope of a project before design consultants are engaged and to relate specific projects to the greater Goals and Objectives for the campus.

The notion of a sustainable, performance landscape sets the standard that buildings are no longer isolated entities. They are actually part of a larger development zone ultimately connected to other areas of campus via a network of cohesive corridors, all of which is surrounded by a campus landscape that has a greater function than simple aesthetics.

There are many ways to access and interrelate the information contained in the Landscape Master Plan. A sample method for informing the design of a new project would be as follows. Using the map and report in tandem:

1. Locate the project area on the Master Plan Map.
2. Using the different electronic layers on the plan, identify key factors affecting the project, such as existing trees, corridor attributes, etc., that determine opportunities and constraints for the project.
3. Identify the project's Ecological Zone and its performance requirements for runoff, impervious cover, tree canopy cover, etc. and incorporate them into the project's program.
4. Go to the Corridor layer of the master plan map and report to gain an understanding of intra-campus functions, circulation, adjacencies, gathering places, entrances, design character, etc. Some of these will serve to provide design context to the project, but others will become definitive parts of its development project's program, e.g. a required transit stop.
5. Use the map and report to evaluate the project's program and to amend as necessary.
6. Use the map and report as an evaluation tool for concept design.
7. Consult the Design Guidelines section during design development phases for site development design of grading, stormwater management, vegetation, and hardscape elements.
8. Review the vegetation communities identified for the project site as shown on the master plan map so that planting design can works in harmony with overall campus vegetation objectives.
9. As specific site issues are being addressed, use the Master Plan Map to revisit larger campus issues and features which may or may not be contiguous to the project, but which can be positively or negatively influenced by it. This might be the case, for example, with stormwater issues or the project site's impact on the Eco-Commons.
10. Prior to construction, consult the guidelines about tree protection and replacement, soil development practices, grading, etc. to develop an on-site operations.
11. Update the Master Plan Map with as-built conditions, including building, hardscape, and vegetation.
12. Update the online Tree Inventory with trees added and removed.

The final statement on how to use the Master Plan is to use it like any tool - to do something better. Use it to inform a project, challenge its designers, and critique its results.

1.5.1 Updating the Master Plan

The master plan and its data base should be kept up-to-date as the campus evolves in order to remain a relevant and useful tool .

2. GOALS AND OBJECTIVES

There are three overarching goals for the Landscape Master Plan, which grow out of the recommendations expressed in the *Campus Master Plan Update, 2004*.

1. **Develop an integrated, ecologically-based landscape and open space system that helps Georgia Tech achieve its goal of environmental sustainability.**

2. **Develop a landscape that enhances the living, working, learning environment of the Institute.**

3. **Develop a landscape that unifies the campus and gives it a distinct sense of place and expresses the identity of Georgia Tech.**

OBJECTIVES

Energy and Atmosphere
- Create microclimates that help buildings conserve energy.
- Encourage walking and bicycles for transportation.
- Fulfill recreational needs on campus to reduce car use.
- Reduce campus contribution to the urban heat island effect.
- Enhance outdoor thermal comfort.
- Improve air quality.
- Buffer noise.
- Reduce light pollution.
- Recycle inert materials from campus demolition.
- Reduce transportation energy costs of plant material.
- Reduce landscape maintenance and subsidy.

Water
- Reduce stormwater discharge to the Atlanta sewer system by 50% over 2003 levels.
- Improve surface water quality.
- Reduce consumption of potable water for non-potable uses.
- Harvest stormwater for non-potable uses, such as irrigation.

Vegetation
- Increase campus tree cover to 55%.
- Increase campus coverage by woodlands to 22%.
- Reduce lawn areas.
- Predominant use of plants native or ecologically appropriate to Eco-Region 45b (EPA).
- Increase biodiversity.
- Increase total biomass.
- Compost landscape waste on campus.

Human Design
- Create campus legibility/orientation.
- Unify the campus and create a sense of place.
- Create a variety of outdoor venues and spaces for activities and people.

3. PLAN-MAP OF THE CAMPUS

The Landscape Master Plan Map of the core campus shows the proposed conditions for the total landscape. These maps are intended to assist Georgia Tech administration, staff, and outside design consultants in spatial decision making referencing a specific location. The Plan Map is intended to accompany the Landscape Master Plan Report and graphically portray many of the concepts presented therein, i.e. vegetative communities, ecological performance zones, etc. Under no circumstances should the plans be used without thorough knowledge of the information presented within the report itself.

3.1 Base Information

The base information for the Master Plan Map contains the major components of the campus landscape such as buildings, roads, parking areas, and walkways. Also included are numerous place-specific "notes" on existing and proposed conditions. The following are base information items noted in the legend:

- Existing Buildings.
- Future Buildings: Proposed Buildings from the 2004 Master Plan Update.
- Development Zones: A grouping of buildings and associated amenities which should be considered a cohesive development unit.
- Proposed Street Trees: Tree planting locations to insure that major streets will be covered by tree canopy.
- Existing Street Trees: Areas where existing street trees influence the location of proposed improvements, such as street widening or walkway placement.
- Stormwater Notes: Identification of place-specific solutions or recommendations to stormwater management.
- Hyperlinks: Links from the online version of the plan maps to associated areas within the report.

3.2 Overlays

There are two overlays for the Base Information on the Plan Map which subsequently creates two sets of maps of the core campus.

The first set of maps shows the base information with the proposed Vegetation Communities overlay for the vegetated areas of campus. These Vegetation Communities are noted on the legend and include:

- Woodland Vegetation
- Parkland Vegetation
- Meadow/Grass Vegetation

See the Vegetation portion of the Design Guidelines in Chapter 6 for a full description of each community.

The second set of maps show the base Information with the proposed Ecological Performance Zones overlay. The seven Ecological Performance Zones in the report have been combined on the Plan Maps into three main groups based on similar performance requirements and are noted on the legend as:

- Development Zones and Standard Corridors: These areas represent a more traditional approach to development.
- Green Building Zones and Transfer Corridors: These areas are in close proximity to the Eco-Commons and development should be handled in a way to minimize stormwater runoff
- Eco-Commons: The green belt within the core campus that is a receiving zone for stormwater runoff.

See Chapter 4 for a full description of the Ecological Performance Requirements.

3.3 Supporting Maps

Additional maps that have been included to assist in decision making are:

- Existing Conditions (2011)
- Tree Inventory of Existing Conditions
- Design Corridor Map with Perimeter Gateways

The master plan maps series has been created to be used online. Embedded hyperlinks on the map and within the legend allow the viewer to easily access other maps and cross-reference information presented on the maps with more detailed descriptions in the report.

Please see the Appendix for reduced copies of the Master Plan Map and supporting maps.

4. ECOLOGICAL PERFORMANCE

4.1 Performance Zones

One of the goals of the *Landscape Master Plan* is to reduce by fifty percent (of 2003 levels) the amount of stormwater that leaves the core campus and enters the Atlanta combined sewer system. To accomplish this, there is a two-pronged strategy. The first part is the establishment of the *Eco-Commons* to receive and manage stormwater from the whole campus. The second part is the establishment of *Ecological Performance Requirements* for the campus to insure that every part of the campus contributes appropriately to stormwater reduction. The *Landscape Master Plan Map with Ecological Performance Zones* identifies four zones:

1. **Eco-Commons** - permanent open space that has high levels of ecological performance and receives and manages stormwater.

2. **Green Building Zone and Green Transfer Corridor** - building areas and movement corridors that are adjacent to the Eco-Commons and may be developed if done so in a "green" way. This means buildings that approximate the ecological performance of a woodland and corridors that manage and transfer stormwater to the Eco-Commons from other parts of campus.

3. **Development Zone Including Parking and Standard Corridors -** campus areas that contain the majority of Georgia Tech's buildings, quadrangles, walkways, athletic facilities, roads and parking.

4. **Greek Sector**—private properties within the campus for fraternities, clubs, and religious organizations.

4.2 Ecological Performance Requirements

Every project on the Georgia Tech campus must meet the performance requirements, which are identified in *Chart 4-2* (pg 14)

C-Factor (Runoff)
The C-Factor requirement is used in an engineering equation to determine the amount of stormwater runoff generated by a site. Typical values are given in *Chart 4-1*, while zone-specific requirements are given in *Chart 4-2.* They give the maximum allowable runoff coefficient (C-Factor) for a total site and its component parts—buildings, hardscape, and vegetated areas. A value of 1.0 means 100 percent runoff.

C-FACTORS ASSOCIATED WITH TYPICAL DEVELOPMENT LEVELS	
Building Standard	0.95
Building "Green"	0.75
Hardscape Standard	0.95
Hardscape "Green"	0.4
Woodland	0.15
Parkland	0.25
Lawn	0.35

Chart 4-1: C-Factors associated with typical levels of site development .

Minimum Tree Canopy Coverage
This requirement specifies the minimum area of a site (including buildings and pavement) that must be covered by tree canopy, which is made up of Large and Medium sized tree species, defined in *Section 6.2.6 PLANT SELECTION*. It is expressed as a percentage of total site area and includes canopy that extends over impervious surfaces. The canopy consists of existing and planted trees. See *Chart 6-25: Canopy of New Large and Medium Trees* for computing coverage of proposed trees.

Minimum Woodland Area
This is minimum site area, expressed as a percentage, that must be covered with a conserved or planted *Woodland Plant Community* (*Section 6.2.5 PLANT COMMUNITIES)*

4.3 Meeting Required Performance

Compliance with these performance requirements should be undertaken in a holistic way so that all the elements of a site and its development program—landform, hydrology, soils, vegetation, buildings and hardscape—are woven into a living, sustainable landscape. Single-purpose, stand alone utility elements are not acceptable.

ECOLOGICAL PERFORMANCE REQUIREMENTS

	ECO-COMMONS	GREEN BUILDING ZONE	GREEN TRANSFER CORRIDOR	DEVELOPMENT ZONE	SURFACE PARKING	STANDARD CORRIDOR	GREEK SECTOR	
Maximum C-FACTOR for Total Site	0.25	0.5	0.45	0.9	0.85	0.75	0.65	Applies to the total site including all of its development.
Maximum C-FACTOR for Buildings	N/A	0.55	N/A	0.95	N/A	N/A	0.95	
Maximum C-FACTOR for Hardscape Areas	0.35	0.35	0.55	0.95	0.95	0.95	0.95	A site's buildings, hardscape and vegetated areas should all work together. The C-Factors shown for each are for general design guidance.
Maximum C-FACTOR for Vegetated Areas	0.15	0.15	0.15	0.15	0.15	0.35	0.15	
Minimum TREE CANOPY Coverage	75%	60%	50%	40%	50%	50%	60%	Minimum required canopy coverage is for total site area, including buildings and hardscape.
Minimum WOODLAND Area	40%	10%	0%	0%	0%	0%	0%	Woodland areas must have 100% Canopy.

Chart 4-2: Requirements for Georgia Tech's Ecological Performance Zones

5. DESIGN CORRIDORS

5.1 DESCRIPTION

The Landscape Master Plan (LMP) defines a grid of movement and open space corridors that represent the most communally-shared part of the campus. (Figure 5-1) While each exists in some part today, many are fragmented or are visually undistinguished. The LMP highlights their potential to unify the campus, give it visual logic, and provide the “street addresses” for all of Tech’s buildings. Based on their cultural history, functions, and visual character, the LMP identifies key attributes for each corridor to inform their design and development. For many, it also defines a role to transfer stormwater to the Eco-Commons.

The corridors should be more than streets and pathways. They should be three dimensional volumes of outdoor space that contain the community life of the campus—portals to buildings, gathering places, and venues for diverse activities. Some should be wide, others narrow, some busy, some not, some modern, others traditional, but all should be part of the common landscape.

While the master plan focuses on the key corridors listed in this chapter, it recommends that all of Tech’s corridors be reclaimed and revitalized as the Institute grows. The sustainablility objective is to re-weave them into the experience of the campus and the city.

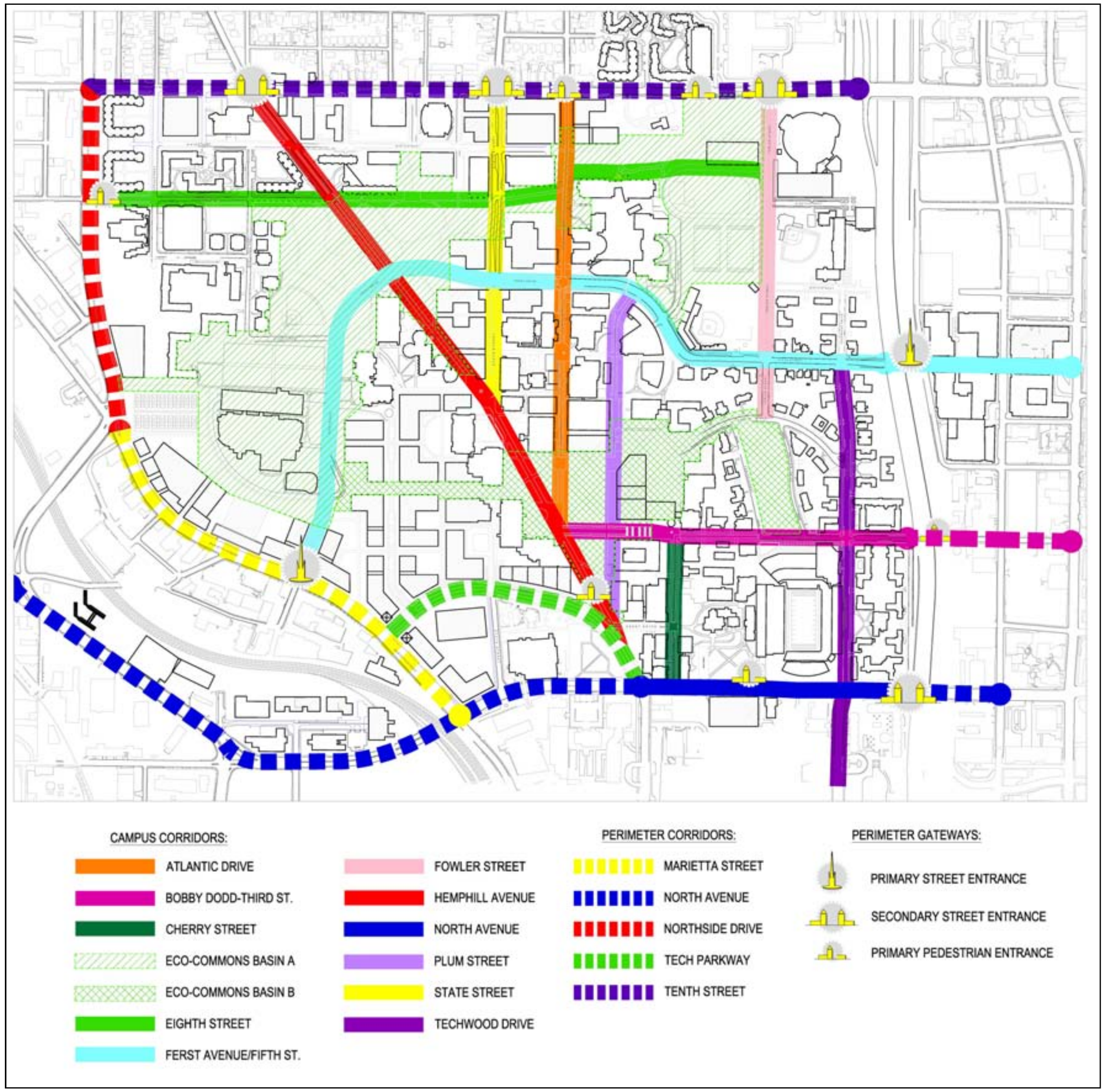


Figure 5-1: Map of Campus Corridors

LIST OF CAMPUS CORRIDORS

- Atlantic
- Bobby Dodd-Third
- Cherry Street
- Eco-Commons Basin A
- Eco-Commons Basin B - Fourth
- Eighth Street
- Ferst-Fifth
- Fowler
- Hemphill
- Plum
- State

PERIMETER CORRIDORS

- Marietta Street
- North Avenue
- Northside Drive
- Tech Parkway
- Tenth Street

5.2 ATLANTIC CORRIDOR

Atlantic is the principal north-south pedestrian corridor on campus and is the curb address of many of the Institute's academic buildings. It is part of the 1912 city grid and originates at its intersection with the Hemphill corridor at Tech Green and the Student Center. From there it leads north over hilly topography to Tenth Street, where it is a major pedestrian gateway.

Objectives:

1. Preserve the legibility of the street, even as it is adapted to car-free status.
   - Curbing or formal guttering should be used throughout.
   - Overall geometry should be orthogonal.
   - Emphasize intersections with east-west walkways and streets.
2. Develop a sense that from end to end it is the same "street" but that it passes through different environments—south to north these are:
   - Collegiate commons at Tech Green
   - Urban street, like Cherry Street on the Hill
   - Highpoint plaza at College of Computing
   - Eco-Commons Woodland north of Ferst Drive
   - Mixed- use neighborhood at Tenth.
4. Design as a multi-purpose pedestrian street that can handle emergency and maintenance vehicles.
5. The corridor should take advantage of its topography – notably its highpoint at the College of Computing and its low points at the North Parking Deck and Tech Green.
6. Use the corridor to manage stormwater and transfer it to the Eco-Commons Basin-A and Eco-Commons Basin-B.

Requirements: (Also see requirements for individual corridor sections)

1. Circulation Type-1: Pedestrian Street *(Section 6.3.1 Circulation Types)*
2. Pavement Type-A 22-foot brick and granite paving with granite curbs *(Section 6.3.2 Pavement Types)*
3. Use Atlantic corridor to manage stormwater and transfer it to the Eco-Commons - Basins A

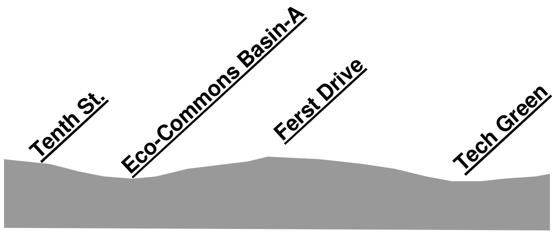


Figure 5-2: N-S profile of the Atlantic Corridor

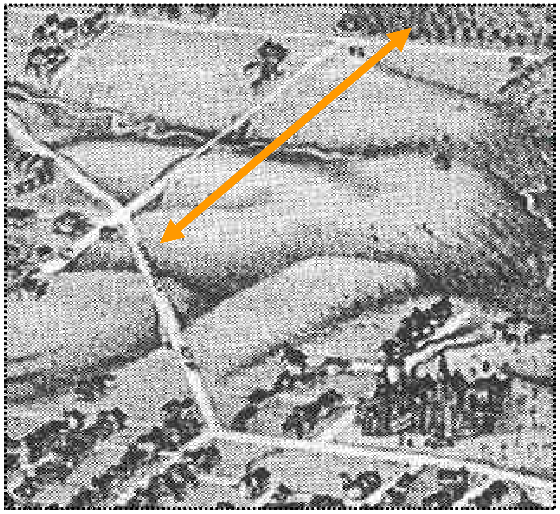


Figure 5-3: 1892 map with Atlantic highlighted crossing the ravine, which is now part of the Eco-Commons–Basin A. North Ave. and Tech Tower is in lower right. Hemphill is the diagonal street to the left.

and B - for storage and re-use.

4. Tree Canopy provided by Street trees *(Section 6.2.9 Street Trees)* or by adjacent informally arranged trees.
5. Lampposts *(Section 6.3.8 Outdoor Lighting)*
6. Plaza entries to buildings with furniture.

5.2.1 <u>Atlantic Corridor: Tenth Street to Ferst Drive</u> *Figure 5-4*

This section of Atlantic cuts through the Eco-Commons Basin-A and is one of its major gateways. *(Figure 5-5)* At Tenth Street it is also a major pedestrian gateway into campus.

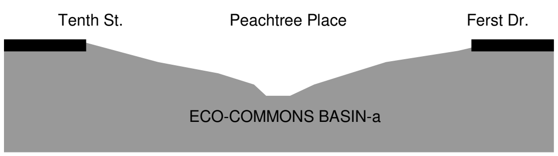


Figure 5-4: N-S Section along the Atlantic Corridor

Specific Requirements for this Section:

- Maintain the historic continuity of the street with orthogonal geometry and paving.
- Provide gateway experiences to the Eco-Commons at Peachtree Place and at the north entrance to NRCB.
- Provide a pedestrian campus gateway at Tenth, incorporating future buildings, which should define a pedestrian street. (Figure 5-6)
- Provide fire truck access to the north side of MS&E

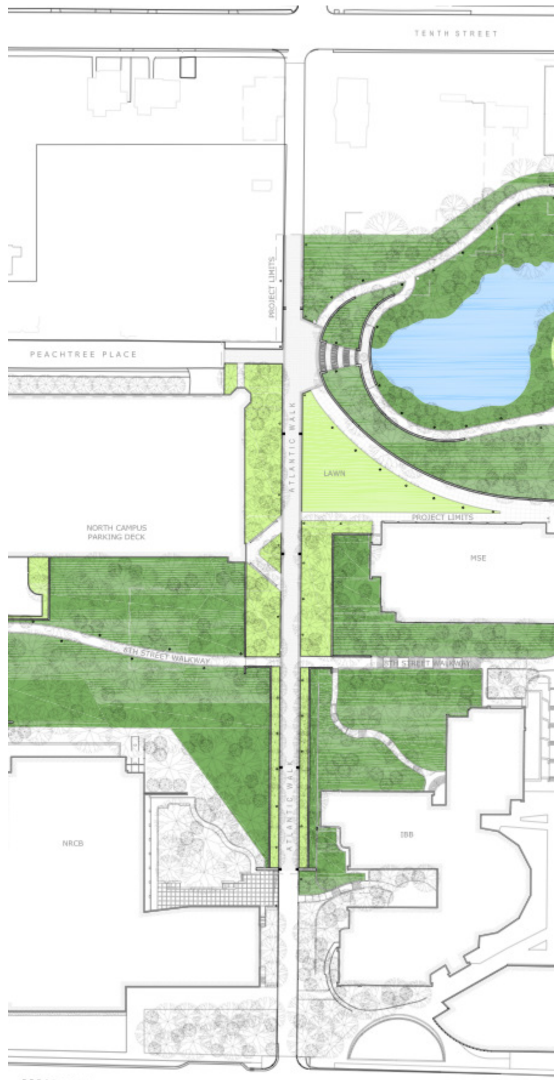


Figure 5-5: The Atlantic Corridor cuts through the Eco-Commons shown in green. Pale green is <u>Parkland</u> and dark green is <u>Woodland</u>. The entrance to the Glade is at Peachtree Place . At Tenth are sites for future buildings..

Figure 5-6: This 22-foot walkway on the Penn campus was formerly a street and serves as a good model for Atlantic at Tenth Street.

- Use the corridor to manage stormwater and transfer it to the Eco-Commons for storage and use.
- Provide a minimum 75% tree canopy with informally arranged large and medium sized woodland trees. Between the Eighth St. walkway and the north entrance to NRCB trees may be planted as street trees due to retaining walls. *(Section 6.2.9 Street Trees)*

5.2.2 Atlantic Corridor at Ferst Drive

This intersection of pedestrian and vehicular circulation is one of the busiest on campus and sits at the crest of a hill. To the South Atlantic leads to the core of the central campus. To the North of Ferst Drive it enters the Eco-Commons.

Figure 5-7: Intersection of Atlantic and Ferst looking north toward the Eco-Commons.

Specific Requirements for this Section

- The intersection should be completely paved in brick.
- NE and NW corners should be planted with woodland.
- The SE corner should be anchored by a major bus canopy which reaches out from the adjacent building and covers the entire sidewalk.
- The SW corner has a remnant woodland which should be protected by a seat wall along the back of walk.

5.2.3 Atlantic Corridor from Ferst Drive to Hemphill at Tech Green

This stretch of the corridor has two topographic events which shape the human experience - a highpoint at its intersection of Fifth (now a walkway from Klaus) and a low point at its intersection with Fourth Street. The highpoint provides strong visual orientation in the north-south direction and is the divide between the campus's Basin A and Basin B watersheds. It should be marked by a crossroads plaza, anchored by a strong vertical focal point for campus orientation (*Figure 5-11*).The buildings along the corridor have relatively small footprints compared to recent campus buildings and with brick exteriors recall the friendliness of The Hill district. Reducing overall corridor width with infill and additions to existing structures would amplify the similarity and improve the corridor's spatial modulation - so that it can expand into Tech Green to the south and into a hilltop plaza at the College of Computing. At Bunger-Henry and other locations along Atlantic, there are opportunities for "cat-bird seat" terraces above the walkway, which should be developed for sitting, studying and overlooking Atlantic.

Specific Requirements for this Section

- Reduce the width of the corridor volume to 60 - 80 feet by adding to the fronts of existing buildings and tightening up the façade line with new in-fill buildings *(Figure 5-9).*
- Establish a plaza at highpoint intersection of Atlantic and the east-west walkway from Klaus (formerly 5th street) with a vertical monument for orientation along Atlantic *(Figure 5-9),* which can be seen from its intersection with Fourth Street and Ferst Drive *(Figure 5-9)*.
- Line this corridor section with street trees for high canopy *(Figure 5-10, Section 6.2.9: Street Trees).*
- Corridor should be designed to collect stormwater and convey it to the Eco-Commons Basin A and B.
- Atlantic should intersect Fourth Street with an orthogonal intersection.
- From Fourth Street to the Student Center, the corridor should visually and functionally open onto Tech Green.
- From Fourth to the Student Center the pavement material may change but not the alignment of the "street".

Figure 5-8: The corridor proportions of The Hill are a model for Atlantic between Ferst Drive and Fourth Street.

DESIGN CORRIDORS

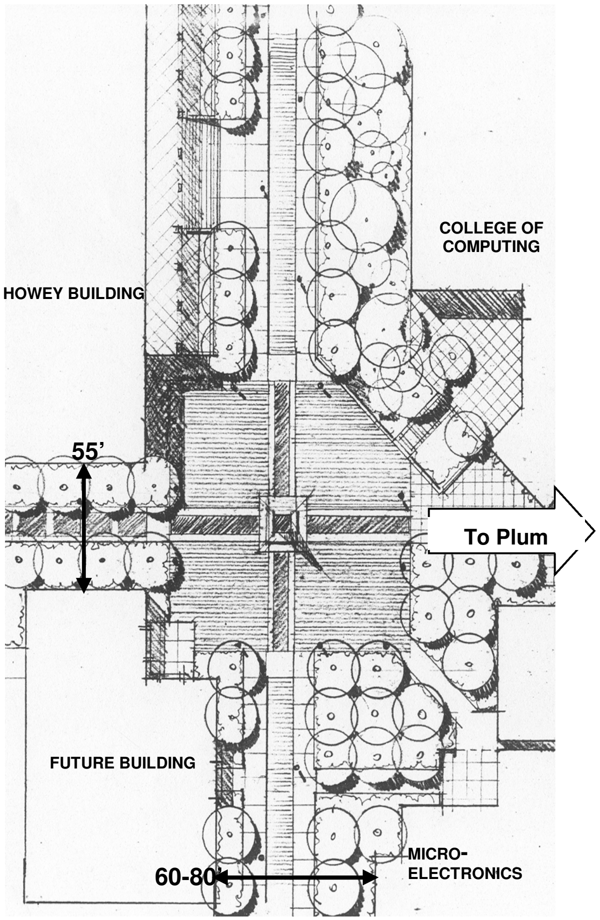


Figure 5-9: Concept for a plaza at the highpoint intersection of Atlantic and former 5th street. A vertical focal point provides important campus orientation on Atlantic's north-south axis.

Figure 5-10: TOP: Tree canopy for the Atlantic Corridor between Ferst Drive and the Student Center. BOTTOM: New 22' wide brick and granite paving on Atlantic.

5.3 BOBBY DODD WAY - THIRD STREET CORRIDOR

This corridor provides a vital pedestrian link from the center of campus to midtown, utilizing a tunnel under I-75/85 (unused as of 2010). From east to west it passes the football stadium, goes over The Hill district and connects to the Clough Undergraduate Learning Center, Tech Green and the Student Center.

Objectives:

1. Create a strong pedestrian gateway and connection from Midtown to the heart of campus.
2. Preserve the historical identity of the street from Spring Street to Cherry Street.
3. Design as a multi-purpose pedestrian-oriented street that can handle emergency and maintenance vehicles, as well as game day crowds.
4. Make the section from Fowler to Cherry pedestrian only.
5. The corridor should take advantage of its topography – notably its highpoint at Cherry Street and its descent to Tech Green.

Requirements: (Also see requirements for individual corridor sections)

1. Tree Canopy provided by street trees *(Section 6.2.9 Street Trees)* or by adjacent informally arranged trees.
2. Lampposts *(Section 6.3.8 Outdoor Lighting)*
3. Plaza entries to buildings with furniture.
4. Use corridor to manage stormwater and transfer it to the Eco-Commons-Basin B (Tech Green and Peters Park) - for storage and re-use.

Figure 5-11: Widen the Third Street sidewalk and make the underpass a gateway to campus.

Figure 5-12: Narrow Bobby Dodd Way to its summit at Cherry. Add vertical monument for campus orientation.

5.3.1 BDW-Third Corridor from Spring Street to Techwood Drive

Work with the City of Atlanta to make a viable pedestrian link between Spring Street and Techwood Drive, including an improved tunnel under I-75/85.

Specific Requirements for this Section

- Remove on-street parking on one side of Third Street and narrow travel lanes to 10 feet.
- Type 4-Pedestrian Walkway *(Section 6.3.1: Circulation Types)*
- Add striped bicycle lanes *(Section 6.3.5 Bicycle Facilities)*
- GT Traditional Lampposts *(Section 6.3.8 Outdoor Lighting)*
- Street Trees (Section 6.2.9 Street Trees)
- Make Third Street underpass a major pedestrian gateway that is reassuringly safe and thematically oriented to GT.
- On the GT side of the underpass narrow the street to widen sidewalks and tree planting strips.

5.3.2 BDW from Techwood to Cherry Street

This section is a key link for eastside residents and game day visitors to get to the Clough Undergraduate Learning Center, Tech Green, and the

Student Center. It is not possible to be handicap accessible, but its steep topography affords great views to east and west. This section also passes

Figure 5-13: View of proposed park and pond to replace existing parking deck.

by the southern end of Peters Park, whose existing parking deck will be replace by a pond in the future.

Specific Requirements for this Section

– At Peter's Park the parking structure should be replaced by an Olmstedian landscape around a pond with woodland on its west side and parkland on its east side. From the stadium plaza there should be a compelling view down the fetch of the pond. *(Figure 5-19)*

– West of Fowler Street, block vehicular traffic and narrow the pavement, as a <u>TYPE 1- Pedestrian Street</u> *(Section 6.3.1 Circulation Types)* with brick pavement and granite curb and gutter. (*6.3.2 Pavement Types) (Figure 5-13)*.

Figure 5-14: Vista from the hilltop of Bobby Dodd Way to Tech Green and the Student Center

Figure 5-15: The Spanish Steps in Rome is a design for the dramatic descent from Cherry Street to Tech Green.

<u>5.3.3 BDW Corridor from Cherry to Student Center</u>

From its summit at the Library plaza there are dramatic views and vertical drops to the east and west which shape in the human experience of the corridor. *(Figure 5-14)*

– 'Spanish Steps' should become part of the outdoor design program for the Clough Undergraduate Learning Center with handicap access handled in the building. *(Figure 5-15)*.

– From the base of the stairs at Plum Street create a wide pedestrian mall to the Student Center. It should be a tree-canopied mall, opening onto Tech Green with ample accommodation of outdoor activities, including sitting, wireless computing, temporary kiosks for student activities, performing, snacking, etc. *(Figure 5-16*)

5.3.4 <u>Plaza at Student Center</u>

The intersection of Bobby Dodd Way, Hemphill and Atlantic is arguably the busiest and most important intersection on campus. It should be treated accordingly. An apt model is the central concourse of Grand Central Station in New York, which not only handles throngs of people making multiple movements, but also contains numerous activity niches.

Specific Requirements for the Section

– Cover the mall and its intersection with Atlantic-Hemphill at the Student Center with a high tree canopy with 75-100% coverage. A model for this canopied activity hub is the Tuilleries in Paris or the Grand Concourse in Central Park in NYC. *(Figures 5-16-19)* A closed canopy parkland like this will frame Tech Green and provide shady contrast. The existing fountain and spire can be beneficially incorporated in this concept as well.

– For a healthier tree environment, a cooler microclimate, and stormwater management, much of the floor area should be handled primarily without rigid paving. Models for this include Green Park and Pall Mall in London, as well as the Tuilleries and Central Park examples.

– Design this area as a functional part of the Eco-Commons, which include a major cistern system under Tech Green lawn for harvesting stormwater for non-potable uses, including the existing fountain at the Student Center..

Figure 5-19: The Tuilleries in Paris illustrate civic space completely covered by tree canopy.

Figure 5-16: Sketch of the pedestrian mall leading to the Student Center with seating and places for temporary activity kiosks. Tech Green is on the right.

Figure 5-17:The Mall in New York's Central Park is a good model for a major tree-canopied circulation space.

Figure 5-18: The lawn on the Mall in Washington, D.C. is managed to withstand the impact of lots of people and use.

5.4 CHERRY STREET CORRIDOR

Cherry Street from North Avenue to Bobby Dodd Way is the heart of GT's historic Hill district.

Objectives:

1. Preserve and or reclaim the district's historic character scale, street trees, and strong spatial enclosure.
2. Eliminate public vehicular access and restrict to pedestrians, bicycles, handicap vans, and service vehicles.

Requirements:

1. Eliminate vehicular traffic north of Ferst Drive *(completed)*
2. Preserve the legibility of the street, even as it is adapted to car-free status.
   - Curbing or formal guttering should be used throughout.
   - Overall geometry should be orthogonal.
4. Circulation Type-1: Pedestrian Street *(Section 6.3.1 Circulation Types)*
5. Pavement Type-A: 22-foot brick and granite paving with granite curbs. *(6.3.2 Pavement Types)*
6. Use corridor to manage stormwater and transfer it to the Eco-Commons - Basins B - for storage and re-use.
7. Traditional lampposts *(Section 6.3.8 Outdoor Lighting)*
8. Traditional site furniture *(Section 6.3.7 Site Furniture)*
9. Street Trees *(Section 6.2.9 Street Trees)*
10. Front yards between the sidewalk and buildings should be planted in a simple manner with the plants typical of early 20th century Atlanta suburbs.
11. The terminus of Cherry Street at Bobby Dodd Way should be a simple formal square with a monument. *(Section 5.3.2 Bobby Dodd Way)*
12. Cherry at North Avenue should be treated as a Minor Drive Entrance with brick piers. *(Section 5.1.8 Campus Perimeter and Entrances)*

Figure 5-20: Cherry Street as it exists today with dashed lines indicating reduced street width as a Pedestrian Street.

5.5 ECO-COMMONS Basin-A CORRIDOR

The Basin A Corridor extends from the top of the watershed at Marietta Street to the Glade and follows the course of an old stream that was still present and flowing in the 1930's, and today is contained in the combined sewer system. This corridor holds the most potential for ecological design at Georgia Tech and should be planned accordingly. The overall landscape character may be thought of in terms of two historically important landscape architects, who were often able to blend human objectives with naturally functioning landscapes—Jens Jensen and Frederick Law Olmsted. *(Figures 5-21)*

Objectives:

1. Significantly contribute to Georgia Tech's goals of sustainability.
2. Construct, manage, and monitor the landscape to perform ecologically – e.g. soils should infiltrate and store rainwater.
3. Contribute to a significant reduction of storm-water entering the City of Atlanta sewer system.
4. Create a mosaic of natural and man-made landscapes infused with accommodations for recreation and other appropriate human activities.
5. Express Georgia Tech's place-maker signatures—*technology, ecology, collegiate life,* and *city.*
6. Identify, fund, build, and operate the Eco- Commons as a "green" utility.

Requirements:

– Meet or exceed GT's Ecological Performance Requirements *(Chart 4-2: Requirements for Georgia Tech's Ecological Performance Zones)*
– Protect existing trees and original landform.
– Protect and/or restore the ecological capacity of the landscape to meet sustainability objectives.
– Utilize basin-wide hydrology.
– Institute innovative ecological design throughout the Eco-Commons.
– Use a unified design vocabulary that runs with the Eco-Commons.
– Install environmental monitoring.
– Provide environmental research opportunities.

Precedent— Boston Fens by F.L. Olmsted, 1879

– Overall plan based on dendritic drainage and watershed characteristics.
– Fluvial land-forming, including channel, terrace, and levee, to manage flow lag-time and discharge
– Provides for stream over-banking and flood storage.
– Graded gravels and soils provides soil-water storage, lateral subsurface flow, and erosion protection.
– Use of vigorous, native floodplain vegetation
– Thicket planting of freely-suckering and seeding shrubs and tree, insuring vigorous regeneration of vegetation.
– Savvy use of the adaptation of different plants for different site situations from wet to dry.
– Aesthetic use of natural plant communities.
– Pervious, gravel paths.

Figure 5-21: L-R: Fragment of Fens plan; Fens under construction; Fens soon after completion.

– Institute interpretive education throughout the corridor. (Figure 5-44)

5.5.1 EC Basin-A Corridor from Marietta Street to Sixth Street

This area is largely occupied by the Campus Recreation Center (CRC), but contains opportunities for managing stormwater.

Specific Requirements for this Section:

1. When Tech Parkway is removed south of CRC, develop a wet woodland landscape to absorb and manage the roof water from Marietta Street development, CRC, the Health Center.
2. Develop a major stormwater storage facility under the soccer field complex for slow release and recirculation to nourish a stream fragments throughout Basin A..
3. Utilize abandoned sewer piping for stormwater management.
4. Plant woodland understory north of soccer complex.

5.5.2 EC Basin-A Corridor from Sixth Street to Hemphill

This area known as Couch Park is an important student outdoor recreational area. It should be further developed not only as an intensively used park landscape, but also as a stormwater receiving and management zone.

Specific Requirements for this Section:

1. Create an integrated hydrological system that is appropriate to recreational use but in balance with its position in the watershed - receiving and releasing flows.
2. Turf areas should be built on porous material to store and manage stormwater.
3. Heavily vegetate steep slopes with woodland. vegetation.

Figure 5-22: Existing conditions where the Eco-Commons will be established.

Figure 5-23: Example of the required landscape character for the recreational area north of Ferst Drive and east of Hemphill.

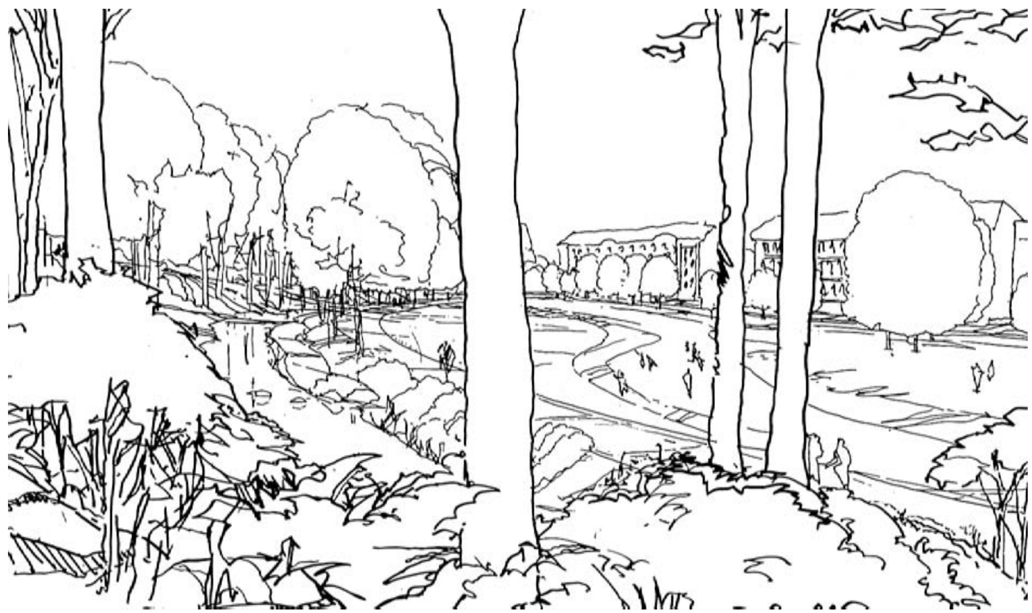


Figure 5-24: View of proposed Eco-Commons area north of Ferst Drive and east of Hemphill, showing woodland slopes and stream in foreground, recreation lawn, and residence halls in background along the 8th Street Corridor.

5.5.3 <u>EC Basin-A Corridor from Hemphill to Dalney</u>

This area represents the largest landscape area of the Eco-Commons and is currently occupied by extensive surface parking lots. *(Figure 5-22)* The steep slope on the south side of this section is an important stormwater transfer zone - moving infiltrated soil-ground water from the developed area south of Ferst Drive into the Eco-Commons.

Specific Requirements for this Section:

1. Develop this section into a semi-natural park to accommodate passive recreation, and natural hydrological features for stormwater management. *(Figures 5-23, 5-24)*
2. Heavily vegetate the Transfer Zone slopes north of Ferst Drive with woodland. *(See LMP Vegetation Communities Plan)*
3. Establish an open stream channel at the base of the steep slope that falls from Ferst Drive Extend channel upstream to Hemphill, where water flows from under and downstream to a wet retention wetland, which lies west of Dalney. *(See LMP Plan, Section 6.1.5 Water Courses)*
4. Create wet retention wetland/pond west of Dalney with a controlled subsurface outfall to the east. *(Section 6.1.4 Ponds, Section 6.1.3 Stormwtaer Management)*
5. Turf areas should be built on porous material to store and manage stormwater.
6. Establish a landscape mosaic of natural plant communities around the recreational parkland that includes upland woodland, riparian communities, and meadows. The goal is to encapsulate the recreational area in a natural landscape. *(Figure 5-25)*

Figures 5-25: Natural plant communities are appropriate in the Eco-Commons to do ecological "work" and provide a natural backdrop to GT's buildings and outdoor recreation. Note their painterly and textural quality.

5.5.4 EC Basin-A Corridor from Dalney to the Glade

This section is identified as Phase One of the Eco-Commons and is designed through the Design Development Phase (2009).

ECO-COMMONS PHASE ONE

Design Development Drawings

2009

Project Description:

This project develops the design for the first phase of the Eco-Commons - a multi-function ecologically based and permanent open space system, which is identified in Georgia Tech's Campus Master Plan Update (2004) and the Landscape Master Plan (2005). The goal of the Eco-Commons is to provide integrated stormwater management, outdoor recreation, enhancement of environmental values, and opportunities for research and education - in a way that contributes to Georgia Tech's leadership in sustainability design.

Project Location:

The Project is located in the Northwest Quadrant of the Georgia Tech Campus, as defined in the Landscape Master Plan, near the bottom of the campus watershed known as "Basin A". The project area is 10 acres with a hydrological centerline that extends from Dalney Street to the Glade on the east. To the north and south of the centerline, the Project touches several existing and proposed building development areas, including the Nano Research Center Building (NRCB), the North Campus Parking Deck, the Molecular science and Engineering Building (MSE), future buildings on Tenth and Atlantic, and the President's Residence. Stormwater runoff from the area is currently collected in a pipe system that discharges into a combined stormwater and sanitary sewer pipe in the Glade, which is the only outlet of Basin A. The physical challenge of the project is that it is a pinch point near the bottom of the drainage basin and has a high coverage of buildings and paving and an abundance of underground utilities.

Objectives:

1. Develop the Eco-Commons concept.
2. Reduce stormwater discharge into the sewer system.
3. Enhance the performance of the watershed.
4. Accommodate human functions in the landscape, including recreation and circulation.
5. Accommodate utilities and building services.
6. Develop a design that is beautiful and didactic.
7. Accommodate monitoring and research.
8. Serve as a model for other campus areas.

Design Concept:

The Eco-Commons is based on the concept of a "Performance Landscape", where man-made and natural systems work together in an ecological way to benefit the campus and its urban context. One of its major goals is to reduce the stormwater footprint of the campus to what it was in 1950, reducing the amount of stormwater entering the Atlanta sewer system by 50 percent. This will be done by joining the capacity of the landscape - its physiography, soils, and plants - with smart infrastructure that mimics the hydrology of a forested watershed. Unlike the hydrology of a typical urban watershed that fluctuates between storm surges and dry conditions, forest hydrology produces more balanced flows and durable ground water and soil moisture. This strategy, known as "hydrological convergence" underlies the Eco-Commons concept. Phase One develops this concept with natural woodland areas and complementary man-made storage and irrigation systems to intercept, infiltrate, harvest, and redistribute stormwater and condensate from buildings. The effect will be to replace one-way flows into the sewer system with cyclical flows that remain on campus to nourish a multi-purpose landscape that serves the Tech Community and enhances regional environmental values.

Figure 5-26 Illustrative Plan

Figure 5-27 Storage/Flow Plan

Specific Requirements for this Section

1. Implement the ECO-COMMONS PHASE ONE Plan *(Appendix A.7: Eco-Commons Phase One)*

Figure 5-26: ECO-COMMONS PHASE ONE Illustrative Plan

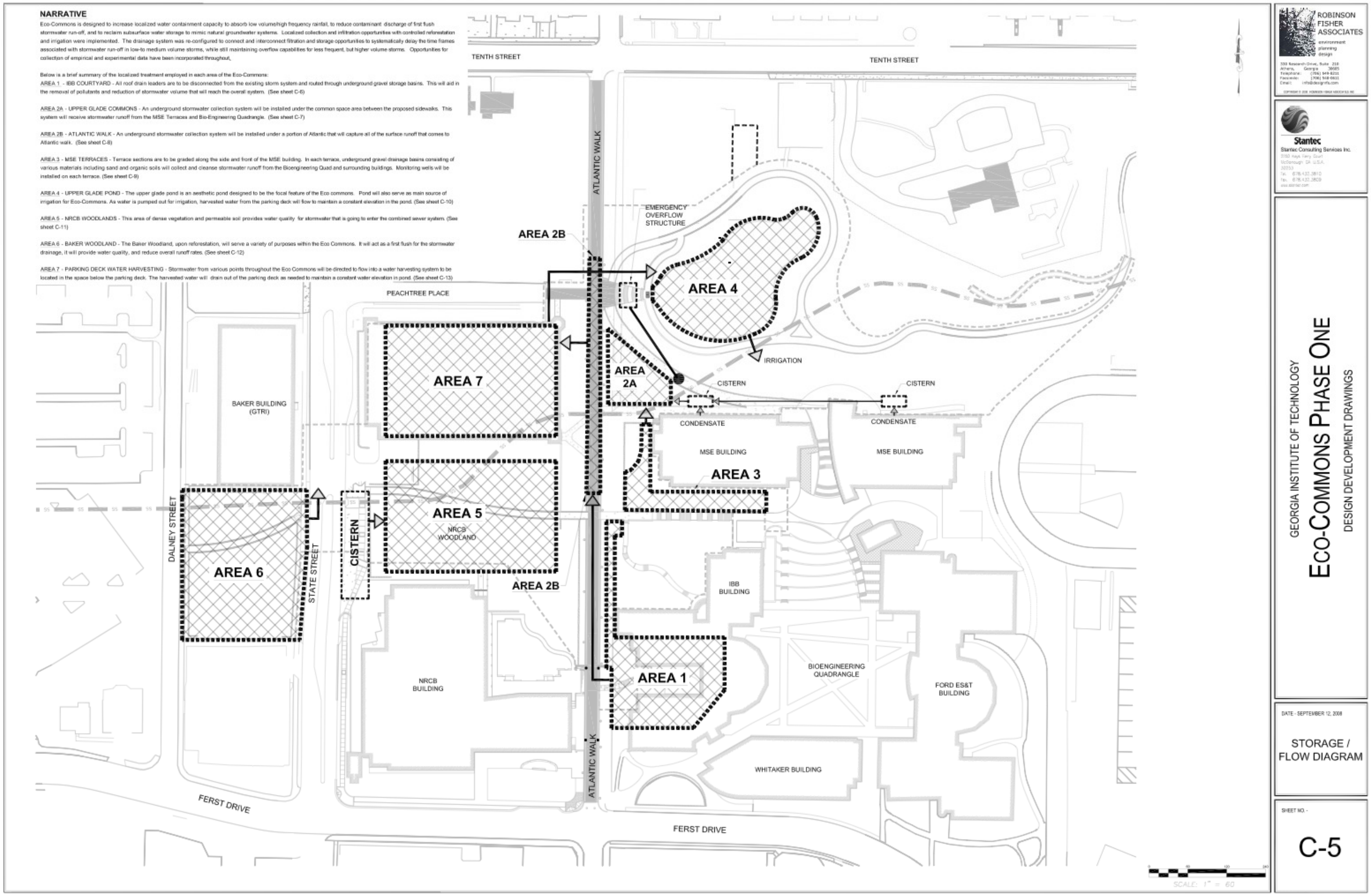


Figure 5-27: ECO-COMMONS PHASE ONE Storage/Flow Plan

5.6 ECO-COMMONS Basin-B CORRIDOR

The Basin-B corridor extends from the top of its watershed at Ferst Drive opposite the Health Center to Peter's Park. Its hydrological centerline is obscured in many places by land use, requiring subsurface solutions - e.g. cisterns, etc. to accomplish hydrological objectives. Beyond stormwater management, this corridor has important pedestrian-circulation functions between the Clough Undergraduate Learning Center (CULC) and the Campus recreation Center (CRC), and between the Student Center and East Housing area.

Figure 5-28: View of walkway with 100% tree canopy to Tech Green between the Ferst Center the Student Center dining room (right)

Objectives:

1. Achieve the best expression of a sustainable campus.
2. Harvest stormwater for non-potable use.

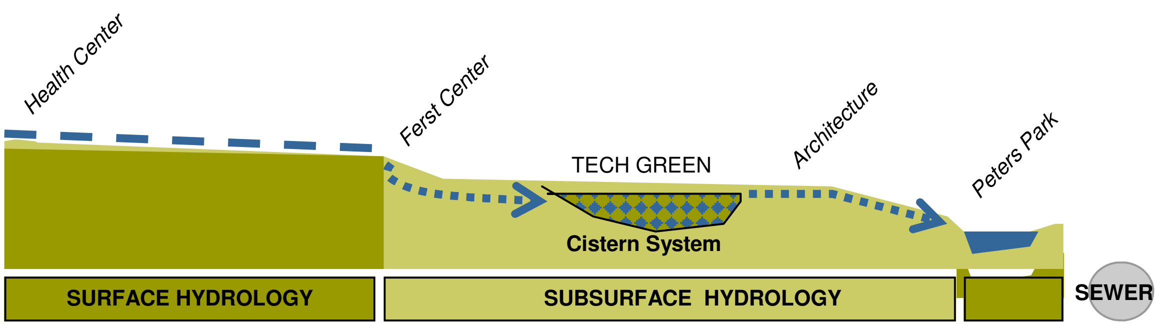


Figure 5-29: Diagrammatic West-East Section of the Eco-Commons-Basin B Corridor.

3. Accommodate the highest standards of community outdoor space for circulation, gathering and activities.

Requirements:

1. Meet or exceed GT's Ecological Performance Requirements *(Chart 4-2: Requirements for Georgia Tech's Ecological Performance Zones)*
2. Collect surface water and condensate from buildings and intersecting north-south corridors for management and transfer to a cistern system at Tech Green. *(Figure 5-29)*
3. Develop a major cistern under Tech Green to store harvested runoff and condensate from the basin.
4. Construct turf areas on gravels.
5. Create a wide multi-purpose walkway from Ferst Drive opposite the Health Center to Tech Green. *(Figure 5-28)*
6. A woodland should be developed around existing oaks south of the Bunger-Henry building.
7. Fourth Street, from Plum to Fowler, should be narrowed (16-foot wide) for restricted vehicular circulation with no on-street parking.
8. Make Fourth Street at Fowler a Minor Drive Entrance *(Section 5.18 Campus Entrances)*
9. Remove parking deck in Peter's Park and put in wet retention pond, which will be the final destination of water in Basin B, with overflow into the City of Atlanta sewer system. *(Section 5.9: Fowler Street Corridor)*

5.7 EIGHTH STREET CORRIDOR

The Eighth Street Corridor, stretches from Northside Drive to Fowler Drive. While most of it is no longer a street, it is the most important east-west pedestrian linkage in the northern tier of the campus and offers connection to future development west of Northside Drive. More than half of the Eighth Street Corridor runs through the Eco-Commons Basin and should serve its stormwater and recreation functions.

Requirements:

- From Northside Drive to Atlantic the Eighth Street Corridor walkway should follow an orthogonal geometry, while east of Atlantic, it should take on the character of a wide, curving woodland driveway.
- At Northside Drive, Eighth Street should look like a private neighborhood street with masonry piers to discourage through traffic. East of Northside Drive, it should collect stormwater that would otherwise enter the city sewer system and transfer it to the Eco-Commons' pond in Couch Park. The streetscape should express this drainage function.
- East of Hemphill, the corridor should continue as a wide multi-purpose walkway that serves as a principal promenade for the park landscape of the Eco-Commons.
- East of the Center Street Apartments, a park activity plaza should be developed to support recreational use of the Eco-Commons.
- From McMillan Street to Fowler Street the Eighth Street Corridor walkway should be no less than 15 feet wide with porous paving and granite curbing or swaled gutters.
- See Eco-Commons Basin A Corridor for additional description.

5.8 FERST-FIFTH CORRIDOR

The Ferst-Fifth Corridor is the campus's principal arterial and carries multiple modes of movement—cars, pedestrians, bicycles, and transit. It is one of the main entrances to Georgia Tech and goes through the middle of campus, connecting the urban environments of Marietta Street and Tech Square. In between it gives access to the major sectors of the campus. The inside of its radius contains most GT's academic core, which is car-free. On the outside of its radius is Basin-A of the Eco-Commons, recreation, sports, and housing. From State Street to Plum Street it passes through an academic sector as it crests a topographic divide at Atlantic. The design character of the Ferst-Fifth Corridor is strongly suggested by the bold architecture and technology of the major buildings that line it (Figure 5-30).

Objectives:

- Make the campus legible to people arriving by way of this arterial roadway - i.e. where things are and how to get to them.
- Accommodate multiple modes of movement – transit, cars, bicycles, walkers, deliveries.
- Create visual continuity from one end of the campus to the other.
- Express Tech's place-making signatures - *Technology, Ecology, Collegiate Life* and *City* .

Requirements:

1. Make the intersection of Ferst Drive and Marietta a Primary Street Entrance *(Section 5.18 Campus Perimeter and Entrances).* It should be a formal, urban entrance to Georgia Tech from one of Atlanta's principal and soon to be revitalized arterials.
2. The landscape between the roadway and buildings should be Woodland or Meadowland. The visual message should be harmony of Technology and Nature - Alvar Aalto at Otaniemi University in Finland comes to mind.
3. The streetscape itself should have consistent treatment along the entire length in order to provide legibility in spite of its curving alignment.
   - Street Trees *(Section 6.2.9 Street Trees)*
   - Type-4 Pedestrian Walkway *(Section 6.3.1 Circulation Types)*
   - Type-C Pavement: Concrete with Brick Bands *(Section 6.3.2 Pavement Types)*
   - Street Lights and Traditional Lampposts *(Section 6.3.8 Outdoor Lighting)*
3. Provide transit pull-offs (*Section 6.3.6 Transit Stops)*
4. Striped bicycle lanes *(Section 6.3.5 Bicycle Facilities)*.
5. Develop corridor for effective way-finding for vehicular traffic seeking specific campus addresses – visitor parking, sports venues, etc
   - Unified signage and sign positioning.
   - Mark major walkways that lead into the academic core with a vertical architectural element that is visible from a passing car or bus. At each there should be a pedestrian crosswalk.

Figure 5-30: The bold architecture of the J. Erskine Love Manufacturing Building and other buildings along Ferst are signatures for the Ferst Fifth corridor when set within a landscape of natural plant communities.

5.9 FOWLER STREET CORRIDOR

Fowler is one of the principal vehicular entrance corridors into the campus, especially for someone exiting I-75/85 at 10th/14th street. It also leads directly to most of Tech's sporting venues and its Greek Sector.

Overall Corridor Design Objectives:

1. Create a vehicular entrance corridor to the campus at Tenth Street.
2. Provide a panoramic view of the campus. The view of interesting architecture like Klaus and the Biomedical building on a hill with lots of trees and recreation fields in the foreground can express Georgia Tech's commitment to technology, environment, and livability.
3. Highlight 3 of Tech's place-making signatures: *Technology, Nature, and City.*
4. Highlight *Collegiate Life* in the Greek Sector.
5. Contribute to campus recreation and the game day experience through the landscape development of Peter's Park.
6. Create an orientation/wayfinding point at the intersection of Fowler and Fifth.

Requirements:

- At the intersection with Tenth Street there should be a masonry framed entrance with tall brick piers flanking wide sidewalks. (Figure 5-32)
- The street should be narrowed to a two-way facility with striped bike lanes. (Figure 5-33)
- There should be no on-street parking.
- Existing street trees should be kept and contained within a 10-foot wide continuous tree strip which is the result of narrowing the street.
- 10-foot wide sidewalks behind the street trees.
- As it passes the proposed pond in the Glade, the track and other sports fields, it should afford a view west to the campus skyline.
- Remove existing screen walls along the sports fields between Fifth and Tenth streets to create a vista of the campus. (Figure 5-31)
- The intersection with Fifth Street at the landmark baseball stadium should be brick -paved to create a strong sense of arrival on a pedestrian-oriented campus.
- Establish clear directional signage to principal campus destinations.
- Work with the Greek organizations to set landscape guidelines for the front yards and porches of the Greek houses.
- Create a lake and park in Peter's Park. (Figures 5-34,35,36)

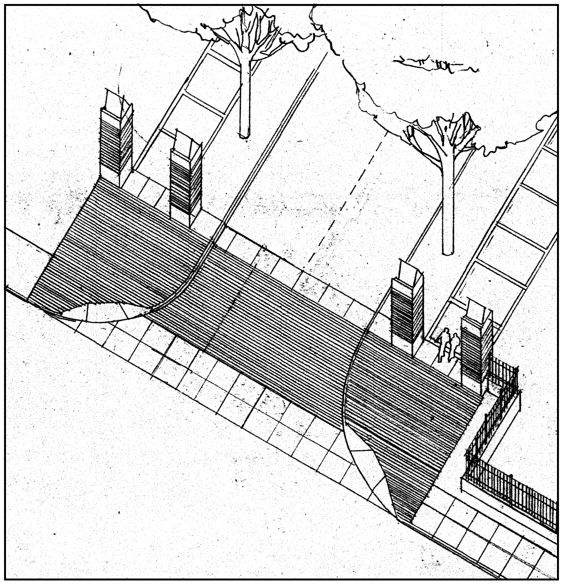


Figure 5-32: Concept for new entrance at Tenth Street

Figure 5-31: Keep existing trees, but remove wall and on-street parking.

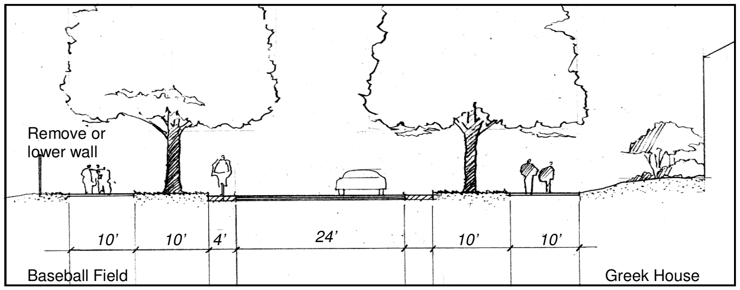


Figure 5-33: Cross-Section of Fowler at Baseball Field Looking North

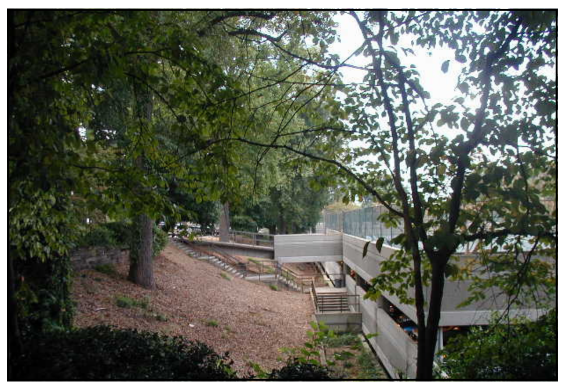
DESIGN CORRIDORS

The steep western side of the pond shall be reinstated as full woodland. There should be no pedestrian access along the west side of the pond. Fowler Street above the pond should be a stormwater transfer zone and a park overlook.

Fourth Street at this point should be necked down and fitted out with minor street entry piers to indicate entrance into the academic core.

The east side of the pond should be parkland setting for informal recreation. Because of heavy game day use, the soils shall be suitably constructed to maintain infiltration.

Figure 5-34: View looking south of proposed Peter's Park restoration with a new lake, which is part of the Eco-Commons. Bobby Dodd Stadium is at top of picture.



Figures 5-35, 5-36: View of Fowler north of Bobby Dodd Way. The section of paving under on-street parking should infiltrate surface runoff under porous concrete unit pavers. When the parking deck is removed, the steep slope will lead down to the pond and should be heavily vegetated with a woodland plant community.

5.10 HEMPHILL CORRIDOR

Hemphill is one of the most important corridors on campus and the most historic. (Figure 5-37) It predates the founding of Georgia Tech and once connected 19th Century Atlanta to the Chattahoochee River. It came before the grid of Atlanta's streets in this area and today remains unique because it lies on the diagonal. It bisects the campus in equal parts and ties the housing of the northwest quadrant to the historic academic core. The two ends of Hemphill—Tenth and North— are at similar elevations, but in between it falls to two low points and rises to a singular high point. These three points, high and low, are among the most important parts of the proposed campus landscape. One is the basin, occupied by the student center, which has become the central commons of the campus. One is the center of what will be the Eco-Commons, and the third, the high point, will be a hilltop piazza within the northwest academic core.

Overall Corridor Design Objectives:

1. Maintain the sense of a street.
2. Express continuity from end to end.
3. Accentuate environmental character differences along the corridor.
4. Provide strong focal points to encourage movement along the corridor (in the manner of Pope Sixtus V).
5. Design as a multi-purpose circulation element that carries pedestrians, bicycles, service and emergency vehicles. It should be 20-25 feet wide curb to curb.
6. Disengage from the existing storm sewers and become an ecological conduit for managing stormwater from adjacent buildings and sites to the Eco-Commons.

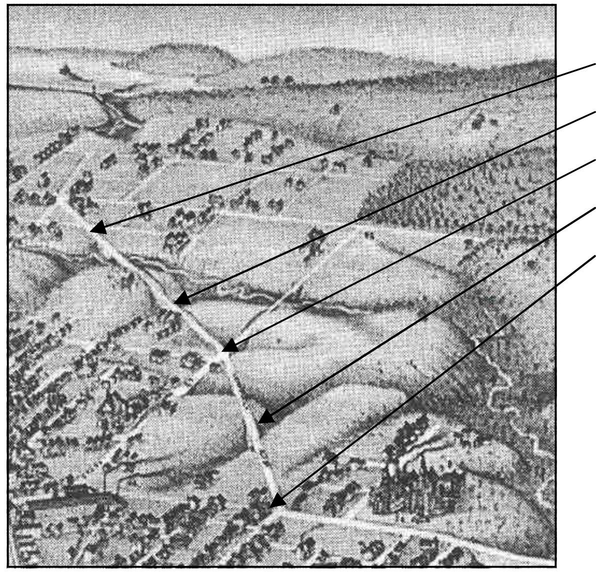


Figure 5-37: 1892 Aerial Drawing showing Tech Tower in lower right and Hemphill running diagonally to upper left.

Five Important Points on Hemphill:

1. Hemphill at Tenth Street
2. Hemphill at Eco-Commons
3. Hemphill at highpoint intersection with State Street
4. Hemphill at Student Center
5. Hemphill at North Avenue

5.10.1 <u>Hemphill Corridor from Proposed Techwood Drive (North Avenue) to State Street:</u>

The point where Hemphill meets the proposed realignment of Tech Parkway and intersects the end of the Plum Street Corridor, is a powerful gateway into the campus and should be intentionally marked as a landmark space. Cars turning off North Avenue onto Techwood should look directly through it like a window into a classic collegiate landscape of lawn, trees and enclosing buildings. Pedestrians at this point should have multiple walkway choices for campus destinations. The corridor follows the line of large oaks that were planted along the historic avenue, which is marked by wide pavement with granite curbing. (Figure 5-38) It goes through the heart of campus under an almost continuous tree canopy. Where Hemphill crosses major pathways, such as the Bobby Dodd Corridor, its pavement should expand to accommodate and encourage human interaction— stopping, meeting, changing direction and passing through. Widening should be proportional to the importance of the intersection. Northwest of the Student

Center and Tech Green, the corridor rises to a summit, where it intersects the State Street Corridor.

Requirements:

- 22-foot brick pavement with split-face granite curbs.
- Lampposts 40 feet apart.
- Benches parallel and in front of curb in groups of no less than 4.
- Localized stormwater collection under walkway that picks up adjacent areas and transfers it to a destination in the Eco-Commons Basin-B.
- Add minor walks as required, but always in straight sections (no curves).
- In this area along Hemphill, the ground plane should be greatly simplified, so that it is a true collegiate parkland—lawn and trees. In a collegiate center, people have to see lots of other people. (Figure 5-39)
- Remove most of the shrub understory for greater eye-level visibility.
- Replace most groundcover beds around trees with mulch.
- Add oak street trees planting 20-25 apart.
- Add a large number of mixed-age shade trees among existing mature trees for future canopy.
- Create a large porous-paved plaza space at the intersection of Bobby Dodd, Atlantic and Hemphill in front on the Student Center. It should be a community space under an almost continuous tree canopy. See Atlantic and Bobby Dodd Corridors for additional information.

Figure 5-38: A shaded walk that leads from North Avenue to the heart of campus should recall one of Atlanta's oldest streets with lampposts and granite curbs. The landscape it passes through should measure up to the best of classic collegiate settings— lawn, large trees and space-framing buildings. Left, the façade of a new building south of the Student Center reinforces the Hemphill corridor.

- A large paved terrace should be developed along the east side of the Ferst Center to allow easy handicap accessibility from Hemphill to the upper level of the Student Center. (Figure 5-40) It would also benefit theater and student center special events, intermissions and pre-event gatherings. Ferst Center modifications should create a front door status and façade to Hemphill.

5.10.2 <u>Hemphill Corridor at State Street Corridor</u>

On the hilltop where several pathways intersect there should be a piazza—where many people pass through in several directions while others meet and linger. (Figure 5-41)

Figure 5-39: The ground plane of the existing landscape should be greatly simplified, leaving a traditional collegiate area of large shade trees and lawn.

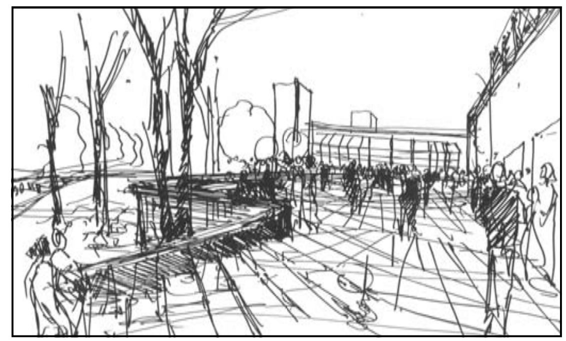


Figure 5-40: Proposed terrace on the east side of the Ferst Center overlooking Hemphill walk. The Student Center is in the background..

Requirements:

- The size of the piazza should be based on a formula that seeks to maintain sufficient human density for liveliness. Christopher Alexander suggests 150-300 square feet per person times the average number of people expected in the space.
- The ground plane must be uncluttered to

accommodate multiple directions, flows, ad hoc uses, special occasions, and use by service vehicles and bicycles.
- Around the edges there should be lots of places to perch alone or in groups.
- The space should be surrounded by shade trees so that there are always shady edges as well as sunny ones.
- A monument should be centrally located to terminate the axis of all walkways leading to the plaza and to provide interest to those in the space.
- Views south to the Atlanta skyline should be protected.

5.10.3 <u>Hemphill Corridor from State to Ferst Drive</u>

The continuity of Hemphill's pavement width and style should be maintained in this section, which is characterized by a continuous and relatively steep slope. Trees should form a complete overhead canopy. At its ends this section is visually anchored by a monument on the summit in the plaza and by a major pedestrian gateway at Ferst Drive. New buildings should be built along the eastern side of the corridor opposite MARC and MRDC buildings. The spatial corridor should be disciplined and relatively narrow. Planting areas should be filled with a multi-layered native woodland—canopy, understory, shrubs, and ferns. (Figure 5-42)

Requirements:
- 2 new street-defining buildings on east side of corridor should sit tight to the walkway.
- 60-80-foot corridor width from façade to opposing façade.
- 22-foot brick pavement with granite curbs or swaled gutters.
- Street trees 20 feet apart, except where buildings abut the walk.
- Major pedestrian gateway at Hemphill and Ferst. (Figure 5-43)
- Establish east-west walkway (former 5th St.) from Hemphill to State and Atlantic.
- Drop inlets for stormwater collection to be managed under the pavement with infiltration and detention boxes, and ultimate transfer to the Eco-Commons.
- Multi-purpose walkway should be very street-like.
- Landscape verges should be multi-layered native woodland (not horticultural).
- The east-facing curved walls of MRDC should be covered with vines.

Figure 5-41: View North of Hemphill reaching the hilltop plaza, where it intersects State Street and the east-west walk leading to the Manufacturing quadrangle.

Figure 5-42: Proposed view north down Hemphill from its summit to Ferst Drive. Hemphill should pinch down between MRDC (on left) and new buildings opposite.

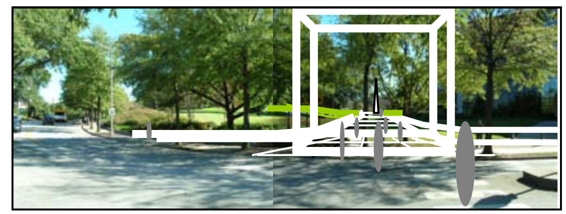


Figure 5-43: A major pedestrian gateway into the academic core should be created where Hemphill meets Ferst.

5.10.4 <u>Hemphill Corridor from Ferst to Tenth</u>

This section of the Hemphill Corridor is the principal vehicular entrance to campus in the northwest sector. It leads through the west housing area, bisects the Eco-Commons and terminates at Ferst. At the intersection of Ferst and Hemphill motorized traffic heading south on the corridor terminates, but historic

Hemphill continues, which is a fitting change of mode given that Hemphill predated the automobile. At Tenth Hemphill is an important community interface between Tech and Homepark, which can be expected to redevelop and intensify as a very desirable mixed use area. From this vantage there is a dramatic vista of the Atlanta skyline. (Figure 6-44)

Requirements:

- Hemphill should be a divided parkway with trees down the middle and on each side.
- The entrance to campus at Tenth Street should be marked with monument, signage, and threshold paving to give a strong sense of arrival. (Figure 5-45)
- Preserve the vista of the Atlanta skyline. (Figure 5-44)
- As part of the entrance statement, the front yard of the Paper Research building should be configured into a small community park where off-campus and on-campus residents in this area can meet.
- The Hemphill frontage of Paper Research should be converted from lawn to woodland.
- Where Hemphill bisects the Eco-Commons , there should be views into this park landscape on both sides. At Eighth Street there should be a view of the pond on the west.
- At Ferst there should be a pedestrian gateway of appropriate scale to terminate the visual axis from Tenth Street.
- The Hemphill-Ferst intersection should be configured into a formal urban intersection with brick paved crosswalks.

5.11 PLUM CORRIDOR

Plum Street is one of the original city streets on campus. Today its street functions are gone, but its orthogonal footprint is still visible. From its southern end at the proposed realignment of Tech Parkway to its northern terminus at Ferst Drive by the Klaus Building Plum is proposed to be a multi-purpose, service lane and walkway corridor.

Overall Corridor Objectives:

1. Over its length it should express its historic orthogonal geometry and continuity—its “streetness.”
2. It should be one of the principal bikeways into the core quadrangle with associated facilities, including bicycle parking.
3. It should be a vital service corridor within the academic core, but not look like a backdoor alley.
4. From Fourth Street north it should accommodate handicap services and special permit parking.
5. It should receive and transfer stormwater from adjacent buildings and areas to Basin -B of the Eco-Commons.

5.11.1 <u>Plum Corridor from Tech Parkway to Fourth</u>

- Multi-purpose walkway 15-foot wide with granite curbs.

Figure 5-44: The commanding view into the campus should be an essential part of the Hemphill entrance to campus.

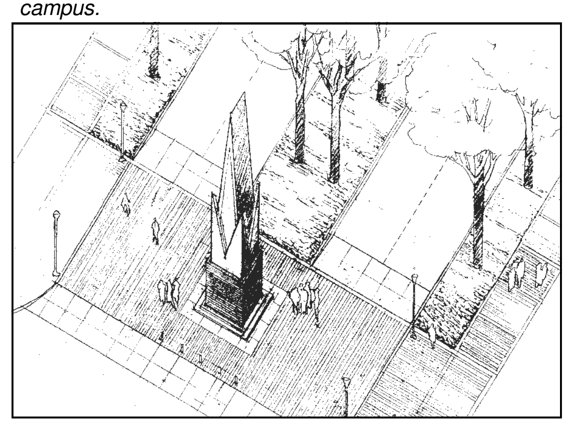


Figure 5-45: Hemphill at Tenth is a primary street entrance to campus and should be marked accordingly.

- Paving should be consistent along this section, but may be any of the paving types that incorporate brick.
- Lampposts 40 feet apart
- Benches in groups of four, as needed.
- The walkway should serve as the boundary between woodland plant community on the east and parkland on the west.
- Street trees.

5.11.2 Plum Corridor from Fourth to Ferst

- Controlled access at Fourth Street for service and special needs.
- Simple urban intersection at Ferst, with crosswalk to Biomedical Building.
- Major bicycle corral, roofed and with lockers, near the School of Architecture. See guidelines on bicycles.
- East-west grid connections to Atlantic.
- Curbed service lane paved with porous paving blocks.
- Transfer stormwater to Eco-Commons Basin-B.
- 10-foot sidewalks all of one treatment, but can be any of the paving types.
- Street trees at 20-30 feet apart.
- Lampposts at 40 feet apart.

5.12 STATE STREET

State Street is one of the original streets on the Tech campus, but much of it has been emasculated by a mishmash of parking lots south of Ferst Drive. It currently provides a secondary vehicular entrance to the campus from Tenth Street, but because of its connection to Atlantic Station, its use can be expected to increase. South of Ferst Drive it has a vital role to play in providing a service, pedestrian and bicycle corridor into the academic core.

Overall Corridor Objectives:

1. Provide a secondary vehicular entrance to the campus that will especially be used by vehicles involved in the daily operation of Georgia Tech—staff, deliveries, and routine business. It is not a primary visitor entrance, but may ultimately become a transit route to and from Atlantic Station.
2. Reinstate the historical footprint of State Street south of Ferst to its intersection with Hemphill as a multi-purpose corridor.
3. Develop State Street into a primary bicycle route into the campus. (This route is part of the PATH Foundation plan for Atlanta.)

Requirements:

- The intersection at Tenth Street should be treated as a *Secondary Street Entrance.*
- From Ninth St. to Ferst Drive, planting beds should be planted with natural plant communities because this area is part of the Eco-Commons.
- At Ferst there should be a purposeful but sedate entrance to the academic core for pedestrians, bicyclists, and service vehicles. (Figure 5-48) This entrance should provide a visual terminus for the public vehicular street.
- South of Ferst, State Street should be reinstated with street-like geometry and elements.
- Street trees 20-30 feet apart.
- 10-foot wide sidewalks.
- Lampposts 40 feet apart.
- 16-foot wide curbed service/bike lane paved with gray concrete unit porous paving.
- New buildings south of Ferst should have public entrances on State.
- Corridor shall collect, manage and transfer stormwater to Basin-A of the Eco-Commons.
- Bicycle route signage.
- Bicycle storage racks adjacent to service lane.
- Bollards for control of vehicular traffic south of Ferst Drive.

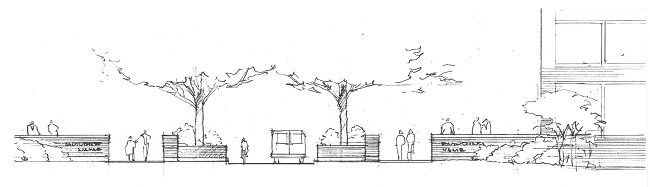


Figure 5-46: State Street Entrance into the Academic

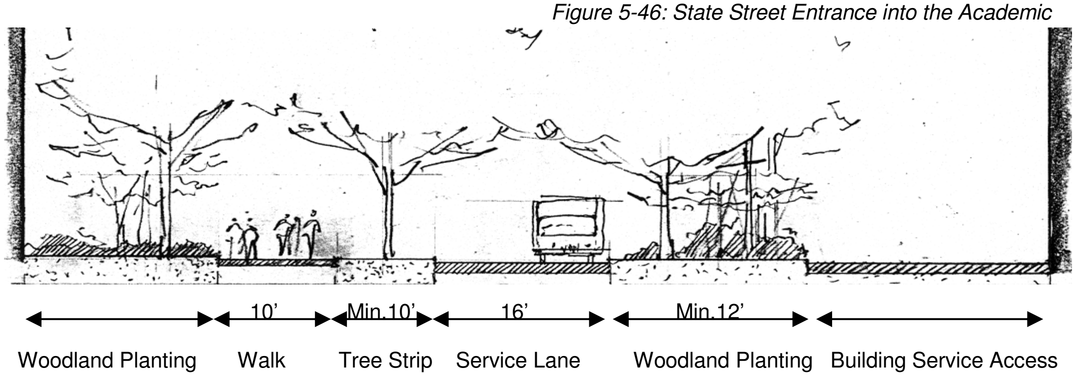


Figure 5-47: Typical Section of State Street Corridor south of Ferst Drive.

5.13 MARIETTA CORRIDOR

According to the *Campus Master Plan Update, 2004* the Marietta Corridor will become Georgia Tech's front door to the south with many new buildings and facilities stretched along its frontage. Georgia Tech will share Marietta Street with the City of Atlanta and along this corridor there will be an intermingling of its buildings with those of others. Georgia Tech will take the leadership in creating this new urban corridor.

Overall Corridor Objectives:

1. Create a new urban street that gives Georgia Tech a strong frontage and exposure to the City of Atlanta, in much the same way the development of Tech Square has.
2. Express Georgia Tech's place-maker signatures with emphasis on *City* and *Technology*.
3. Create a major vehicular and pedestrian entrance to Georgia Tech.
4. Be mindful that Marietta is the top of the campus's watershed and act accordingly.

5.13.1 Marietta Corridor from North Avenue to Ferst

From downtown this section of Marietta Street is the point of arrival to Georgia Tech.
Requirements:

- At the North Avenue Overpass locate a Georgia Institute of Technology sign (not a monument, however) to announce the campus.
- Create a stately and unified streetscape similar to what is seen in the Federal district of Washington D.C.
- Buildings along this frontage should be set back 50 feet from the curb and line up to form a strong architectural edge.
- At the building set back line paces between buildings should be marked off with low walls or metal picket fences.
- A 10-foot wide walkway set well back from the curb with rows of large trees on both sides.
- Building entrances should address Marietta formally and their front yards should be defined by a continuous, mid-height metal fence on a masonry base with low piers at each walkway entrance.
- Building names should be mounted perpendicular to the sidewalk to be easily seen by the passing public.
- Walkway entrances to the campus that are not associated with streets or drives should be marked with masonry piers.
- The intersections of Tech Parkway and Ferst Drive should be architecturally framed by flanking buildings.
- Techwood Drive and Ferst Drive should intersect Marietta with planted medians.
- Major campus entrance with appropriately scaled vertical element at Ferst Drive.
- Street lighting should be provided by City of Atlanta. The sidewalk should be lighted with Georgia Tech lampposts.
- There should be some restrained façade lighting or repetitive architectural lighting accents along the entire frontage to give night time unity and additional illumination.

5.13.2 Marietta Street Frontage: Ferst Drive to Northside Drive

Along this section, there are variety of proposed buildings and facilities, including a sports venue. On the opposite side of Marietta from campus, private businesses and residences will face the street. Together they should create a memorable urban streetscape.
Requirements:

- Provide an architectural variety of buildings to form a wall to the street set 20' back from the curb.
- Facades should rise directly from the back of the sidewalk pavement with lots of window and portal openings, awnings, etc. On the Tech side of Marietta it is not retail frontage, but it should share some of the same architectural and streetscape characteristics.
- Street trees set in a continuous tree planting strip that have porous pavers.
- The street should be lighted with City of Atlanta poles and lights.
- The sidewalk should have Georgia Tech lampposts.
- Unified street furnishings, which could be a unique design for this frontage.
- The buildings should offer some architectural lighting that emulates the spill-light and random light-patterning of an urban street front.

5.14 NORTH AVENUE CORRIDOR

When Georgia Tech was founded in 1886, North Avenue was on the edge of the City of Atlanta. Beyond it lay the countryside. Today it remains the Institute's historical address and for many it remains its front door, because of Tech Tower and Bobby Dodd Stadium. Today it is also a busy urban street that connects Georgia Tech to Mid-town Atlanta - with traffic, pedestrians, and urban problems too. As Tech expands southward, North Avenue is no longer the edge of campus.

Objectives:

1. Make North Avenue a gateway corridor to Georgia Tech that feels like it is passing through the campus.
2. Create a unified streetscape that is safe and attractive for pedestrians on a daily basis and for special events.
3. Make North Avenue a vital link to Midtown.
4. Preserve and enhance the historic district.

Requirements:

1. Treat the eastern end of North Avenue as a Primary Street Entrance *(Section 5.18 Campus Perimeter and Entrances).*
2. Establish a unified streetscape:
– Street Trees *(Section 6.2.9 Street Trees)*
– Type-4 Pedestrian Walkway *(Section 6.3.1 Circulation Types).*
– Type-B Pavement: Brick with Brick Bands or Type-C Pavement: Concrete with Brick Bands *(Section 6.3.2 Pavement Types).*
– City of Atlanta Street Lights.
– GT Traditional Lampposts *(Section 6.3.8 Outdoor Lighting)*
3. Open up view into the Tech Tower Quad. *(Figure 5-47). Conform to Historic Preservation Best Practices.*
4. Keep existing arched entrance to quad.
5. Refine the small parking area at Tech Tower:
– Type-F Paving: Open joint concrete paver with granite curb *(Section 6.3.2 Pavement Types)*
– Brick piers at entrance.
6. Treat Cherry Street as a Minor Campus Entrance *(Section 5.18 Campus Perimeter and Entrances)* Remove Georgia Tech sign at Cherry Street and replace it with a simple sign incorporated into brick entrance piers.

Figure 5-48: Historic postcard of Georgia Tech and North Avenue.

5.15 NORTHSIDE CORRIDOR

Northside Drive forms the western edge of the campus. Along Northside Drive one looks up to the campus, which sits above the street. Existing conditions are in a transitional, moderately blighted state, but this will change as this area redevelops.

Overall Corridor Design Objectives:

1. Provide a unified, secure and recognizable frontage for the campus—an enclosed campus with buildings in a park-like setting.
2. This frontage should be attractive, but not look like Georgia Tech's front door.
3. Provide comfortable pedestrian movement along Northside, including sidewalks and street trees.
4. Allow for future pedestrian movement from the existing campus to new land uses on the west side of Northside Drive.

Requirements:

- Along this entire frontage there should be a tall metal picket fence with intermittent brick piers (modeled on those at the stadium on North Avenue).
- An 8-foot concrete sidewalk with brick bands.
- Street trees in a 10 foot-wide grass strip between curb and sidewalk.
- A secure pedestrian entrance and a transit stop as necessary, should be established by the future tennis center.
- The intersection of Northside Avenue and Eighth Street should be marked as a *Minor Street Entrance*.
- Accommodate a future walkway connection between the existing campus and future development on the west side of Northside Drive.
- Proposed residential buildings between Eighth and Tenth Streets should have entrances on Northside.
- A major Georgia Institute of Technology sign integrated into the perimeter wall and fencing should occupy the southeast corner of the intersection of Northside Drive and Tenth Street.
- Georgia Tech lampposts should light the sidewalk.
- The street should be lighted by City of Atlanta street lights.
- Transit pull-offs and shelters as needed.

5.16 TECH PARKWAY (proposed)

Tech Parkway, along with Marietta Street, shall be the new curb address of the north campus.

Overall Corridor Objectives:

1. Create a front door sense of arrival for Georgia Tech visitors.
2. Create a sophisticated urban parkway with on-street parking and a wide, tree-filled median.
3. Express Georgia Tech's place-making signatures with emphasis on *Collegiate Life, City,* and *Technology*.
4. Use multiple buildings to form an urban façade with an active urban sidewalk environment.
5. Develop a compelling "window" into a traditional collegiate quadrangle setting along the Hemphill Corridor.
6. Establish urban design connection to the Coca Cola Building and the park in front of it.

Requirements:

- Building entrances and canopies should address the parkway
- At the intersection of the Hemphill corridor there should be a long view into the campus past a monument of some significance. This is Tech's curbside "collegiate" view. Visitor parking can be provided near this spot behind the building setback line.
- From Hemphill to Marietta the north side of the corridor should be defined by an almost continuous building façade line set back 30' from the curb.
- Facades should have lots of ground level openings to contribute to the interest and liveliness of the sidewalk.
- Cars on Tech Parkway should be able to see people inside the buildings. At night light should spill out onto the sidewalk.
- Spaces between buildings should meet the setback line with garden walls or metal picket fences, which is also the case for the front yards of existing buildings from North Avenue to Hemphill.
- Driveway and walkway entrances into the campus from Tech Parkway should be

marked with masonry piers to read as private streets and walks.
- On-street parking.
- Transit stop pull-off.
- Passenger drop-offs associated with major building entrance(s).
- 10-foot wide sidewalk with unified sidewalk paving—brick or brick and concrete paving.
- Street trees in continous tree strip (may have porous pavers over).
- Georgia Tech lampposts 40 feet apart.
- The street should be illuminated by City of Atlanta poles and fixtures.
- At the intersections with Marietta and North Avenue, provide brick threshold (crosswalk) paving across the street and way-finding signage.

5.17 TENTH STREET CORRIDOR

The Tenth Street Corridor forms the northern boundary of the campus (with the exception of the Graduate Living Center). At its eastern end it is the point of arrival to the campus for vehicles from 75/85 and Midtown. At its west end is Northside Drive. In between it passes through Homepark. With the completion of Atlantic Station, Tenth Street has become an increasingly important campus frontage with principal points of entry at Fowler, Atlantic, State , and Hemphill. West of the Graduate Living Center, the corridor takes on the flavor of Home Park with its mix of housing, large trees, and on the Tech side large freestanding office-institutional buildings. The principal cross street in this section is State Street, which will provide an important connection to Atlantic Station. At Hemphill Avenue, Tenth Street reaches a summit overlooking the campus. At the Hemphill intersection there are retail and mixed uses, which can be expected to intensify. From Hemphill Tenth drops descends to its intersection with Northside Drive.

Overall Corridor Design Objectives:

1. Create a front door presentation for the campus with clear way-finding legibility.
2. Express Georgia Tech's four place-making signatures: *Technology*, *Ecology*, *Collegiate Life* and *City*.
3. Create a corridor environment and frontage that are compatible with Homepark, Tech's only residential neighborhood.

5.17.1 <u>Tenth Corridor from 75/85 to Atlantic</u>

The eastern end of this section is dominated by large stand alone buildings set well back from the street, such as the coliseum and corporate buildings of the Turner Center. The presentation of the campus at this end of Tenth is shaped by these elements plus a proposed pond that is part of the Eco-Commons, the existing woods of the Glade, and the massive granite retaining wall at the President's Residence. (Figure 5-50)

Requirements:

- 8-foot wide Georgia Tech sidewalk—concrete with brick banding.
- City of Atlanta street lights.
- Georgia Tech Lampposts 40 feet apart.
- Low granite rubble wall (both retaining and freestanding) with a metal picket fence on top, a few feet of groundcover in front, and woodland planting behind. This frontage should say, "technology in a park".
- Use of granite rubble to blend with the granite wall along the frontage of the President's residence.
- No street trees, but tree canopy should arch over the sidewalk from the behind the wall/fence at the back of the sidewalk
- *Primary Vehicular Entrance* treatment of Fowler intersection. Walls and a paved threshold shall be granite rubble to blend with the existing walls of the President's Residence.
- Pedestrian entrance to the Glade should be designed to accommodate pedestrians with a gate wide enough for service vehicles. Overall character shall be that of an understated estate drive. This will match the feel of the wide gravel walk inside the Glade.
- Retain the wall and driveway entrance in front of the President's house. (Figure 5-50)

5.17.2 <u>Tenth Corridor from Atlantic to Hemphill</u>

Heading west from the southeast corner of Atlantic there are several proposed research oriented buildings that will join some existing institutional buildings. On the opposite side of Tenth are houses and apartments of Homepark.

Requirements:

- A new curbline should be set on the south side of the street and a new cross section established which includes a 10-foot wide street tree strip, 8-foot sidewalk, and 15-foot building setback from back of side-walk. (Figure 5-51)
- Street trees at 20-30 feet apart.
- New buildings should have active, people-friendly fronts on the sidewalk.
- Planting areas in front of buildings should have a raised curb to separate them from the sidewalk. (Figure 5-51)
- Where transit waiting areas are situated in front of future buildings, they should be designed as part of the new building.
- Where existing buildings are setback from sidewalk, such as Advance Technology Development Center, their front yards should be articulated with site walls within 15 feet of the back of the sidewalk.
- The GT chiller plant should be screened from the street by a tall metal picket fence with dense planting behind it.
- Entrance walks to buildings with front yards should be marked by low piers.
- The intersection with Atlantic Drive should receive a *Primary Pedestrian Gateway* to give a strong sense of entering the cam-pus.
- State Street should be marked as a *Secondary Campus Street Entrance* with masonry piers like those at Fowler.
- Dalney Street and minor drives all the way to Northside Drive should be necked down and flanked as *Minor Street Entrances*.

5.17.3 <u>Tenth Corridor at Hemphill</u>

The total streetscape of the summit should be designed as a whole to express a mixing of collegiate and community life.
Requirements:

- The Hemphill campus entrance should be developed as a *Primary Street Entrance.*
- The intersection should have well-defined crosswalks.
- A small neighborhood green park should be developed in front of the Institute of Paper Sciences.
- On the southeast corner there should be a transit stop and shelter for City and cam-pus buses.
- 8-foot concrete sidewalk with brick bands.
- Lampposts 40 feet apart
- Street Trees

5.17.4 <u>Tenth Corridor from Hemphill to Northside</u>

Along this steeply sloping section of the corridor there are several proposed GT residential buildings.
Requirements:

- 8-foot concrete sidewalk with brick bands set back from street 10 feet to accommodate street trees planted at 20-25' apart.
- A tall metal picket should run along the back of the sidewalk.
- Brick masonry wall at the corner of Northside Drive that bears the Georgia Tech sign.
- Treat driveway entrances in this section treated as minor entrances.

Figure 5-49: 10th Street looking east.

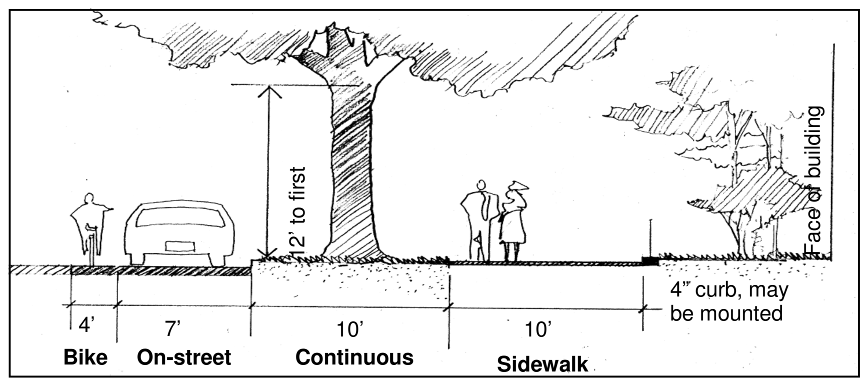


Figure 5-50: Proposed section of south side of corridor looking east.

5.18 CAMPUS PERIMETER AND ENTRANCES

The campus perimeter and entrances represent Georgia Tech's curb address and its face to the passing public. They should convey the sense of a campus and provide arrival and entrance to Georgia Tech. There are five corridors that form the interface between the campus and the city.

- Marietta Street
- North Avenue
- Northside Drive
- Tech Parkway
- Tenth Street

Objectives:

1. To visually define the perimeter of campus along North Avenue, Tech Parkway, Marietta Street, Northside Drive, and Tenth Street.
2. To enhance Georgia Tech's curb presentation in a way that express unique attributes - *technology, ecology, collegiate life, and city.*
3. To mark the important entrances from the city into the campus for both cars and people and contribute to the sense of arrival.

5.18.1 Perimeter Treatment

The treatment of the perimeter should be appropriate to different frontage sections, but contain materials and forms that promote overall unity – a family resemblance.

- Perimeter treatments of both horizontal and vertical surfaces should be visually consistent for meaningful lengths.
- Sidewalk paving should be one of the Georgia Tech standards that incorporates brick—all brick, or brick banding.
- Paving type should be allocated to entire frontage corridors, but may upgrade for special areas.
  - Marietta Street: Concrete Paving with Brick Bands
  - North Avenue: Concrete Paving with Brick Band
  - Northside Drive: Concrete Paving with Brick Bands
  - Tech Parkway: Brick Paving with Brick Band
  - Tenth Street: Concrete Paving with Brick Bands
- There should be a visual edge at the back of the sidewalk, such as a wall, curb, fence or building façade. The following types may be used:
  - Curb
  - Low metal picket fence - 3' to 5' high on granite base
  - High metal fence - 8' -10' high on granite base.
  - Low masonry wall -3' to 5' high
  - High masonry wall - 6'-10' high
- Materials:
  - Walls should be granite rubble or brick with limestone coping.
  - Curbs should be granite.
  - Fencing should be heavy vertical steel pickets with a masonry base and piers.
- Buildings that rise from the back of the sidewalk should be appropriately designed for a public sidewalk environment—no service entrances or blank walls.

5.18.2 Campus Entrances

There are three kinds of entrances into the campus.

- Street Entrances - for vehicles and pedestrians.
- Pedestrian Gateways - for pedestrians and bicycles only.
- Service entrances

Street entrances and pedestrian gateways should be designed as threshold experiences to produce a tangible sensation of arrival. Service entrances should be unmarked except for minor signage.

- There should be a hierarchy of entrances to the campus from major to minor.
- Each entrance or gateway should be appropriate to its importance and context, while maintaining a family resemblance to one another—balancing individual expression with the unity of the campus.
- Some entrances may be stand-alone monuments or piers, while others may be incorporated with adjacent buildings.
- Typical materials should be granite, brick, limestone or precast concrete, and metal pickets. Other materials may be considered on a case by case basis.

Primary Street Entrances

- Primary entrances should be significant urban design focal points.

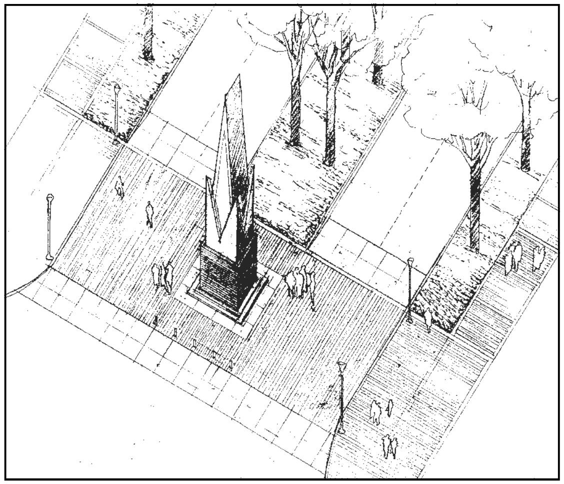


Figure 5-51: Example of a Primary Street Entrance.

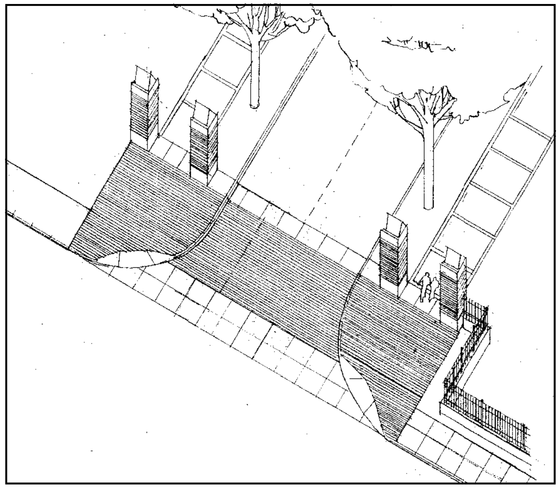


Figure 5-52: Example of a Secondary Street Entrance.

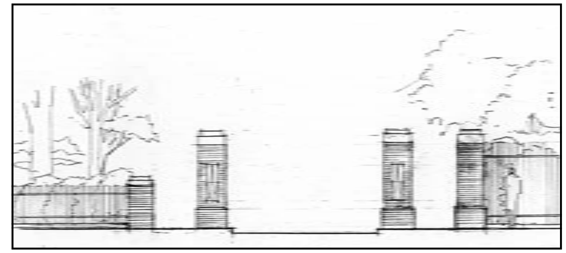


Figure 5-53: Example of a Minor Street Entrance.

- Fifth at Tech Square - while not a single point, a threshold experience should be provided by the architectural composition of the Tech Square development itself from West Peachtree Street to and including the bridge over 75/85.
- Tech Parkway - the entire parkway, as proposed in the *Campus Master Plan Update, 2004* will function as a street entrance. (See Tech Parkway Corridor)
- *Ferst at Marietta* - a major vertical object (traditional or modern in design in any range of materials) of sufficient scale to work with adjacent buildings should be located in the median of Ferst. There should be threshold paving and formal street tree plantings. (Figure 5-52) (See Ferst-Fifth Corridor)

Primary Pedestrian Gateways

- Atlantic at Tenth Street - an arch or similar element should serve as visual terminus to Atlantic and give a strong sense of a portal. It should work with flanking buildings, the character of Homepark, and the requirements for emergency and service vehicle access. (Figure 5-55)
- *Third at I-75/85* - This underpass should be transformed into a signature experience, emphasizing *Technology* and *City*. It should be well-lighted and safe.
- Fowler at North Avenue - Existing archway.
- Hemphill at Tech Parkway - This entrance is situated at the end of a long vista down the Hemphill corridor to Tech Green. The view should be classically collegiate. A vertical monument visible from North Avenue and Tech Parkway should be centered in the Hemphill corridor.

Secondary Street Entrances

While termed 'secondary', these entrances require bold treatment to convey the sense of a threshold to an arriving automobile. These entrances are located at:

- Hemphill at Tenth
- Fowler at Tenth
- State at Tenth Street
- Techwood at North Avenue

Use the elements indicated in the drawing to compose specific entrances. (Figure 5-53)

- 12-14 foot tall piers with granite or limestone base, brick shaft, and limestone capital. Piers should be patterned on those at the stadium on North Avenue.
- GT signage and street name on piers.
- Piers flank sidewalks to emphasize pedestrians.
- Various wall/fence/building conditions join piers.
- Brick pavement across street with wide concrete bands to create campus threshold.

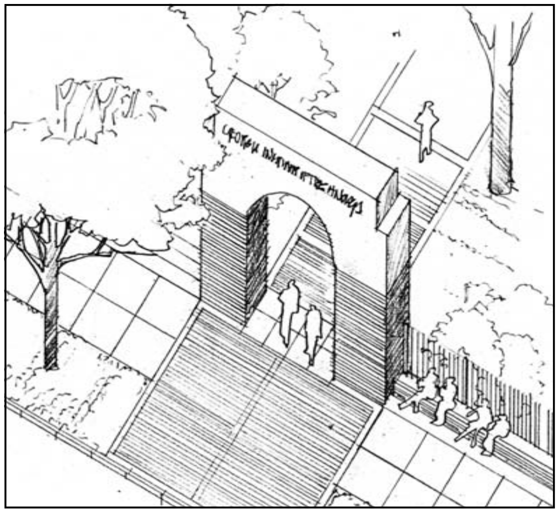


Figure 5-54: Example of a Primary Pedestrian Gateway at Atlantic and Tenth.

– Should be site-specifically designed.

Minor Drive Entrances

These entrances lead into the campus but should be expressed more like a private drive than a public street. They are located at:

- Cherry at North Avenue
- Eighth at Northside Drive
- Minor Streets off Tenth

Use the elements indicated in the drawing to compose specific entrances. (Figure 5-55)

– 8-10' brick piers flank street at curb with limestone caps and GT sign.

– Secondary brick piers (tall or short) at back of sidewalk to frame pedestrian entrance.

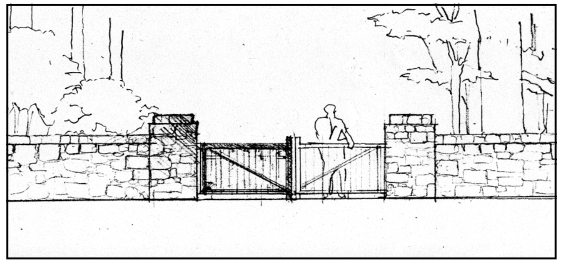


Figure 5-55: Example of a Secondary Pedestrian Gateway into the Glade from Tenth.

– Secondary signs posting restricted access.

– Various wall/fence/building conditions can adjoin piers.

– Should be site-specifically designed.

Secondary Pedestrian Gateways

These gateways are located where walkways pass through perimeter walls or fences.

– The Glade at Tenth - The entrance into the Glade should be designed to accommodate pedestrians with a gate wide enough to be opened for service vehicles. Walls should be granite rubble to blend with the existing retaining walls of the President's residence. (Figure 5-56) Design character should be like an estate drive. Discrete signage may be affixed to one of the piers.

– Various locations between proposed buildings on Tech Parkway - Low brick and masonry piers should tie to buildings and or site walls and fences.

6. GUIDELINES & STANDARDS

TABLE OF CONTENTS

6.1 EARTHWORK & WATER GUIDELINES AND STANDARDS

Physiography and hydrology are the armature of Georgia Tech's ecological landscape. The interface of surface and subsurface conditions underlies the concept of the Eco-Commons. (Figure 6-1) and holds the potential to sustain campus open space and development by the preservation or mimicry of natural systems.

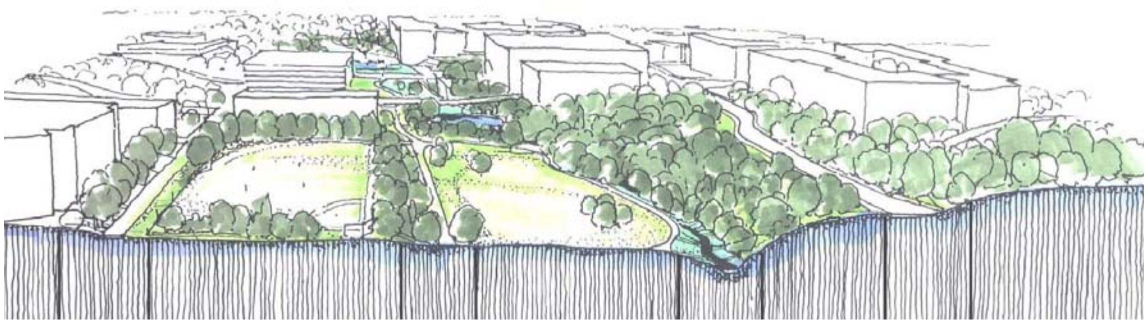


Figure 6-1: Illustrative section of the Eco-Commons in the NE Quadrant of campus, emphasizing the interplay of landform, soils and water.

Natural Drainage System

- *The campus is composed of 3 drainage basins. Basin A and B are at the top of a regional watershed which is Marietta Street.*
- *Georgia Tech can exert complete control over its surface hydrology and stormwater management in Basins A and B.*
- *Water flows north in a dendritic pattern of swales and bottomlands.*
- *All basins once had year-round flowing streams, which were buried by construction of the City of Atlanta combined sewer system and campus development.*
- *The sewer system follows the natural system and flows northward.*
- *The only surface water outlet for the campus is the sewer, which leaves the campus at the north end of Basin B.*
- *The goal is for the campus landscape to absorb 50% of the stormwater quantity that discharged into the sewer system in 2004.*

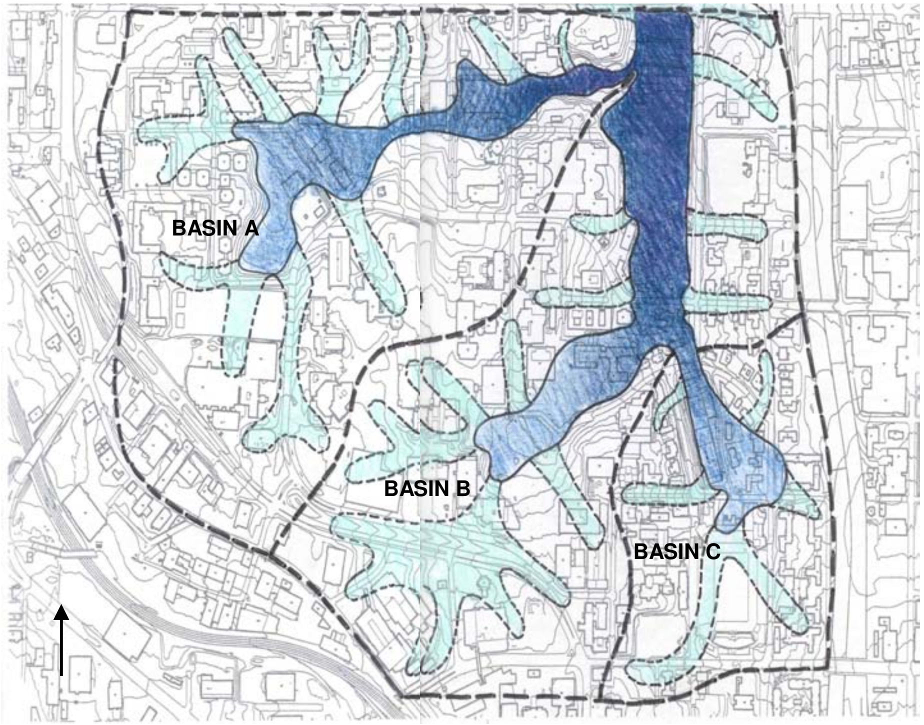


Figure 6-2: Watersheds of Georgia Tech's core campus. Dashed lines define watersheds. Blue tones indicate basin drainways, swales, and bottomlands.

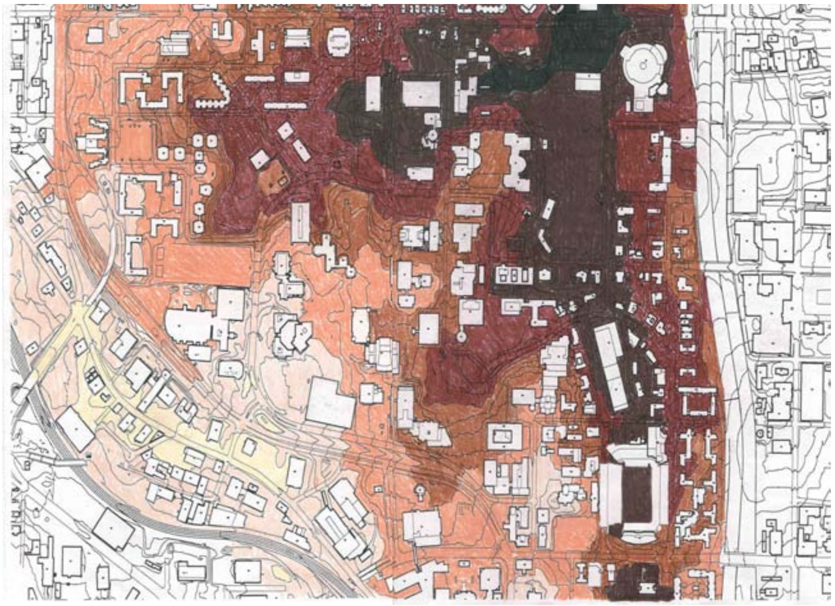


Figure 6-3: Elevation Map showing the topography of the Georgia Tech Campus. The lighter the color the higher the elevation.

Topography

- *The campus is a water-shaped landscape, typical of the Appalachian Piedmont.*
- *130 feet of vertical change.*
- *Marietta Street corridor is the high point.*
- *The Glade is the low point.*

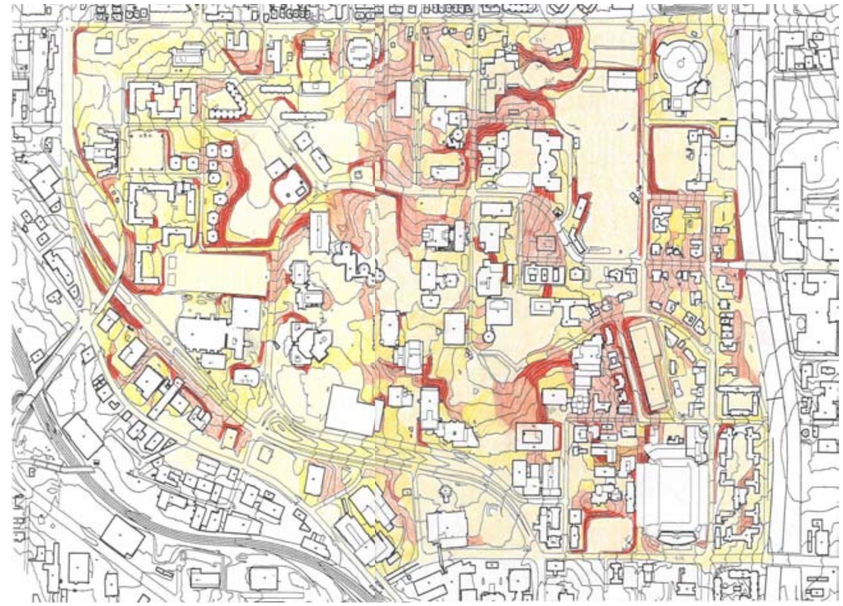


Figure 6-4: Slope Map showing the topography of the Georgia Tech Campus. The lighter the color the flatter the slope.

Slopes in the Landscape

- *RED slopes exceed 25% and strongly define landscape character. The slope on the west side of Peters Parking Deck is typical.*
- *DARK PINK slopes project a strong sense of sloping ground and are a challenge to handicapped mobility.*
- *YELLOW slopes are typically the maximum for easily accessible walk-ways.*

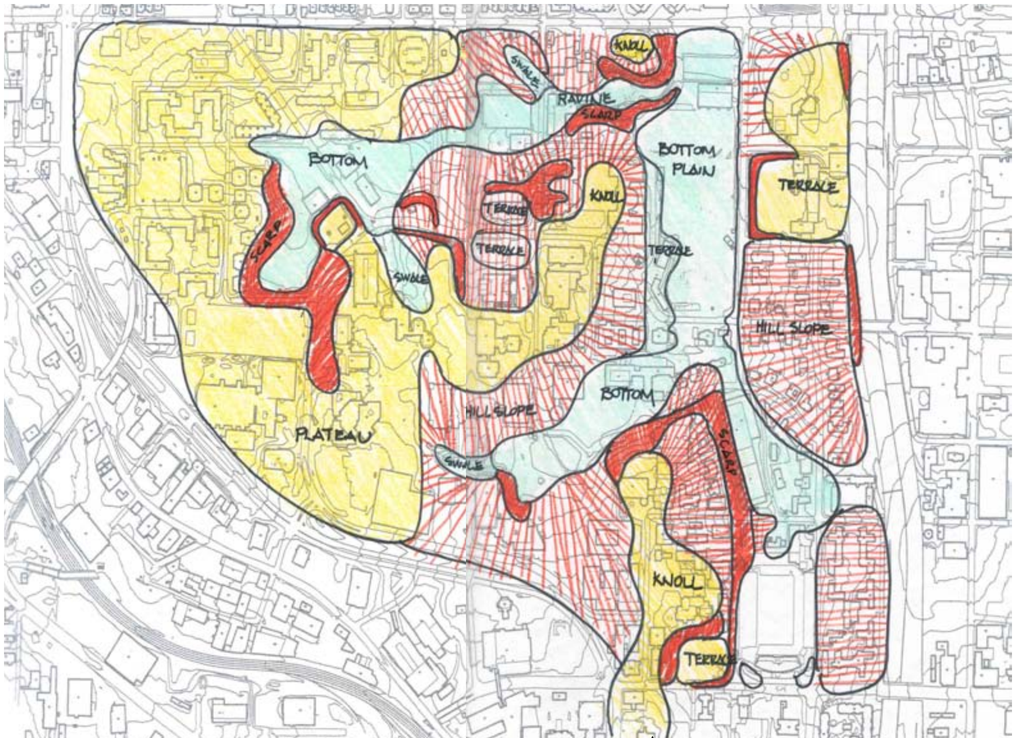


Figure 6-5: Landforms of the Georgia Tech Campus.

Landforms of the Campus

- *The campus is a dissected plateau with two bottom plains which are flanked by gentle hillslopes or steep scarps.*
- *There are 3 basic landforms: Plateau, Bottom, and Slope. They include smaller forms: Knoll, Terrace, Hillslope, Scarp, Ravine, and Swale.*
- *Tech was first sited on a knoll and the plateau and other uplands remain the most suitable areas for buildings.*
- *The bottomlands represent the core of the Eco-Commons and contain many athletic fields, including Bobby Dodd Stadium, the baseball field, track, and Couch Park.*

6.1.1 LANDFORM & GRADING

Objectives:

1. Preserve or restore a campus physiography that is based on the natural lay of the land.
2. Use project-related grading as an opportunity to enhance overall landscape performance and stormwater management.

Requirements:

1. Prepare a site grading plan for every design phase: Concept, Schematic, Design Development, and Construction Documents.
2. Site grading should be designed and executed in context of the overall topography, natural landforms and drainage of the campus. A project's grading should have continuity with the larger landscape.
3. Maximum slope shall be 1:1, but in areas associated with existing scarps and rock outcroppings slopes may be steeper .
4. Maximum slope for lawn areas shall be 3:1.
5. Control overland flow and encourage infiltration of stormwater into the soil.

6.1.2 SOIL DEVELOPMENT

Objectives

1. Enhance the capacity of existing soils to infiltrate precipitation runoff, retain moisture, and sustain robust vegetation.
2. Eliminate hauling in soil from off campus to replace campus soils for landscape development.
3. Utilize on-campus waste to improve soils, including inorganic material, such as gypsum, and composted organic material.

Typical soils on campus are sandy clays, classified as *Urban.* The are typically compacted, and lack structure and organic material, resulting in high runoff, low available-water, poor aeration, low infiltration and permeability rates, and low fertility.

Requirements:

1. Prepare a *Soil Protection and Improvement Plan* based on site-specific soil tests.
   - The plan shall be certified by a Certified Professional Soil Scientist (CPSS) by the *Soil Science Society of America* (https://www.soils.org/certifications).
   - The plan should specify actions to protect good site soil characteristics, and improve those that are not. - including structure, infiltration, permeability, and fertility.
2. Rehabilitate existing disturbed soils onsite or from on campus, instead of importing soil from off-campus. Where possible massively redevelop to a depth of 48" using sub-soiler and other equipment and techniques. Where compacted soils cannot be massively redeveloped, drill 12" diameter vertical cores 6' deep on a 3 meter grid. Figure 6-6
3. Treatment of disturbed soils should meet requirements on Chart 6-1.
4. Where possible utilize appropriate on-campus inorganic and organic waste materials in soil redevelopment.
5. Where possible, renovate compacted soils in undisturbed site areas.
6. Use structural soils for heavily used lawn areas.
7. Include the following CSI Master Format Specification sections in construction documents:

   Section 32-91-12 Soil Rehabilitation

   Section 32-91-13 Soil Preparation

REQUIRED SOIL STRUCTURE PERFORMANCE

Chart 6-1

SOIL LAYER	Infiltration	Permeabilty Rate
Surface to Depth of 12"	B Hydrologic Soil Group	2.0" - 6.0" /hour
Surface to Depth of 36"		0.6" - 2.0"/hour
Depth of 36" to 72"		0.6" - 2.0"/hour

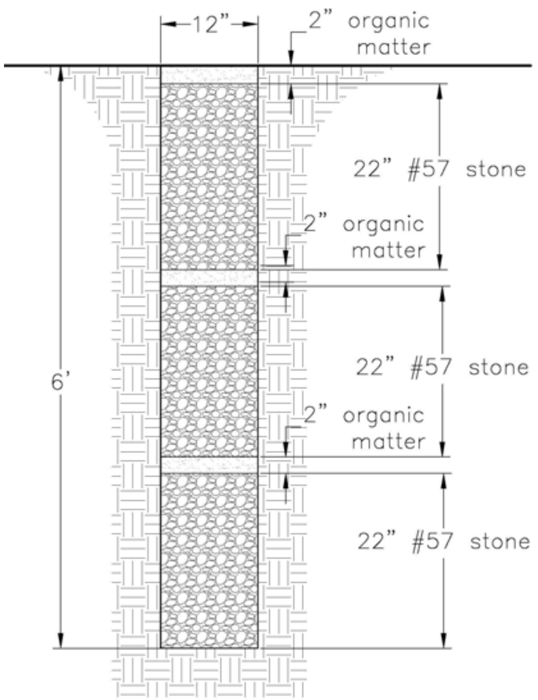


Figure 6-6: Vertical cores drilled into compacted soils can be part of a program to rehabilitate soils in situ This eco-mimics the rehabilitative effect of the shafts left by dead decomposing tap roots of Loblolly pine, which encourages deep air and water penetration and soil biota.

6.1.3 STORMWATER MANAGEMENT

Objectives:

1. Reduce the storm-water footprint of the campus to what it was in 1950 - reducing the amount of storm-water entering the Atlanta sewer system by 50 percent of 2004 levels.
2. Treat stormwater as a resource to sustain the campus and reduce the use of potable water for non-potable uses.
3. Manage stormwater on a campus-wide basis using an integrative watershed approach.
4. Manage campus stormwater by joining the capacity of the landscape - its topography, soils, and plants - with smart infrastructure that mimics the hydrology of a forested watershed. *Figure 6-7 : Campus Stormwater Goal*.
5. Replace direct flows of stormwater into the sewer system with cyclical flows that remain on campus.
6. Take advantage of localized collection and storage opportunities to capture large and small volumes (where feasible and cost effective) and to increase the time associated with stormwater runoff in low-to-medium volume storms, while maintaining overflow capacities for less frequent high volume storms to control flooding.
7. Develop innovative solutions that embrace infiltration, water harvesting, storage, non-potable water use, smart irrigation technology and stormwater reuse.
8. Collect empirical and experimental data for research and education.
9. Let the campus serve as a model for Atlanta and other campuses.

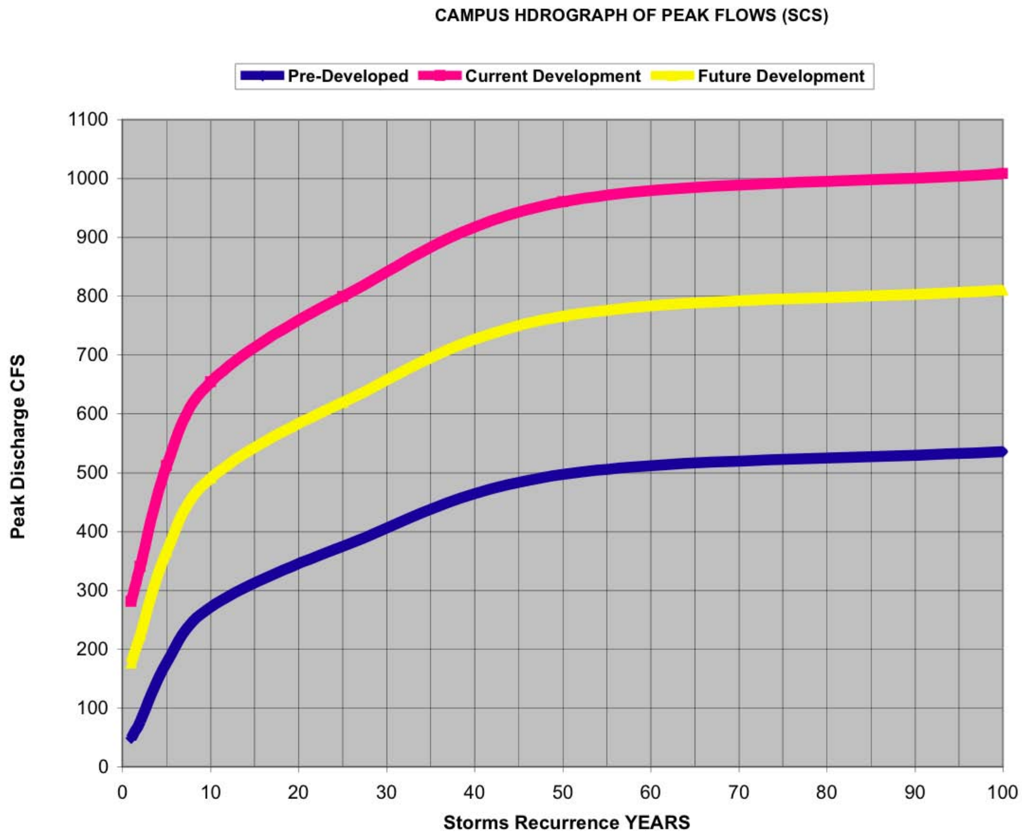


Figure 6-7: Campus Stormwater Goal. The yellow line on the graph (middle) indicates the goal that is achievable on the Georgia Tech campus by application of sustainable stormwater management. It is roughly 50% lower than the stormwater discharge from the campus in 2004 (labled Current Development) The lower line indicates the stormwater discharge at a pre-development state.

Requirements:

1. Establish project objectives, based on the stormwater management objectives of the Landscape Master Plan.
   - Volumetric Control and Rate Reduction (50% goal).
   - Soil Recharge and Delay of Runoff.
   - Water Harvesting and Reuse.
   - Water Quality.
   - Application of *Landscape Master Plan* principles (e.g. increase tree canopy coverage).

2. Identify project opportunities within basin context, identify constraints, and highlight limiting factors.
   - Storage Locations (cisterns, retention, detention).
   - Future Buildings (green building concepts).
   - Disconnection of immediate discharge to existing combined sewer system.
   - Surface water filtration and infiltration.
   - Subsurface retention and infiltration.
   - Innovative concepts.
   - Constraints.
   - Permitting (City of Atlanta, Georgia Stormwater Management)

3. Recommend a stormwater strategy and project area on the basis of the following determinations, as well as identified constraints. *Figure 6-9: Example of Hydrological Concept*
   - Collection - increase indirect routing of flows.
   - Storage Opportunities and Interconnections.
   - Redistribution/reuse.
   - Effect on stormwater runoff volumes and rates.
   - Condensate Collection.

4. Identify design elements to actualize recommended stormwater strategy.

5. Provide detailed hydrologic routing data through all components of stormwater management system, and resulting site discharge for 2-year to 100-year storms. Include data tabulations for percent reduction of site flow for all storms.

6. Provide detailed information on all components, including:
   - Onsite and offsite areas and sub-area acreages and runoff coefficients. Show in graphical and tabular formats.
   - Detention and retention volumes and tributary areas. Include cisterns, infiltration devices, etc.
   - Stormwater route diagrams of all stormwater flows. Include all onsite and offsite areas, as well as sub-areas such as rooftops, inlets, etc.

Stormwater Management Techniques

The requirements of stormwater management at Georgia Tech require an integrated approach and innovative techniques. Refer to <u>*Appendix A.7: Eco -Commons Phase One Plans*</u> to see examples of some techniques.

1. **Mimic Natural Systems** – Observe and mimic the pathway of rainfall in a natural environment – e.g. interception by vegetation, trunk flows, surface roughness, indirect overland flows, micro-diversion and detention, and infiltration. Nature's method is to "hold and cherish" water as gravity pulls it along - the opposite of what an efficient piping system does.
2. **Alternative Stormwater Transport Methods** – e.g. use of gravel-filled trenches along walkways to create a "capillary system" that absorbs stormwater after a rain event for slow subsurface flows and infiltration.
3. **Irregular Surface Swales** - i.e. not straight and smooth)
4. **Small Scale Surface Detention** – e.g. broad shallow depressions in a lawn that fill after a heavy rain and let it go within a few hours.

6. Subsurface Retention and Infiltration – e.g. a simple excavated pit filled with gravel can retain the water of a 2-year storm off of a roof. Over time the clay subsoil becomes increasingly permeable and water is absorbed. What is not absorbed has been detained before moving on to the next “stop” in a series of stormwater techniques.

7. **Green Building Concepts** – A whole range of techniques that come from letting a building act like a tree –interception, surface wetting, trunk flow, and evapo-transpiration. Only about 50% of an average summer rain hits the ground under a mature tree canopy - the rest is intercepted, entrained and evaporated by leaves and branches. What if the west-facing wall of a building, which bears the brunt of frontal storms in Atlanta, were given extra roughness to increase wettable area, retard surface flow and position wetness for evaporation by afternoon sun?

8. **Cisterns and Storage** – Any of a number of media to store harvested stormwater, including subterranean vaults, fabricated cellular storage, and above ground tanks.

9. **Multiple Components in Series** – Use any number of techniques in a series to enhance overall effectiveness by (a) increasing the lag-time between the rainfall event and its departure from a basin or sub-area and (b) by inter-relating flows, which also helps to efficiently utilize stored water for various purposes.

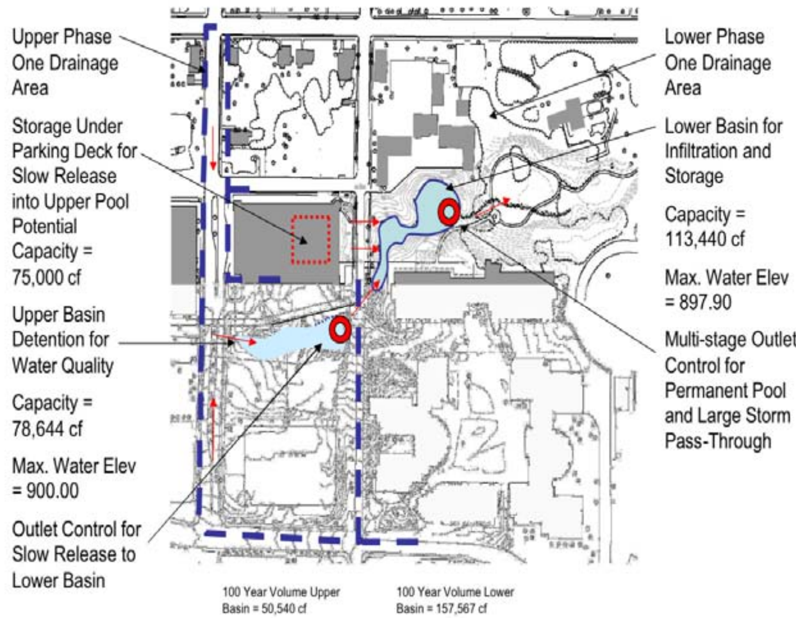


Figure 6-8: Example of a Hydrological Concept , which puts site specific stormwater ideas on the table early in the Concept Phase for review and integration with other parts of the design program, such as building and corridors.

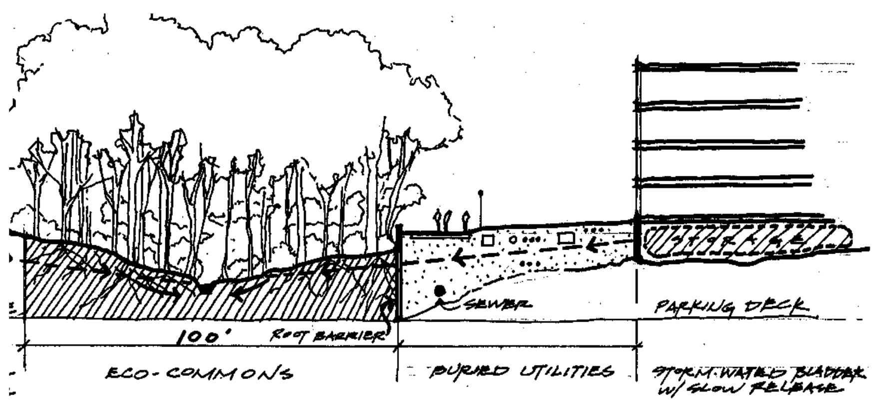


Figure 6-9: Example of a hydrological concept, which explores the idea of storing harvested stormwater under an existing parking deck.

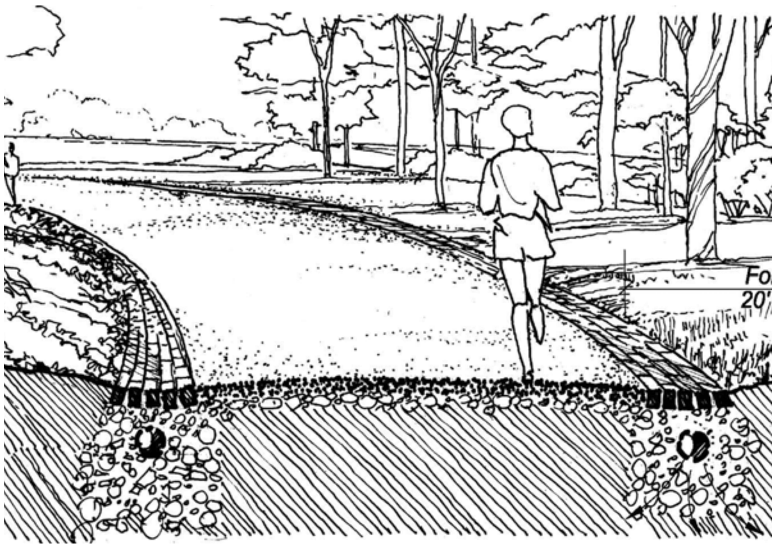


Figure 6-10: Example of a hydrological concept , which explores the idea of a jogging path of unconsolidated aggregate with open-jointed stone gutters with gravel-filled trenches.

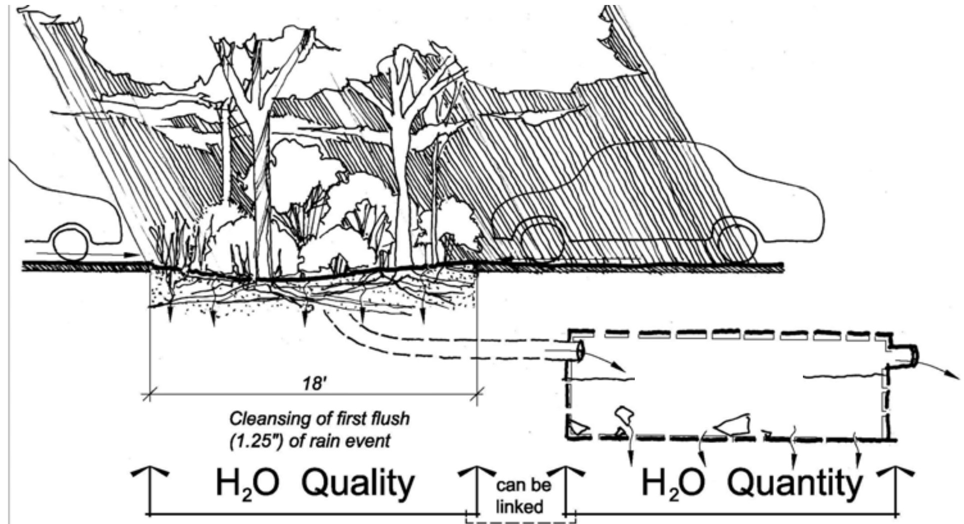


Figure 6-11: Example of a hydrological concept addressing parking lot drainage issues.

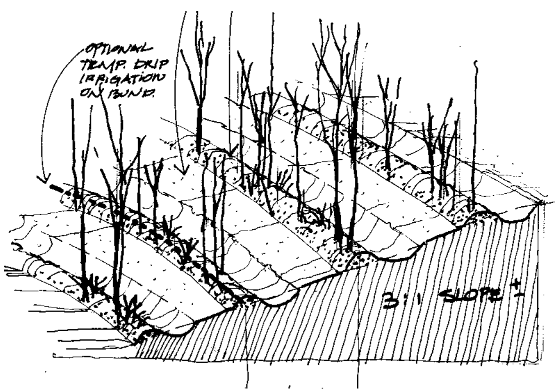


Figure 6-12: Example of a hydrological concept, which engages the idea of terracing.

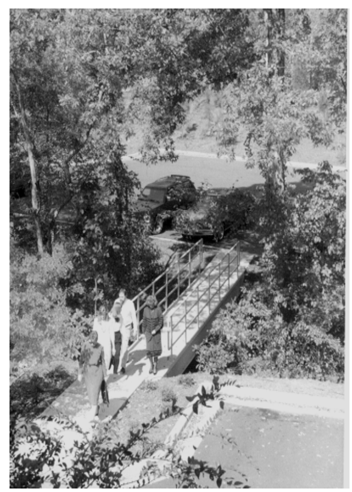


Figure 13: A woodland swale between parking lots can be part of an integrated hydrological concept.

6.1.4 PONDS

Ponds are an important part of the Eco-Commons concept. While their primary purpose may be related to stormwater management, they must be attractive, ecologically beneficial, and offer passive recreational amenity.

Objectives

1. Develop as ecologically functional parts of the campus stormwater management system.
2. Develop as an attractive amenity feature of the landscape.
3. Integrate ponds into the physiography of the campus, so that they look like they belong.

Requirements:

1. Be visually logical within landscape context.
2. Avoid obvious dams and spillways.
3. Base pond design on watershed characteristics, rainfall data, and anticipated build-out development of the campus.
4. Look good year-round without obvious water fluctuations. Periodic inundations of shorelines can be acceptable if well planned for and if frequency does not challenge viability of vegetation.
5. Water quality should never represent a hazard to public health.
6. Ponds should be designed as natural systems to support aquatic life and should have natural bottoms. They may be supported by man-made systems, such as re-circulating pumps, as necessary.
7. Ponds shall never use deep groundwater or city water.
8. Pond design and construction shall extend a minimum of 100 feet beyond the water's edge, and should include the design of soils and grading.
9. A pond should be insulated from direct overland flow.
10. Entering flows should be silt-trapped.
11. Able to be nourished by unconfined groundwater.
12. At least 75 percent of a pond's edge shall be fully naturalized with native vegetation.
13. No more than 5 percent of a pond's edge may have a bulkhead.
14. Plans should address fluvial, hydrological, and limnological processes.
15. Ponds should have management plans and on-going resources to maintain them.

Figures 6-14: Examples of ponds that are comparable in size to what may be appropriate for the Eco-Commons. All appear larger than they are because of controlled vantage points. They allocate only a small portion of their shorelines to human access - most is given to riparian vegetation. The 3 arch bridge at near left is actually a dam.

6.1.5 WATER COURSES

Surface water courses will be a critical part of the Eco-Commons.

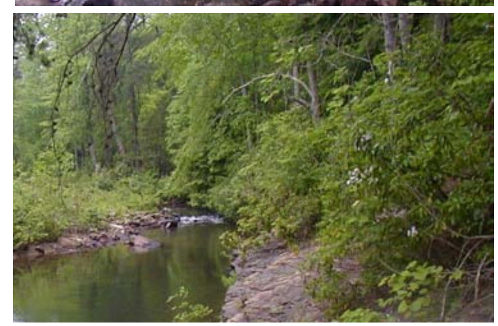
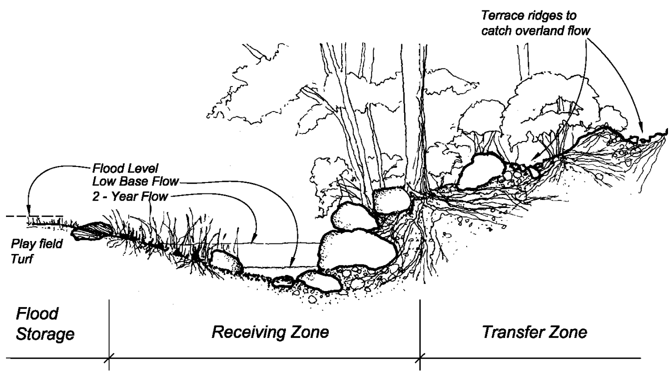
Objectives

1. Develop as an ecologically functional part of the campus stormwater management system.
2. Develop as an important amenity feature in the Eco-Commons.
3. Develop in a way that is mindful of historic physiography.

Requirements

- Design with total watershed planning.
- Use most appropriate fluvial form, based on flow characteristics, including low base flow and flood flows.
- Use a repeating "pool and riffle" longitudinal profile.
- Design as linear wetland within a 100-foot wide corridor by several meters deep zone.
- Integrate landform, hydrology, soils, and vegetation in design.
- Primarily use natural materials and forms. Man-made design forms may be used for accent.
- Channels should be tucked up against heavily vegetated slopes to insure fluvial asymmetry and to create a cross-section that is accessible to people only on one side.
- Express the continuity of the water course.
- Avoid or minimize the use of culverts and underground piping.
- Manage human use to protect sensitive environmental areas.
- Mitigate direct overland flow into the channel by levies, terracing, berms, and vegetation.
- Use natural rocks and gravels liberally to reinforce banks and bottom and to dissipate water energy.
- Use vigorous, suckering riparian plants along channel.
- 100 % tree canopy over stream corridor.
- Prepare a stream management plan.



Figures 6-15: The photographs show stream channels that can inform the design of stream fragments in the Eco-Commons. Their desirable characteristics include asymmetrical landform, boulders reinforcing banks, rocky stream bottom, overhanging canopy, and dense, riparian vegetation. The diagram illustrates basic channel anatomy. Transfer and Receiving Zones refer to surface and subsurface water.

6.2 VEGETATION GUIDELINES

Contents:

On the Georgia Tech campus vegetation plays both an ecological and a design role. It is the single most important player in making a sustainable campus and contributes to both beauty and environmental health. At Georgia Tech the sustainable use of vegetation is governed by ecological principles, site assessment, and interface with human use. Primary emphasis is on plant (vegetation) communities (*synecolgy)* and secondary emphasis on individual plants (*autecology*).

Objectives

1. Vegetation should play both an ecological and a design role.
2. Increase total tree canopy coverage of the campus to 50% or more.
3. Increase woodland area to minimum 22% of campus
4. Increase parkland area to 43% of campus
5. Use vegetation to actively manage stormwater through interception and evapo-transpiration.
6. Use vegetation to enhance the structure and fertility of the soil.
7. Ameliorate urban climatic conditions that contribute to the ‘urban heat island effect’.
8. Create beneficial micro-climates people and buildings.
9. Improve air quality and attenuate noise.
10. Increase bio-diversity.
11. Increase total biomass on campus.
12. Reduce dependence on fertilizers, irrigation, and chemical pesticides and fossil fuel energy.

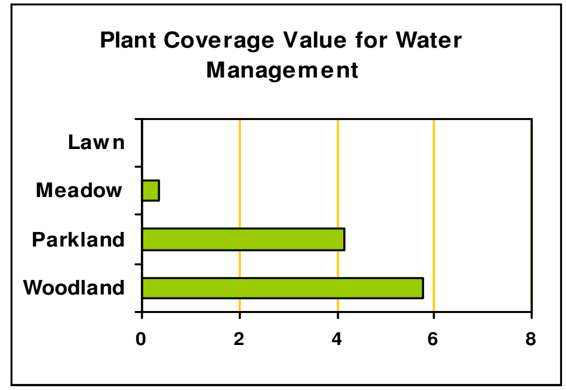


Chart 6-2: Chart showing the relative value of different plant communities for stormwater management, with Woodland representing six times the value of Lawn.

6.2.1 TREE PROTECTION

Objectives:

1. Protect existing trees to be retained on a project site during construction.

Requirements:

1. Protect the root zone of existing trees to be retained on a project site. The root protection zone shall be defined as a diameter equal to 2 times the height of the tree.

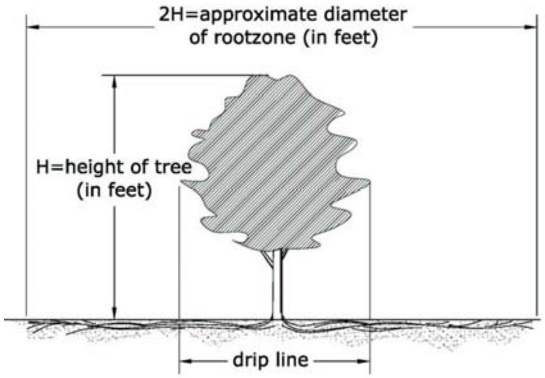


Figure 6-16: Root Protection Zone

2. Within the Root Protection Zone:
- No more than 10% may be altered with cut or fill.
- No trenching.
- No parking of equipment or construction activity.
- No storage of materials or soil stockpiling.

3. Fence the Root Protection Zone with 4-foot high orange polyethylene fabric attached to wooden stakes prior to all construction activity, including moving equipment and trailers onto the site.

4. Prepare a *Tree Protection Plan* as part of a project's construction documents that shows: the Tree Protection Zone(s) and specifies fencing and a schedule of protection mounting and dismounting.

6.2.2 TREE REPLACEMENT

Objectives:

1. To replace the ecological value of existing trees that are removed because of construction or poor condition.

2. To increase the total tree canopy of the campus to a minimum of 55%.

Trees are vitally important to the ecology and sustainability of Georgia Tech's campus. When an existing tree is removed for some reason, it must be replaced with enough new trees to approximate its ecological value within a reasonable period. Since it takes several decades for a small planted tree to equal the size of a large removed tree, the number of replacement trees is based on the <u>*basal area*</u> of the removed tree. Basal area is the cross-sectional area of its trunk 4.5 feet above ground and reflects a tree's <u>*biomass*</u>, which includes its roots, trunk and canopy. and reflects its ecological value for campus soils, hydrology, micro-climate and biodiversity.

Eco-mimicry suggests that trees be planted abundantly to replace a lost tree. This is commonly seen in nature when an opening occurs in a forest and is spontaneously replaced with many seedlings - Nature appears unwilling to wait the decades required for a single tree to grow to equal what was lost. Since Georgia Tech's goal is to grow its tree canopy to cover 55% of the campus, it makes sense to plant abundantly to replace lost trees.

Requirements:

1. If trees are to be removed, a tree condition assessment must be completed by a certified arborist.
2. Use the <u>*Tree Replacement Chart for Large and Medium Trees*</u> (Chart 6-3) to determine how many trees are required to replace a tree that is removed.
3. For trees on campus that must be removed because of disease or danger, a minimum of 3 replacement trees is required.
4. Replacement trees must be 'Large' or 'Medium' trees on the list, *Acceptable Plants for the Georgia Tech Campus.*
5. Plant the replacement trees anywhere on campus with the approval of Georgia Tech.
6. Record the location, size, and species of replacement trees on the *Tree Inventory.*

Chart: 6-3

TREE REPLACEMENT CHART FOR LARGE AND MEDIUM TREES

	Circumference 4.5' Above Ground		Diameter 4.5' Above Ground		3" Caliper Tree*		2" Caliper Tree		1" Caliper Tree
If Tree is:	**Less than 37"**	or	**Less than 6"**	then plant:	**1**	or	**2**	or	**10**
If Tree is:	**29' - 37"**	or	**6" - 11"**	then plant:	**2**	or	**4**	or	**20**
If Tree is:	**38" - 56"**	or	**12" - 17"**	then plant:	**5**	or	**10**	or	**50**
If Tree is:	**57" - 74"**	or	**18" - 23"**	then plant:	**10**	or	**20**	or	**100**
If Tree is:	**75" - 93"**	or	**24" - 29"**	then plant:	**18**	or	**36**	or	**180**
If Tree is:	**94" -112"**	or	**30" - 35"**	then plant:	**28**	or	**56**	or	**280**
If Tree is:	**113" -132"**	or	**36" - 41"**	then plant:	**41**	or	**82**	or	**410**
If Tree is:	**More than 132"**	or	**More than 42"**	then plant:	**55**	or	**110**	or	**550**

* The caliper of replacement trees are measured 6" abouve ground. To substitute other acceptable sizes: 1(3"caliper tree) = 2 (2"caliper trees) or 10 (1"caliper trees)

6.2.3 REFORESTATION

(Permanent and Temporary)

Objectives:

1. To increase campus tree canopy coverage and capture the ecological benefit of woodlands even on a short term basis.

Eco-mimicry suggests that trees be planted on vacant and/or under-vegetated places on the campus, even if they will ultimately be built upon. Even in a juvenile state, woodland planting yields significant ecological value, such as stormwater interception and absorption.

Requirements:

1. Develop a program to reforest temporary or permanent sites.
2. Prepare a map of the campus that identifies opportunities for temporary and permanent woodland planting. These may be designated as receiving zones for replacement trees. (See *6.2.2 TREE REPLACEMENT*) The map in *Figure 6-17* is a point of beginning.

Figure 6-17: Utility-free Areas for Potential Reforestation

6.2.4 TREE CANOPY

Objective:

1. To increase the tree canopy of the campus to a minimum of 55% of total campus area by 2020.

Requirements:

1. Every campus project must meet the minimum requirements for Canopy Coverage in Chart 4-2: *Requirements for Georgia Tech's Ecological Performance Zones*.
2. Requirements must be achieved within 10 YEARS
3. Only LARGE AND MEDIUM SIZED TREE SPECIES on the *Acceptable Plants for Georgia Tech* list can be used to satisfy requirements. This applies to the calculation of existing and proposed trees.
4. Measure the canopy of existing trees that will be retained, using field-verified measurements from current air photography.
5. Measure the projected canopy of new trees from a 20-scale or smaller site plan with the canopy of all proposed trees drawn to scale using Chart6-4: Projected Canopy Size of New Trees For new trees, use Chart 6-6: *Canopy of New Large and Medium Trees*.
5. Prepare 2 *Reflected Canopy Plans* of a project's final design-development planting plan that shows total canopy (existing retained and new canopy): *Total Canopy Year 5* and *Total Canopy Year 10*

   – Plans should be prepared as on the project site plan, drawn to scale at no greater scale than 1"=20'.

   – Show the stem of each new and retained tree with a solid dot.

   – Show the **actual** canopy of existing trees or masses of trees as a transparent **GREEN** tone without a line around it.

   – Show the proposed canopy area of each new tree as a transparent **RED circle** without a line around it.

   – Put a dashed perimeter line around canopy masses (including existing and new trees), planimeter; This is the TOTAL CANOPY, which must meet the minimum requirement for tree-canopy.

6. Fill out the *Project Canopy Chart. (See Chart 6.5)*

Chart 6-4:

PROJECTED CANOPY SIZE OF NEW TREES *(LARGE AND MEDIUM SIZED TREE SPECIES)*

TREE SIZE AT PLANTING	CANOPY AREA YEAR 1	CANOPY AREA YEAR 5	CANOPY AREA YEAR 10
1 Inch Caliper	4 SF (2.25' diameter)	30 SF (6' diameter)	153 SF (14' diameter)
2 - 4 Inch Caliper *	20 SF (5' diameter)	80 SF (10' diameter)	284 SF (19' diameter)

This chart is based on several sources averaged to represent all LARGE AND MEDIUM TREE SPECIES on the list of *Acceptable Plants for Georgia Tech*. * 4" caliper is the maximum allowable size for new trees on campus. Use the dimensions in this chart to prepare **Reflected Canopy Plans.**

Chart 6-5:

PROJECT CANOPY CHART

To be filled out for campus projects	PROJECT	*EXAMPLE*
TOTAL PROJECT AREA (SF)		*100,000*
REQUIRED CANOPY (PERCENT)		*60%*
REQUIRED CANOPY AREA (SF)		*60,000*
RETAINED CANOPY AREA (SF) *		*30,000*
NEW CANOPY AREA (SF) *		*30,000*
SUM OF RETAINED + NEW		*60,000*
YEAR OF COMPLIANCE		*2020*

*As measured from Reflected Canopy Plan (not a sum of individual tree canopy areas)

6.2.5 PLANT (VEGETATION) COMMUNITIES

A plant community is defined as a regionally-occurring spatial formation of plants that has recognizable structure or physiognomy. By analogy, if an individual plant is a word then a plant community is a paragraph. On campus there are three main plant communities: ***Woodland***, ***Parkland***, *and* ***Meadowland***. There are also two special purpose communities: *Ornamental* and *Lawn*. *Woodland* is the most ecologically-complex and sustainable vegetation complex, while *Ornamental* and *Lawn* are the least. Plant communities represent stages in ecological succession, whereby one community is progressively replaced by another until stasis with site resources is reached. During this process, total biomass, community structure and species diversity increase spontaneously.

Objectives:

1. To create an ecologically-based mosaic of plant communities.

Requirements: *(Also see specific requirements for individual plant communities)*

1. The *Vegetation Communities* identified on the Landscape Master Plan Map must be implemented by any new site-related project on campus.

WOODLAND

PARKLAND

MEADOWLAND

ORNAMENTAL

LAWN

2. The *Plant Community* shall be the predominant design unit of landscape design and management. See *Figure 6-18*

– Vegetation design should be holistic and relate to the whole campus landscape - e.g. if there is a wetland running through campus, it should be expressed continuously on every project site it crosses.

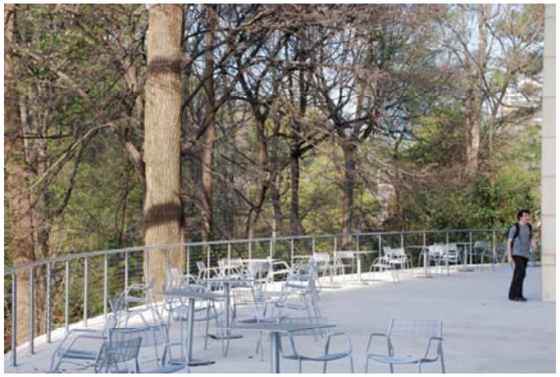
– Buildings, movement corridors, and gathering places should be conceived as existing within vegetation environments - e.g. a path through a meadow or a building within a woodland.

– Establish boundaries between plant communities along visually logical lines - e.g. hardscape elements such as a walk or retaining wall.

3. Identify locations where ecological succession can be a viable means to achieve vegetation design goals:

– For example: stop mowing unused turf areas and let nature spontaneously develop a meadowland.

– For example: using fast-growing loblolly pines to establish temporary woodlands on unused building sites that will not be built on for 3-5 years.



A new gathering place takes advantage of an existing woodland.

A newly planted woodland has lots of woody stems for quick development of community biomass and physiognomy for ecological benefits.

A walkway forms a logical and easy to maintain edge to this woodland community.

The road is a passageway through this woodland community.

A newly planted parkland promises a high tree canopy over lawn.

A pond and woodland setting with man-made geometry.

Figures 6-18: Examples of landscape design using the plant community approach.

6.2.5.1 Woodland Plant Community

This is a multi-layered plant community with an overstory canopy, an understory of young or small trees and shrubs, an herbaceous ground layer, and a heavy litter layer. It is the most important ecological and sustainable component of the campus landscape. Its defining aspect is its vertical layering of leaf masses with 100%, redundant coverage of the ground plane.

Requirements:

1. A newly planted or amended woodland should have a ground coverage of 100% at the overstory level, 65% at the understory level, and 35% at the shrub/herbaceous level. Planting density should be sufficient for achievement in 10 years.

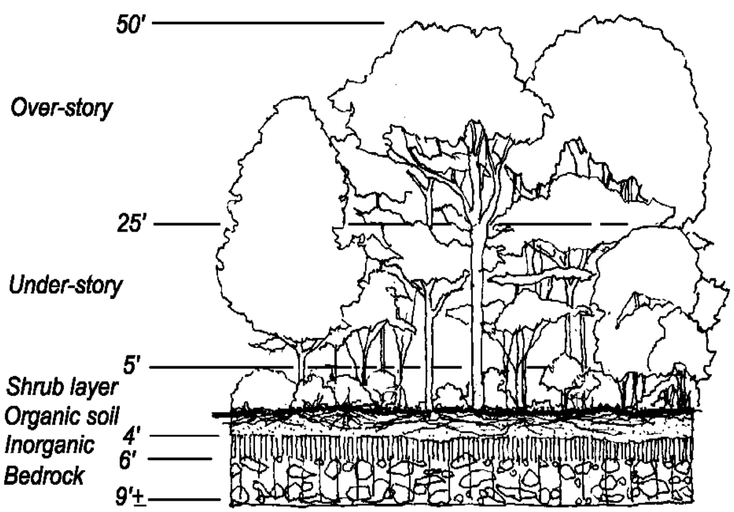


Figure 6-19: Diagram of the vertical layering typical of a woodland.

2. A woodland may have a natural or man-made character, as long as some vertical layering is achieved and its composite environmental effect on stormwater is comparable to that of a natural woodland.
3. Predominantly use native tree species from Eco-Region 45b that are genetically predisposed to survival in a developing woodland setting and are part of the old-field to forest successional pattern.
4. Make woodland plantings site specific-topography and hydrology should strongly influence plant species composition.
5. Planting density and physiognomy (form) should be based on eco-mimicry - i.e. nature develops woodlands as fast as possible with the maximum amount of plant biomass allowed by a site's resources. This is commonly seen when an opening occurs in a forest and is spontaneously filled with a thicket of seedlings, which shapes the microclimate close to the ground, conserves moisture, cools soil temperatures, and enhances soil structure and fertility. Trees respond with quick growth, vertical elongation, root fusing and stratification in the shortest possible time.
   - Use the species and density of new planting to shape site microclimate, reduce soil temperature, increase soil moisture, and improve soil structure. Having lots of woody stems is more important than having large specimens.
   - For new woodland plantings, typically plant 65-75 woody stems per 1000 square feet, made up of overstory trees (40-60%) and understory trees (20-40%) and shrubs (20%).
   - Plant a variety of tree sizes from 1" to a maximum of 4" caliper.
   - Typical tree spacing should range from 3 to 15 feet.
   - Use up to 20% evergreen trees in the combined overstory and understory layers - e.g. pines, magnolias, hollies. Pines specifically provide quick shading that helps the woodland community establish quickly. Pines' deep tap roots improve clay subsoils for permeability and plant growth.
6. Mulch new woodland plantings with a mixture of detritus - wood, leaves, and needles - to jump start a healthy surface soil environment. Allow the litter layer to build up to provide tight nutrient cycling and a healthy soil environment. Utilize campus compost.
7. Manage the new woodland with the mindset that all the trees are one organism, whose form will change over time, as its biomass increases to reach stasis with site resources. Individual trees may be squeezed out by competition but the community is more important than an individuals within it.

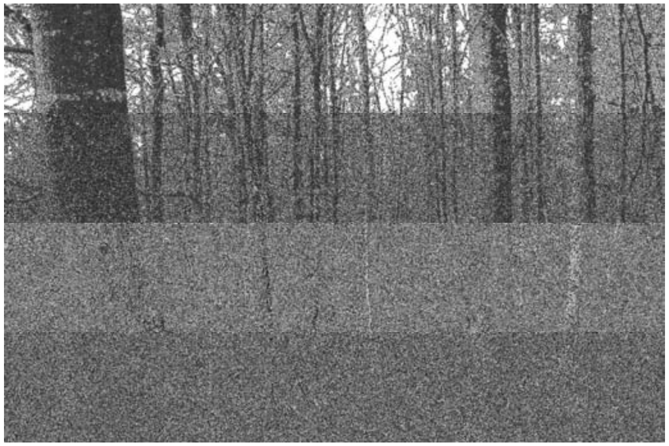


Figure 6-20: Example of a natural woodland shows trees of mixed age and typical density and spacing.

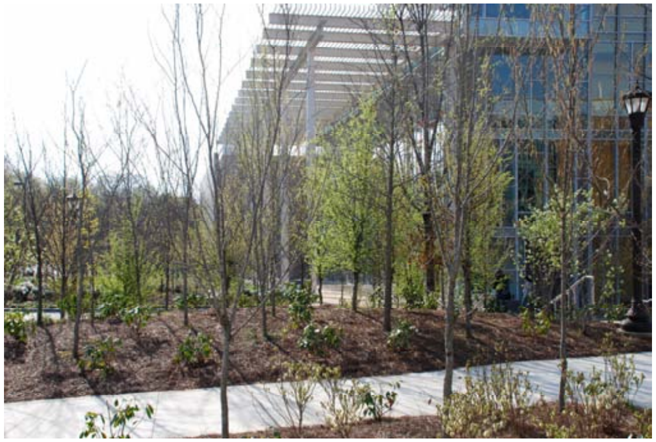


Figure 6-21: Example of a 9 month old woodland planting on the GT campus that shows woodland structure and high initial bio-mass .

Figure 6-22: Two pictures taken 3 years apart of the same area on the GT campus demonstrate ecological succession , which was jumpstarted by a dense planting of tree saplings. One of the ecological benefits to the campus is the reduction of stormwater runoff.

WHY PLANT TREES SO CLOSE TOGETHER?

To jumpstart woodland establishment by mimicking Nature's compelling tendency to maximize biomass on a site as fast as possible. Quick development means harvesting ecological and cost-saving benefits within the first year of planting.

WHAT ARE THE BENEFITS OF PLANTING DENSELY?

1. Trees and shrubs grow faster. The composite effect of density creates an equable soil microclimate of temperature and moisture, which is conducive to woodland growth. It promotes better infiltration and retention of water, richer soil biota, greater root mass, better soil structure, and tighter nutrient cycles than allowed by the soil conditions that prevail with low density planting.
2. Rapid attainment of ecological stability. Dense planting quickly establishes a community form and physiology that buffers environmental extremes, and functionally joins individual trees and shrubs together. Root-fusing between individual trees is part of a community physiology that transcends the individual—like a tissue made up of cells.
3. **3.** Stormwater runoff decreases immediately as the biomass of the woodland increases *Figure 6-23.* An early, full canopy intercepts rain and keeps much of it from reaching the ground. What does reach the ground is absorbed by moist soils protected by shade with lots of woody stems and litter layer that inhibit overland flow. Once in the soil, water is retained as soil moisture by good soil structure produced by root mass, organic material, earthworms and other soil biota. Soil water remains available for sustaining use by vegetation.

WILL THE WOODLAND CHANGE OVER TIME?

The woodland's community form and function will persist but individuals within it will change. Some trees will outperform others, some may die. Over time as Nature achieves maximum biomass allowed by a site's resources, it will be contained within fewer individuals—the older woodland has fewer but bigger trees.

Figure 6-23: Stormwater runoff on a site decreases as the biomass of a plant community increases—illustrated by two photographs of the same site.

6.2.5.2 Parkland Plant Community

Parkland consists of a discontinuous overstory canopy, a limited and intermittent understory, and an open herbaceous or ground layer. It is the bread and butter of the collegiate landscape - lawn and large trees. It is best used where there is a need for free movement at the ground plane, open visibility at eye level, and park uses of lawn.

Figure 6-24: Mature Parkland on the GT campus.

Figure 6-25: Example of a parkland with a strong man-made character (The Tuilleries, Paris),has 100% canopy and permeable ground for active moisture and air exchange.

Requirements:

1. A newly planted or amended parkland should have a high tree canopy that covers 75-100% of the ground plane. Planting density should be sufficient for to achieve this canopy within 20 years.
2. The majority of the ground plane should remain open with lawn, groundcover or paving, but up to 20% may be covered by shrubs and small trees.
3. Individual tree trunks in open lawn may be mulched without edging, but should not generally be encircled with groundcover.

6.2.5.3 Meadowland Plant Community

Meadowland is predominantly a landscape of un-mown grasses and forbs with shrubs masses and a few trees. In natural settings it is associated with old fields and the edge of woodlands, ponds, and streams. It is best used on campus where there is a need to preserve open views of buildings or vistas without the need for circulation or play. It can give a sense of openness and provide floristic and ecological interest.

Requirements:

1. Use appropriate plant species typical of early succession, including freely suckering shrubs, such as Virginia Sweetspire, and clumping grasses, such as Switchgrass, and trees such as Red Cedar and Persimmon. (*See Section 6.2.8 Plants for Special Purposes*)
2. Use plant material appropriately adapted to a site's moisture condition - xeric, mesic, or hydric. Vegetation should not require irrigation after establishment.
3. Use spreading perennials, such as Black-eyed Susan, and self-seeding annuals for floristic displays, where appropriate.

Figure 6-26: A good example of a late successional

4. Provide a management plan to GT Facilities for maintenance, including mowing schedule.

6.2.5.4 Ornamental Planting

This is a horticultural grouping of plants for limited areas that may be associated with a garden or entrance and primarily relates to flowering plants- Ornamental areas require a disproportionate amount of maintenance and should not be widely used on campus. For floral areas GT needs maximum bloom time for the least manpower and material cost.

Requirements:

1. Use plants identified in Chart 6-6: *Acceptable Plants for the Georgia Tech Campus.*
2. Primarily rely on flowering woody plants and vigorous perennials.
3. Use the ornamental qualities of plant textures, as well as flowers.
4. Concentrate floral displays in a few key locations.
5. Prepare a schedule of flowering plants that shows phenology to demonstrate design logic.
6. Identify the material and manpower requirements for upkeep.

Figures 6-27: Floral displays using durable perennials and flowering woody plants. Clockwise from upper left: daylilies, camellias, Rudbeckia and Virginia Sweetspire.

6.2.5.5 Lawn

Lawn is an important part of the campus, but should only be used where there is functional requirement or compelling visual reason. Otherwise, its high stormwater runoff, irrigation and fertilizer demand are a challenge for campus sustainability.

Requirements:

1. Do not irrigate with potable water.
2. Use structural soil for actively-used lawn areas.
3. Use turf grasses identified in Chart 6-7: *Acceptable Plants for the Georgia Tech Campus.*
4. Identify the level of turf management that is appropriate to a project's use.

6.2.6 PLANT SELECTION

Objectives:

1. Insure that new plantings on the Georgia Tech campus are in harmony with the region's native flora, identified as Eco-Region 45b on the Eco-Regions Map of the United States.
2. Provide a diverse palette of reliable plants to accomplish a project's design purpose, which are variously adapted to different site conditions on campus, work well with the plant community approach, and are reliable performers with the maintenance resources of Georgia Tech.
3. Provide a palette of plants with which to meet Georgia Tech's campus landscape sustainability objectives and requirements, as expressed in the Landscape Master Plan.

Requirements:

1. Use only plant material identified in Chart 6-6: *Acceptable Plants for the Georgia Tech Campus.* This chart purposely contains a wide range of plants in order to accommodate a variety of project and site situations and must be used with professional knowledge of the region's vegetation and ecology.
2. Selected plant material may only be used in the *Plant Communities,* identified in Chart 6-6: *Acceptable Plants for the Georgia Tech Campus.*
3. Consult Section 6.2.8 Plants For Special Purposes for further selection and requirements. For example, only trees identified for use as street trees may be used for that purpose.
4. Discretionary choices within the lists of acceptable plants should be governed by the following Georgia Tech preferences.

– Plants native to the Atlanta region.

– Plants having physiognomic similarities to native species.

– Plants adapted to specific site conditions.

– Plants that do not require much material and maintenance subsidy, including pruning, long term irrigation, fertilization, and pest control.

– Proven performers are preferred over newly developed cultivars, especially for trees.

– If a plant's flowers are one of the main reasons for its selection, those that bloom between September and June.

5. Submit a Plant Schedule, which shows proposed plants organized in the following way:

– First, by *Woodland, Parkland, Meadowland, Ornamental, Lawn, Street Tree*. Note: a plant may appear under more than one.

– Second, by *Large Tree*, *Medium Tree*, *Small Tree*, *Shrub*, *Vine*, *Groundcover*, *Fern-Grass-Sedge*, *Perennial Flower*.

– Third, by *Name of Plant*

– For each plant indicate the following:

Phenology of Leaves

Phenology of Flowers (only for plants that are being used because of their flowers)

Notes, if any, on special adaptation for site conditions.

6. Include the following CSI Master Format Specification Sections in Construction Documents:

32 92 00 Turf and Grasses

32 93 00 Trees, Sgrubs, Groundcovers, Etc.

6.2.7 PLANT MATERIAL SOURCE AND SIZE

Objectives:

1. To utilize plant material that is regionally adapted and requires the least fossil fuel for delivery to Georgia Tech.
2. To maximize new planting survival and quick growth for maximum biomass.

Requirements:

1. All plant material must have been propagated and grown in the Piedmont or Coastal Plain physiographic provinces within 250 miles of Georgia Tech.
2. All plant material must be container grown,

unless approved by Georgia Tech.

3. All plant material shall conform to the American Standard for Nursery stock, ANSI z60.1-1980
4. Maximum size for a tree shall be 4” cal.
5. Minimum container size for a tree shall be 3 gallon.
6. Minimum container size for shrubs shall be 3 gallon.
7. Minimum container size for vines shall be 3 gallon.
8. Minimum container size for groundcover shall be 4” pot.
9. Minimum container size for perennials shall be 1 gallon.
10. The Plant Material Schedule for a project must specify height, canopy diameter, caliper and container size.

Chart 6-6

ACCEPTABLE PLANTS FOR THE GEORGIA TECH CAMPUS

BOTANICAL NAME	COMMON NAME	Woodland	Parkland	Meadowland & Edges	Ornamental Only	Lawn	Native to Atlanta
		PLANT COMMUNITY					
LARGE TREES							
Acer negundo	Boxelder	X		X			X
Acer rubrum	Maple, Red	X	X	X			X
Betula nigra	Birch, River	X		X			X
Carya cordiformis	Hickory, Bitternut	X	X				X
Carya glabra	Hickory, Pignut	X	X				X
Carya illinoensis	Pecan	X	X				X
Carya ovata var. australis	Hickory, Southern Shagbark	X	X				X
Carya pallida	Hickory, Sand	X	X				X
Carya tomentosa	Hickory, Mockernut	X	X				X
Celtis laevigata	Sugarberry	X	X				X
Fagus grandifolia	American Beech	X	X				X
Fraxinus americana	Ash, White (use only clones)	X					X
Fraxinus pennsylvanica	Ash, Green (use only clones)	X					X
Liquidambar styraciflua	Sweetgum	X	X	X			X
Liriodendron tulipifera	Tulip Poplar	X	X	X			X
Metasequoia glyptostroboides	Redwood, Dawn		X	X			
Pinus echinata	Pine, Shortleaf	X	X	X			X
Pinus taeda	Pine, Loblolly	X	X	X			X
Platanus occidentalis	Sycamore	X	X	X			X
Quercus acutissima	Oak, Sawtooth		X	X			
Quercus alba	Oak, White	X	X				X
Quercus bicolor	Oak, Swamp White	X	X				X
Quercus coccinia	Oak, Scarlet	X	X				X
Quercus falcata	Oak, Southern Red	X	X				X

ACCEPTABLE PLANTS FOR THE GEORGIA TECH CAMPUS

BOTANICAL NAME	COMMON NAME	Woodland	Parkland	Meadowland & Edges	Ornamental Only	Lawn	Native to Atlanta
		PLANT COMMUNITY					
Quercus falcata var. pagodifolia	Oak, Cherrybark	X	X				X
Quercus georgiana	Oak, Georgia	X	X				X
Quercus laurifolia	Oak, Diamond Leaf (Laurel)	X	X				
Quercus lyrata	Oak, Overcup	X	X				X
Quercus michauxii	Oak, Swamp Chestnut	X	X				X
Quercus muehlenbergii	ChinkapinOak	X	X				X
Quercus nigra	Oak, Water	X	X				X
Quercus nuttalli	Oak, Nuttall	X	X				X
Quercus phellos	Oak, Willow	X	X				X
Quercus prinus	Oak, Chestnut	X	X				X
Quercus rubra	Oak, Northern Red	X	X				X
Quercus shumardii	Oak, Shumard	X	X				X
Salix nigra	Willow, Black			X			X
Taxodium distichum	Baldcypress	X		X			X
Ulmus alata	Elm, Winged	X	X	X			X

MEDIUM TREES

BOTANICAL NAME	COMMON NAME	Woodland	Parkland	Meadowland & Edges	Ornamental Only	Lawn	Native to Atlanta
Acer buergeranum	Maple, Trident		X	X			
Acer campestre 'Evelyn'	Maple, Hedge		X	X			
Acer leucoderme	Maple, Chalk	X					
Carpinus betulus	Hornbeam, European				X		X
Carpinus caroliniana	Hornbeam, Am. Ironwood	X	X	X			X
Cladrastis kentukea	Yellowwood, American		X	X			
Cryptomeria japonica	Cedar, Japanese				X		
Gingko biloba	Ginkgo		X				

ACCEPTABLE PLANTS FOR THE GEORGIA TECH CAMPUS		Woodland	Parkland	Meadowland & Edges	Ornamental Only	Lawn	Native to Atlanta
BOTANICAL NAME	**COMMON NAME**	**PLANT COMMUNITY**					
Halesia tetraptera	Carolina silverbell	X		X			X
Ilex latifolia	Lusterleaf Holly	X					
Juniperus virginiana	Cedar, Red			X			X
Magnolia acuminata	Cucumber Magnolia	X					X
Magnolia grandiflora	Southern Magnolia	X	X	X			X
Nyssa sylvatica	Blackgum	X	X	X			X
Parrotia persica	Persian Ironwood		X	X			
Pistacia chinensis	Pistache, Chinese		X	X			
Prunus caroliniana	Cherrylaurel, Carolina	X	X	X			X
Prunus x yeoensis	Cherry, Yoshino				X		
Quercus hemisphaerica	Oak, Laurel	X	X				
Ulmus parvifolia	Elm, Chinese	X	X	X			
Ulmus rubra	Elm, Slippery	X		X			X

SMALL TREES

Acer ginnala	Maple, Amur			X			
Acer palmatum	Maple, Japanese	X					
Aesculus sylvatica	Buckeye, Painted	X					X
Alnus serrulata	Alder, Hazel (tag)			X			X
Amelanchier arborea	Serviceberry, Downy	X		X			X
Amelanchier x grandiflora	Autumn Brilliance Serviceberry	X		X			X
Castanea pumila	Chinquapin, Allegheny	X					X
Cercis canadensis	Redbud, Eastern	X		X			X
Cornus florida	Dogwood	X		X			

ACCEPTABLE PLANTS FOR THE GEORGIA TECH CAMPUS		Woodland	Parkland	Meadowland & Edges	Ornamental Only	Lawn	Native to Atlanta
BOTANICAL NAME	COMMON NAME	PLANT COMMUNITY					
Cornus florida X Cornus kousa	Dogwood	X		X			X
Corylus americana	American Filbert			X			X
Ilex decidua	Holly, Deciduous(Possumhaw)	X		X			X
Ilex 'Emily Bruner'	Emily Bruner Holly				X		
Ilex 'Nellie Stevens'	Nellie Stevens Holly				X		
Ilex opaca	Holly, American	X		X			X
Ilex vomitoria	Holly, Yaupon			X			
Ilex x attenuata 'Fosteri' - related	Foster Holly				X		
Lagerstroemia indica	Crapemyrtle, Common			X			
Magnolia stellata	Star Magnolia			X			
Magnolia virginiana	Sweetbay Magnolia	X	X	X			X
Ostrya virginana	American Hop Hornbeam	X	X	X			X
Pinus virginiana	Pine, Virginia			X			X
Prunus serrulata	Cherry, Japanese Flowering				X		
Prunus subhirtella	Higan Cherry				X		
Vitex agnus-astus	Vitex (Chastetree)			X			
SHRUBS							
Abelia grandiflora - and cultivars	Abelia		X		X		
Aesculus parviflora	Bottlebrush Buckeye	X					X
Aronia arbutifolia	Red Chokeberry			X			X
Azalea - Deciduous Type	Native Azalea	X	X	X			X
Azalea - Glendale Type	Azalia - Glendale Type	X	X	X			
Azalea - Indica Type	Azalea - Indica Type	X	X	X			

ACCEPTABLE PLANTS FOR THE GEORGIA TECH CAMPUS

BOTANICAL NAME	COMMON NAME	Woodland	Parkland	Meadowland & Edges	Ornamental Only	Lawn	Native to Atlanta
		PLANT COMMUNITY					
Azalea - Kurume Type	Azalea - Kurume Type		X		X		
Azalea - Satsuki Type	Azalea - Satsuki Type		X		X		
Buxus sempervirens	Boxwood		X		X		
Callicarpa americana (or Japonica)	Beautyberry		X	X			X
Calycanthus floridus	Sweetshrub	X	X	X			X
Camelia sasanqua	Sasanqua	X	X		X		
Cephalanthus occidentalis	Buttonbush, Common	X	X	X			X
Cepthalotaxus harringtonia	Japanese Plum Yew	X	X	X			
Chionanthus virginicus	Fringetree	X	X	X			X
Clethora alnifolia	Sweet Pepperbush	X	X	X			X
Cornus racemosa	Dogwood, Grey	X		X			X
Euonymous alatus cultivars	Winged Euonymus		X	X			
Forsythia x intermidia	Border Forsythia		X	X			
Fothergilla gardenii	Dwarf Fothergilla	X	X	X			X
Fothergilla major	Large Fothergilla	X	X	X			X
Gardenia jasminoides cultivars	Gardenia		X		X		
Hamamelis vernalis(also mollis)	Witchhazel	X	X	X			X
Hydrangea quercifolia	Oakleaf Hydrangea	X	X	X			X
Ilex cornuta -various cultivars	Burford Holly		X		X		
Ilex crenata -various cultivars	Japanese Box-leaved Holly		X		X		
Ilex glabra	Inkberry		X	X			X
Ilex verticillata	Winterberry, Common		X	X			X
Ilex vomitoria 'nana' and similar	Yaupon		X	X			X
Illicium henryi	Henry's Anise	X	X				

ACCEPTABLE PLANTS FOR THE GEORGIA TECH CAMPUS		Woodland	Parkland	Meadowland & Edges	Ornamental Only	Lawn	Native to Atlanta
BOTANICAL NAME	**COMMON NAME**	**PLANT COMMUNITY**					
Illicium parviflorum	Small Anise-tree	X	X	X			X
Itea virginica	Virginia Sweetspire	X	X	X			X
Jasminum nudiflorum	Winter Jasmine			X	X		
Lorapetalum	Lorapetalum		X	X			
Kalmia latifolia	Mountain Laurel	X					X
Myrica cerifera	Waxmyrtle, Southern		X	X			
Myrica cerifera 'pumila'	Dwarf Wax Myrtle		X	X			
Osmanthus americanus	Osmanthus, Devilwood	X	X	X			X
Osmanthus sp	Tea Olive		X		X		
Rhamnus caroliniana	Buckthorn, Carolina			X			X
Rhus aromatica (and related species)	Fragrant Sumac			X			X
Rosemary	Rosemary				X		
Sambucus canadensis	American Elderberry			X			X
Spiraea x bumalda	Bumwald Spirea				X		
Vaccinium arboreum	Farkleberry	X		X			X
Vaccinium ashei	Rabbiteve Blueberry	X		X			X
Viburnum dentatum	Arrowwood Viburnum	X		X			X
Viburnum plicatum var. tomentosum	Doublefie Viburnum	X	X				X
Viburnum pragense	Prague Viburnum	X	X				
Viburnum x burkwoodi	Burkwood Viburnum	X	X				X

VINES

Akebia quinata	Fiveleaf Akebia				X		
Clematic armandii	Clematis armandii				X		

ACCEPTABLE PLANTS FOR THE GEORGIA TECH CAMPUS		Woodland	Parkland	Meadowland & Edges	Ornamental Only	Lawn	Native to Atlanta
BOTANICAL NAME	**COMMON NAME**	**PLANT COMMUNITY**					
Clematis virginiana	Virgin's Boxer			X			X
Clematis x jackmanii	Clematis x jackmanii				X		
Ficus pumila	Creeping Fig				X		
Gelsemium sempervirens	Carolina jessamine	X		X			X
Lonicera sempervirens	Trumpet or Coral Honeysuckle	X		X			X
Parthenocissus quinquefolia	Virginia Creeper	X		X			X
Parthenocissus tricuspidata	Boston Ivy	X		X			
Smilax lanceolata	Smilax	X		X			X
Trachelospermum jasminoides	Confederate or Star Jasmine				X		
Vitis rotundifolia	Muscadine Grape	X		X			X

GROUNDCOVERS

Aspidistra elatior	Cast-iron Plant	X					
Hedera helix (manage to prevent climbing)	Engish Ivy	X	X				
Helleborus orientalis	Lenten Rose	X	X				
Juniperus conferta	Shore Juniper			X			
Liriope muscarii (no variegated)	Liriope- clumping	X	X				
Liriope spicata (no variegated)	Liriope - turf-forming	X	X				
Ophiopogon japonicus (no variegated)	Mondo Grass	X	X				
Pachysandra terminalis	Pachysandra	X	X				
Trachelospermum asiaticum	Asiatic Jasmine	X	X				
Vinca minor	Periwinkle	X	X				

ACCEPTABLE PLANTS FOR THE GEORGIA TECH CAMPUS		Woodland	Parkland	Meadowland & Edges	Ornamental Only	Lawn	Native to Atlanta
BOTANICAL NAME	**COMMON NAME**	**PLANT COMMUNITY**					
FERNS, GRASSES, SEDGES							
Andropogon sp.	Broomsedge			X			X
Annual Rye	For overseeding only		X			X	
Bermudagrass	TifWay 419 (type) sod only					X	
Carex sp.	Sedge			X			X
Cyrtomium falcatum	Japanese Holly-fern	X					
Dryopteris erythrosora	Autumn Fern	X					
Miscanthus	Miscanthus			X			
Onoclea sensibilis	Sensitive Fern	X					X
Osmunda regalis	Royal Fern	X					
Panicum virgatum	Switchgrass			X			X
Pennisetum	Fountain Grass			X			
Polysticum acrosticroides	Christmas Fern	X					X
Pteridum aquilinum	Bracken Fern	X		X			X
Tall Fescue	The Rebels (type) sod only		X			X	
Thelypteris decursive-pinnata	Japanese Beech Fern	X					
Thelypteris kunthii	Southern Shield Fern	X		X			X
Typhus latifolia	Cattail			X			X
Zoysigrass	Meyer (type) sod only		X			X	
PERENNIAL FLOWERS							
Asclepias tuberosa	Butterfly Weed			X			
Buddleia davidii	Butterfly-bush			X			
Coreopsis species	Coreopsis			X			X

ACCEPTABLE PLANTS FOR THE GEORGIA TECH CAMPUS		Woodland	Parkland	Meadowland & Edges	Ornamental Only	Lawn	Native to Atlanta
BOTANICAL NAME	**COMMON NAME**	**PLANT COMMUNITY**					
Echinacea species	Purple Cone Flower			X			
Gaillardia pulchella	Indian Blanket			X			
Helenium species	Sneezeweed			X			X
Helianthus species	Sunflower			X			X
Hemerocallis species	Daylilly			X			
Hosta species (no variegated)	Hosta	X					
Iris - bearded	Bearded Iris			X			
Iris kaempferi	Jananese Iris			X			
Iris pseudoacorus	Yellow Lousiana Iris			X			
Iris siberica	Siberian Iris			X			
Iris tectorum	Japanes Roof Iris			X			
Iris versicolor	Blue Flag Iris			X			
Narcissus species	Daffodil	X					
Rudbeckia species	Black-eyed Susan			X			X
Solidago helenium	Goldenrod			X			X

6.2.8 PLANTS FOR SPECIAL PURPOSES

Objectives:

1. Utilize plants that are adapted to their site and suited to their purpose.

Requirements:

1. Plant selections should demonstrate their suitability to a project's purpose and its site conditions. Use the following plant lists for this purpose:

   BOTTOMLAND PLANTS (*Chart 6-9)*

   LAWNS (*Chart 6-11)*

   SHRUB MASSES (*Chart 6-8)*

   TEMPORARY REFORESTATION (Chart 6-10)

   STREET TREES (*Chart 6-12)*

2. For all street trees, use only those listed on *Chart 6-12: Street Trees.*
3. For all lawns, use only those listed on *Chart 6-11:Lawns.*

Chart 6-7

SHRUB MASSES

These shrubs colonize, thicken, and re-juvenate themselves by their ablility to sprout shoots from stems at or under the ground. These plants are especially desirable for naturalized and mass plantings. Those that thrive in woodland communities contribute to a complete shrub layer. Those that thrive in sun can make effective masses for screening.

Clethora alnifolia	Sweet Pepperbush
Aesculus parviflora	Bottlebrush Buckeye
Aronia arbutifolia	Red Chokeberry
Callicarpa americana (or Japonica)	Beautyberry
Calycanthus floridus	Sweetshrub
Cornus racemosa	Dogwood, Grey
Forsythia x intermidia	Border Forsythia
Fothergilla major	Large Fothergilla
Ilex verticillata	Winterberry, Common
Illicium parviflorum	Small Anise-tree
Itea virginica	Virginia Sweetspire
Myrica cerifera 'pumila'	Dwarf Wax Myrtle
Osmanthus americanus	Osmanthus, Devilwood
Rhamnus caroliniana	Buckthorn, Carolina
Sambucus canadensis	American Elderberry
Vaccinium arboreum	Farkleberry
Vaccinium ashei	Rabbiteve Blueberry
Viburnum dentatum	Arrowwood Viburnum

Chart 6-8

BOTTOMLAND PLANTS

These plants are adapted in various ways to thrive in bottomland conditions on the Georgia Tech campus. Select plants that are appropriate to the plant community in which they will be used.

LARGE TREES

Acer negundo	Boxelder
Betula nigra	Birch, River
Celtis laevigata	Sugarberry
Liriodendron tulipifera	Tulip Poplar
Pinus taeda	Pine, Loblolly
Platanus occidentalis	Sycamore
Quercus bicolor	Oak, Swamp White
Quercus michauxii	Oak, Swamp Chestnut
Salix nigra	Willow, Black
Taxodium distichum	Baldcypress

MEDIUM TREES

Carpinus caroliniana	Hornbeam, Am. Ironwood
Halesia tetraptera	Carolina silverbell
Nyssa sylvatica	Blackgum
Ulmus parvifolia	Elm, Chinese
Ulmus rubra	Elm, Slippery

SMALL TREES

Alnus serrulata	Alder, Hazel (tag)
Amelanchier arborea	Serviceberry, Downy
Amelanchier x grandiflora	Serviceberry, Autumn Brilliance
Ilex opaca	Holly, American
Magnolia virginiana	Sweetbay Magnolia
Myrica cerifera	Waxmyrtle, Southern

SHRUBS

Aronia arbutifolia	Red Chokeberry
Asimina triloba	Common Pawpaw
Calycanthus floridus	Sweetshrub
Cephalanthus occidentalis	Buttonbush, Common
Clethora alnifolia	Sweet Pepperbush
Ilex glabra	Inkberry
Ilex verticillata	Winterberry, Common
Illicium parviflorum	Small Anise-tree
Sambucus canadensis	American Elderberry
Hamamelis vernalis	Vernal Witchhazel
Viburnum dentatum	Arrowwood Viburnum

Chart 6-9

TEMPORARY REFORESTATION

These plants can be used for rapid, temporary reforestation of vacant campus areas that will be cleared and developed in 5 to 10 years. Small plant sizes, including bare root whips, should be densely planted for quick site coverage. A general rule is to plant 75 woody stems per 1000 square feet.

TREES

Acer negundo	Boxelder
Betula nigra	Birch, River
Liquidambar styraciflua	Sweetgum
Liriodendron tulipifera	Tulip Poplar
Pinus taeda	Pine, Loblolly
Pinus virginiana	Pine, Virginia
Salix nigra	Willow, Black

SHRUBS

Callicarpa americana (or Japonica)	Beautyberry
Calycanthus floridus	Sweetshrub
Forsythia x intermidia	Border Forsythia
Myrica cerifera	Waxmyrtle, Southern

GRASSES

Andropogon sp.	Broomsedge
Fescue Kentucky 31	Kentucky 31 Fescue
Panicum virgatum	Switchgrass

Chart 6-10

LAWNS

WARM SEASON GRASSES

Bermudagrass	TifWay 419 (type) sod only
Zoysigrass	Meyer (type) sod only

COOL SEASON GRASSES

Tall Fescue	The Rebels (type) sod only
Annual Rye	For overseeding only

EROSION CONTROL GRASSING

Per City of Atlanta requirements

GROUNDCOVER FOR STREET TREE STRIP

Bermudagrass	TifWay 419 (type) sod only
Zoysigrass	Meyer (type) sod only
Liriope spicata	Lilly Turf

Chart 6-11

STREET TREES

Only trees on this list may be used for planting in rows along campus streets and walkways. In urban situations use continuous planting trenches and structural soils. Tree grates may not be used.

		Min.Width of Tree Strip	Non-Buttressing Trunk	Buttressing Trunk	Native Tree
LARGE TREES					
Quercus nuttalli	Nuttall Oak	8'		X	X
Quercus phellos	Willow Oak	8'		X	X
Quercus shumardii	Oak, Shumard	5'	X		X
Ulmus alata	Winged Elm	5'	X		X
** Ulmus americana 'Princeton' type*	** American Elm 'Princeton' type*	8'		X	X
MEDIUM TREES					
Acer buergeranum	Trident Maple	5'	X		
Acer campestre	Hedge or Field Maple	5	X		X
Carpinus caroliniana	Amer. Hornbeam, Ironwood, Blue Beech	5'	X		X
Gingko biloba 'Princeton Sentry' type	Ginkgo	5'	X		X
Celtis laevigata	Sugarberry, Sugar Hackberry	8'		X	X
Metasequoia glyptostroboides	Dawn Redwood	8'			
Nyssa sylvatica	Blackgum, Sour Gum	5'	X		X
Quercus hemisphaerica	Laurel Oak, Darlington Oak	8'		X	X
Taxodium distichum	Baldcypress	5'	X		
SMALL TREES					
Amelanchier arborea (single trunk only)	Downy Serviceberry	3'	X		X
Amelanchier x grandiflora (single trunk only)	Autumn Brilliance Serviceberry	3'	X		X
Carpinus betulus	European Hornbeam (upright)	3	X		
Lagerstroemia indica (single trunk only)	Crapemyrtle, Common	3'	X		
Parrotia persica	Persion Parrotia or Persian Ironwood	3'	X		

** Requires special permission because of uncertain longevity.*

6.2.9 STREET TREES

Street trees are defined as trees that are planted in a row along streets and walkways, often in linear planting strips between a street and a sidewalk.

Objectives:

1. Insure that street trees remain healthy for long life without damage to hardscapes.

Requirements:

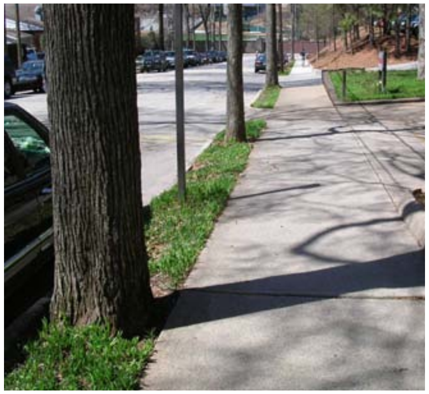
1. Use only tree species listed on *Chart 6-12: Street Trees.*
2. Plant trees in wide, continuous tree planting strips/beds. Provide no less than the minimum planting strip width for selected trees, identified on *Chart 6-12: Street Trees.* The minimum width for a tree with a buttressing trunk is 8 feet, The minimum width for a non-buttressing tree is 3' to 5' depending on the species.
3. Provide durable soil structure for air and water movement. Infiltration and permeability rates of soil within the full volume of the planting strip shall comply with 6.1.2 *Soil Development.*
4. Use the following tree spacing in a row:

– For Large Tree: 20-30 feet

– For Medium Tree: 15-20 feet

– For Small Tree: 10-15 feet

5. Consider using multiple species to avoid disease problems and tree loss related to monocultures.
6. Maximum tree size at planting: 4-inch caliper.
7. Minimum tree size at planting: 2-inch caliper.



Figures 6-28: Examples of non-buttressing and buttressing trunks. Winged Elm is on the left. Willow Oak is on the right.

Figure 6-29: A good example of an 8-foot wide continuous tree planting strip. It can be overlaid with open joint paving, as shown or planted with grass or groundcover. Tree spacing is 20 feet..

6.2.10 PLANTING AND UTILITIES

Objective

1. Establish a campus-wide standard for planting and utilities.
2. Establish a special standard for planting and utilities in the Eco-Commons.

Requirements

1. Chart 6-13 PLANTING SETBACK FROM UTILITIES provides specific information regarding the proximity of proposed plantings to underground utilities.
2. In the Eco-Commons there are minimal setbacks, because of ecological functions that serve the entire campus.
3. When utilities require access it is expected that it will be necessary to cut trees and vegetation and replant afterwards.
4. Use rapid growing and disturbance-tolerant trees for locations near utilities.
5. Use suckering shrubs over and near utility runs. See Chart 6-8: Shrub Masses

PLANTING SETBACK FROM UTILITIES	Electric Cable - buried	Fiber Optic Cable	Electricity & Communication	Water Line	Chill Water Line	Steam Line	Gas Line	Sanitary & Combined Sewer	Storm Sewer	Manhole	Steam Manhole Vent	Steam Expansion Loop
CAMPUS-WIDE STANDARD	Minimum Setback in Feet from Utility Centerline											
Large Tree		0	0	5'	5'	5'	3'	5'	3	5'	5'	5'
Medium Tree	0	0	0	5'	5'	5'	3'	5'	3	5'	5'	5'
Small Tree	0	0	0	0	0	5'	0	0	0	2'	2'	3'
Shrub	2'	2'	3'	0	0	3'	1'	0	0	1	2'	2'
Lawn and Groundcover	0	0	0	0	0	0	0	0	0	0	0	0
ECO-COMMONS STANDARD	Minimum Setback in Feet from Utility Centerline											
Large Tree	0	0	0	0	0	5'	0	0	0	5'	5'	5'
Medium Tree	0	0	0	0	0	5'	0	0	0	5'	5'	5'
Small Tree	0	0	0	0	0	3	0	0	0	2'	2'	3'
Shrub	0	0	0	0	0	0	0	0	0	1	2'	2'
Lawn and Groundcover	0	0	0	0	0	0	0	0	0	0	0	0

Chart 6-12 Planting Setback from Utilities on the Georgia Tech Campus

6.2.11 IRRIGATION (Including Stormwater Redistribution through Irrigation)

Objectives:

1. Develop a campus-wide, smart irrigation system that integrates water harvesting and storage, stormwater management, and plant irrigation technology without potable water.
2. Create an as-built data base and monitoring and control system to manage campus-wide irrigation and redistribution spray application of stormwater.

Requirements:

1. Develop an integrated irrigation concept as part of Schematic Design, which addresses water supply and irrigation purpose, including stormwater redistribution.
2. In Design Development refine the integrated irrigation concept with supply-side and demand-side projections. Present a feasible system that has been vetted by the design team (including civil-soil engineering), and by Georgia Tech staff.
3. Construction Documents should include CSI Master Format Specification: 32 80 00 Irrigation.

6.3 HARDSCAPE GUIDELINES

Contents:

ALLOWABLE USE OF CIRCULATION TYPES

	Pedestrians	Bicycles	Service & Handicap	Emergency
TYPE 1 PEDESTRIAN STREET	X	X	X	X
TYPE 2 PRIMARY MULTI-PURPOSEWALK	X	X	X	X
TYPE 3 SECONDAY MULTI-PURPOSE WALK	X	X	X	X
TYPE 4 PEDESTIAN ONLY WALK	X			
TYPE 5 MINOR WALK	X			
TYPE 6 SERVICE LANE		X	X	X
TYPE 7 FIRE TRUCK OFF-ROAD ROUTE				X

Chart 6-13: This table identifies the permitted use for each Circulation Type.

6.3.1 CIRCULATION TYPES

Objectives:

1. Establish a legible hierarchy of circulation elements to accommodate different modes and volumes of use on campus.
2. Accommodate safe multi-purpose movement within the core campus by pedestrians, bicyclists, golf carts, gem cars, handicap transit, emergency vehicles, and occasional large trucks.

Requirements:

1. Identify the Circulation Type(s) for all circulation elements within and adjacent to a project. There are seven circulation types used on the Georgia Tech campus besides public streets. Consult the Master Plan Map and Corridor Descriptions for location, dimensions, and special functions, such as stormwater management. Note that a corridor may contain more than one Circulation Type.
2. In Schematic Design review Circulation Type determinations with *Capital Planning and Space Management (CPSM).*

TYPE 1 - Pedestrian Street

This is a street-form primary multi-purpose walk with curb and gutter that is used in selected historic corridors, including Cherry, Atlantic and Hemphill. It accommodates high volume pedestrian use, major bicycle traffic, and occasional use by service, emergency, and handicap vehicles. Width: 20 to 25 feet.

TYPE 2 - Primary Multi-Purpose Walk

This is a multi-mode facility for high volume pedestrian use, major bicycle traffic, and controlled use by service, emergency, and handicap vehicles. Width: 20 to 25 feet.

TYPE 3 - Secondary Multi-Purpose Walk

This is a multi-mode facility for lower traffic volumes. Width: 15 to 20 feet.

TYPE 4 - Pedestrian Walkway

This is a pedestrian-only facility and is the typical sidewalk of all public streets. Golfcarts and bicycles are prohibited. Width: 8 to 12 feet. The Master Plan Map shows 10-foot widths for this type.

TYPE 5 - Minor Walk

This walk type is for very limited use areas, such as walks to dumpsters or service doors. Width: 6 feet.

TYPE 6 - Service Lane

This is a curbed roadway for areas with high, regular volumes of vehicular service traffic. It is also suitable for bicycles. Service lanes may have sidewalks and curbed parking bays for gem-cars, golfcarts, and bicycle corrals. Width: 16 feet.

TYPE 7 - Fire truck Off-Road Access Route

This is a designated route unobtrusively blended into landscape areas to provide access for firefighting. It should not be visually recognizable by the casual viewer.

6.3.2 PAVEMENT TYPES

Objectives:

1. Establish a hierarchy of paving material and design to relate to function, visual importance, and campus unity.

Requirements:

1. There are 8 pavement types for campus circulation elements, not including public streets.

   A. Brick with Granite Curb & Gutter

   B. Brick with Brick Bands

   C. Concrete with Brick Band

   D. Concrete with Concrete Bands

   E. Utility Concrete Paving

   F. Open-Jointed Concrete Pavers

   G. Unconsolidated Aggregate (Gravel)

   H. Reinforced Turf

2. All pavements must be built to support vehicular loads, except those used for Circulation Types 4 and 5.
3. The design of all pavements and related drainage structures must comply with campus-wide stormwater planning.
4. Trees pits are not permitted within the full flow width of a circulation element.

Chart 6-14

ALLOWABLE PAVEMENT FOR CIRCULATION TYPES

	A - Brick with Granite Curb & Gutter	B - Brick with Brick Bands	C - Concrete with Brick Bands	D - Concrete with Concrete Bands	E - Utility Concrete	F - Open Joint Conc Pavers	G - Unconsolidated Aggregate	H - Reinforced Turf or Gravel
TYPE 1 PEDESTRIAN STREET	X							
TYPE 2 PRIMARY MULTI-PURPOSEWALK		X	X				X	
TYPE 3 SECONDAY MULTI-PURPOSE WALK		X	X		X		X	
TYPE 4 PEDESTIAN ONLY WALK		X	X	X			X	
TYPE 5 MINOR WALK					X	X	X	
TYPE 6 SERVICE LANE						X		
TYPE 7 FIRE TRUCK OFF-ROAD ROUTE								X

Figure 6-30. Atlantic Promenade north of Ferst, showing Pavement Type-A: Brick with granite curb and gutter

6.3.2-A Pavement A: Brick Paving With Granite Curb and Gutter

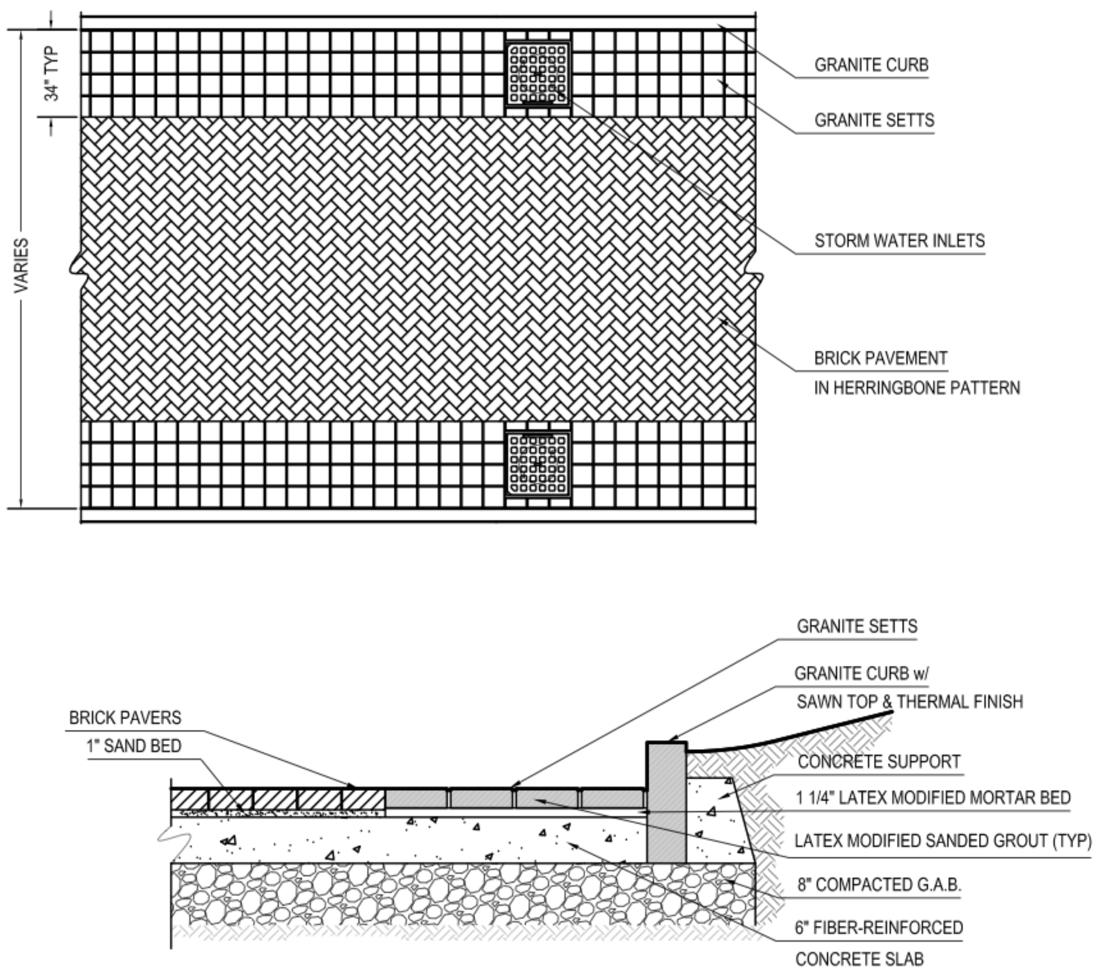


Figure 6-31: Plan and Section of Type A: Brick Paving with Granite Curb and Gutter.

MATERIALS

1. Brick Pavers:

– Whitacre Greer (Manufacturer) ASTM C 936, Standard Bevel-Edge Vacuum Dry-Pressed Brick Pavers.

– 4”x8”x3-1/8” for *Pavement Type A* when used for *Circulation Facility Type 1*.

– 4”x8”x3-1/8” for *Pavement Types B and C* when used for *Circulation Facility Types 2 or 3*.

– 4”x8”x2-1/4” for *Pavement Types B and C* when used for *Circulation Facility Type 4.*

– Brick Paver Color Mix:

  – Shade 30 Rustic Clear -15%
  – Shade 32 Antique - 25%
  – Shade 33 Dark Antique - 20%
  – Shade Mulberry - 15%
  – Shade 35 Red Sunset - 25%

2. Granite Setts

– ‘Elberton Gray’ granite from Georgia

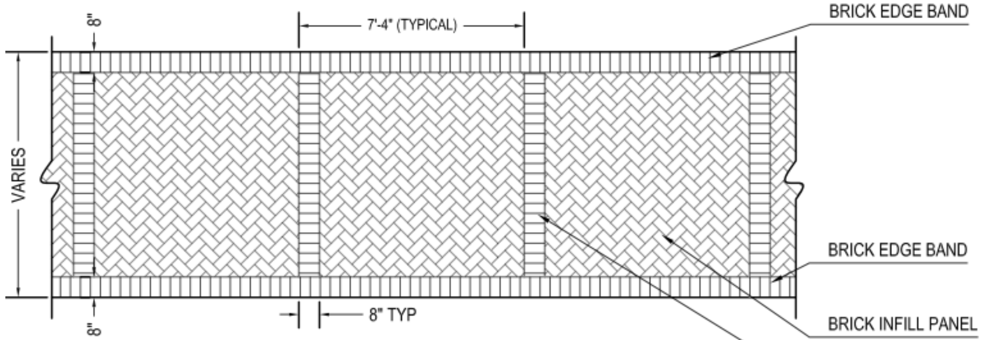
– 8” x 8” X 2-1/2” with broken top face and all other sides sawn.

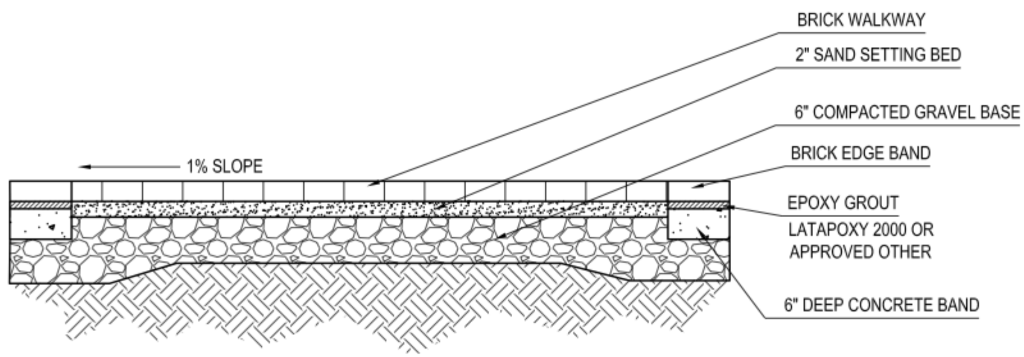
3. **Granite Curb**

– Elberton Gray’ granite from Georgia.

– Broken face of curb with sawn top.

6.3.2-B Pavement B: Brick Paving with Brick Bands





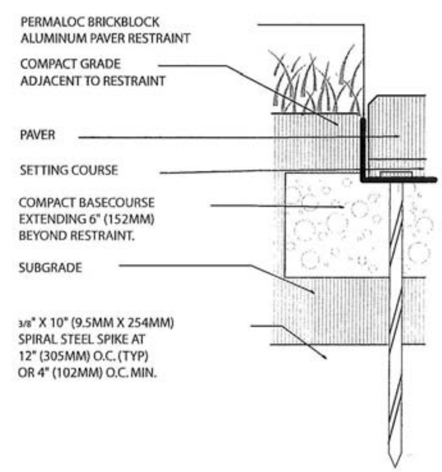
Note: Areas with significant vehicular traffic, grade changes or other transitional areas may require the use of a concrete base to prevent settling or shifting of paving units.

Figure 6-32: Plan and Section of Type B: Brick Paving with Brick Bands.

MATERIALS

1. Brick Pavers:

- Whitacre Greer (Manufacturer) ASTM C 936, Standard Bevel-Edge Vacuum Dry-Pressed Brick Pavers.
- 4”x8”x3-1/8” for *Pavement Type A* when used for *Circulation Facility Type 1*.
- 4”x8”x3-1/8” for *Pavement Type B* when used for *Circulation Facility Types 2 or 3*.
- 4”x8”x2-1/4” for *Pavement Type C*
- 4”x8”x2-1/4” for *Pavement Types B* when used for *Circulation Facility Type 4.*
- Brick Paver Color Mix:
  - Shade 30 Rustic Clear -15%
  - Shade 32 Antique - 25%
  - Shade 33 Dark Antique - 20%
  - Shade 34 Mulberry - 15%
  - Shade 36 Red Sunset - 25%
- Brick Pattern: Herringbone or Running Bond



6.3.2-C Pavement C: Concrete Paving with Brick Bands

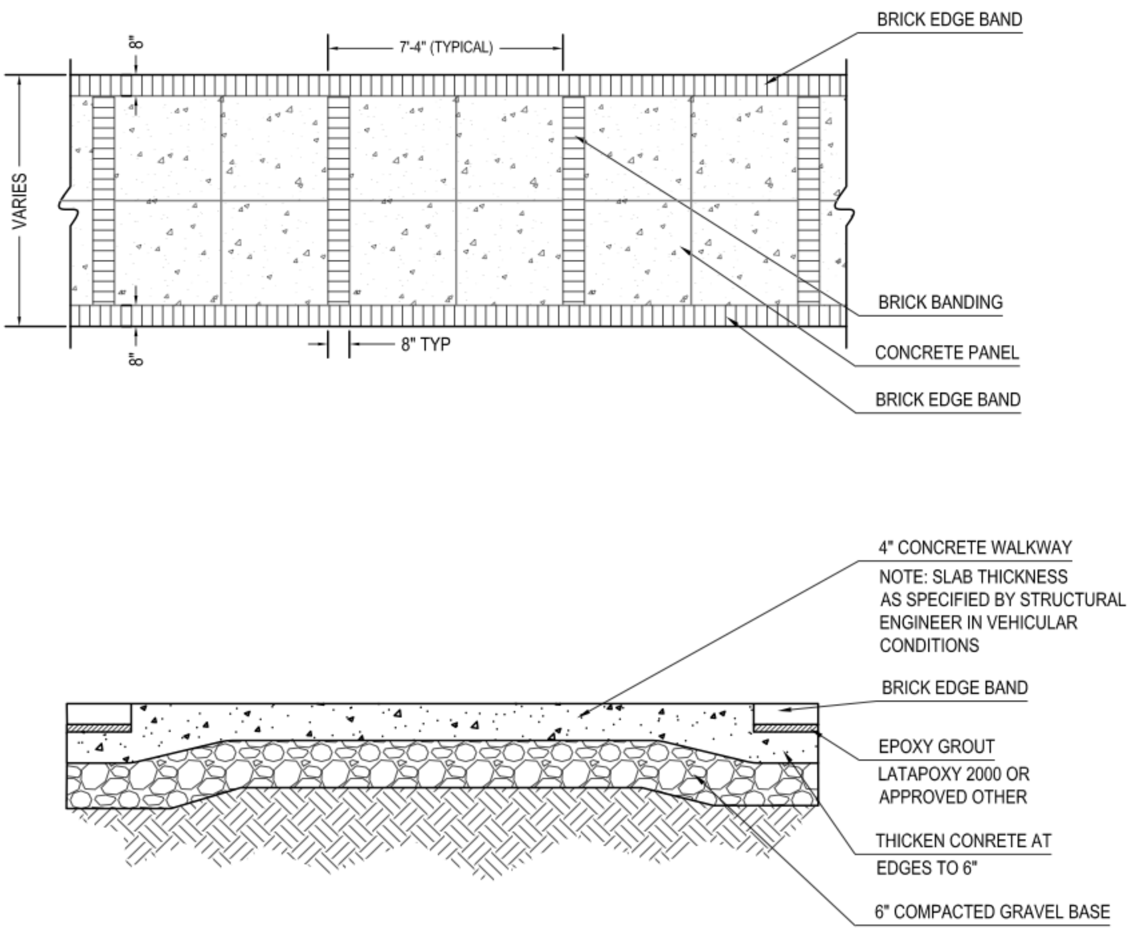


Figure 6-33: Plan and Section of Type C: Concrete Paving with Brick Bands.

MATERIALS

1. **Brick Pavers:**

– Whitacre Greer (Manufacturer) ASTM C 936, Standard Bevel-Edge Vacuum Dry-Pressed Brick Pavers.

– 4”x8”x3-1/8” for *Pavement Type A* when used for *Circulation Facility Type 1*.

– 4”x8”x3-1/8” for *Pavement Types B* when used for *Circulation Facility Types 2 or 3*.

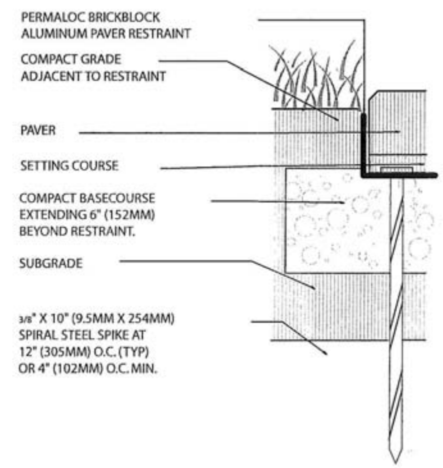
– 4”x8”x2-1/4” for *Pavement Types B and C* when used for *Circulation Facility Type 4.*

– Brick Paver Color Mix:

  – Shade 30 Rustic Clear -15%
  – Shade 32 Antique - 25%
  – Shade 33 Dark Antique - 20%
  – Shade 34 Mulberry - 15%
  – Shade 36 Red Sunset - 25%

2. **Concrete**

– Light broom finish and saw cut joints



6.3.2-D Pavement D: Concrete Paving with Concrete Bands.

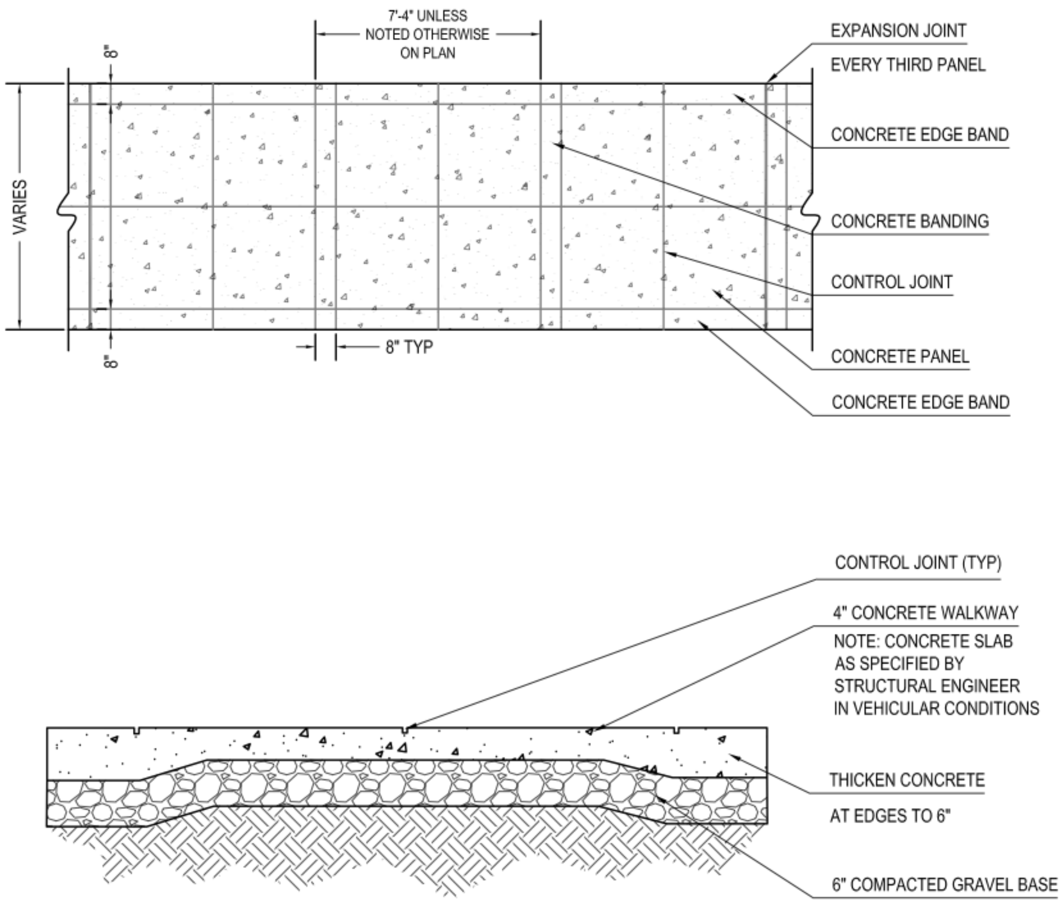


Figure 6-34: Plan and Section of Type D: Concrete Paving with Concrete Bands.

MATERIALS

1. Concrete

– Light broom finish and saw cut joints

6.3.2-E Type E: Utility Concrete Paving

- 5" Minimum thickness for pedestrian only walks
- Slab thickness specified by structural engineer in vehicular conditions
- Light broom finish with sawed joints
- 5 foot minimum walk width

6.3.2-F Type F: Open-Joint Concrete Unit Paving

MATERIALS

1. Concrete Paver
2. Granite Curb

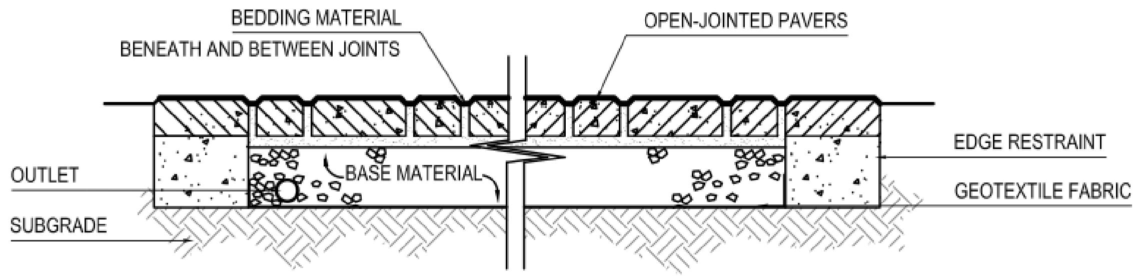


Figure 6-35: Section of Type F Open-Jointed Concrete Unit Paving.

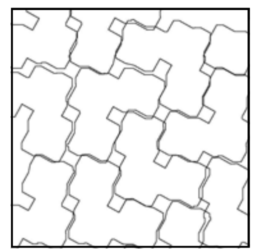


Figure 6-36: Plan Detail of Type F Paving

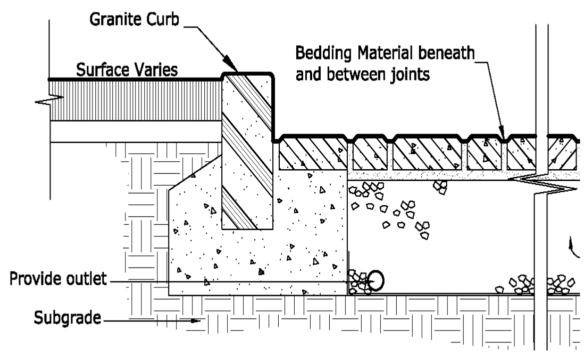


Figure 6-37: Section of Granite Curb with Type F Paving

Type G: Unconsolidated Aggregate Paving

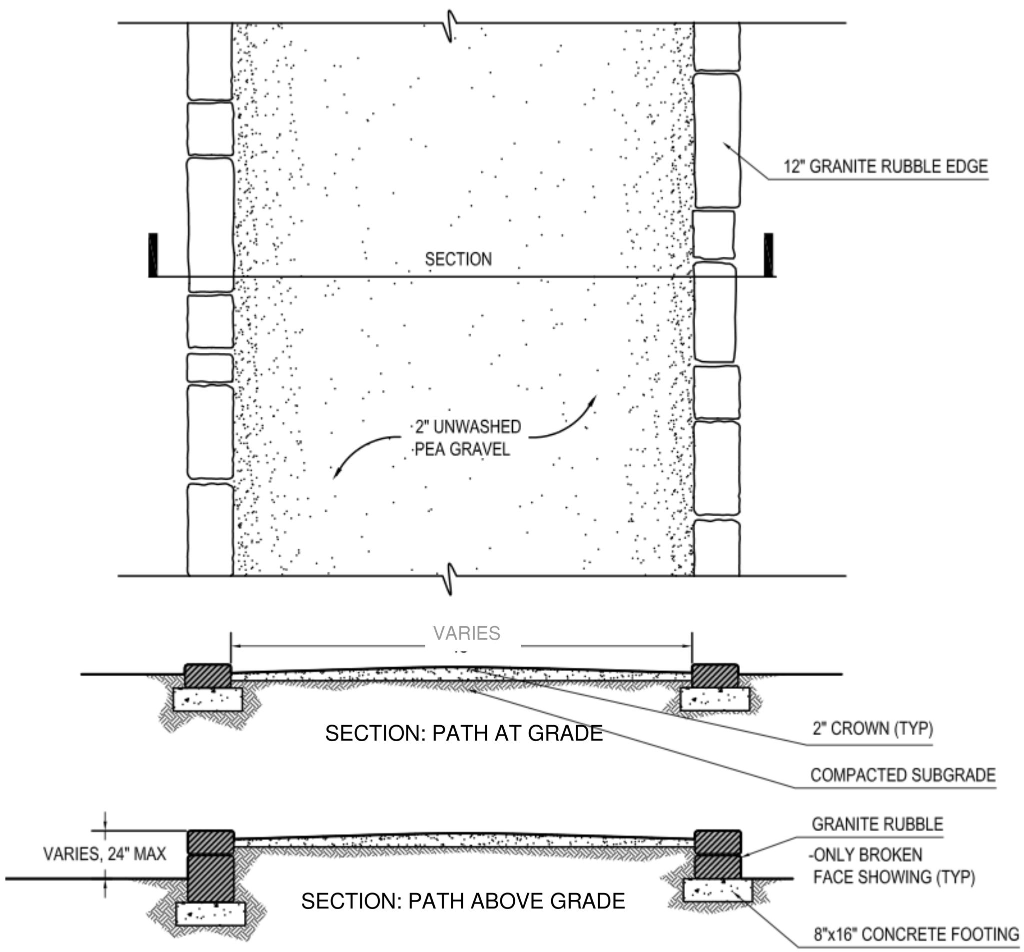


Figure 6-38: Plan and Sections of Type G: Unconsolidated Aggregate (Gravel)

MATERIALS

1. 'Oconee Pea" - Unwashed pea gravel (a mixture of sizes pea-size and smaller, including sand). Supplier:
   - LC Curtis & Son, Inc.
     1241 Greensboro Highway
     Watkinsville, Georgia 30677
     706-769-5339
2. 'Elberton Gray' Granite Rubble - rectangular pieces , minimum 6" thick, with exposed broken face.
3. Gravel Reinforcement - invisible structural system below the surface of gravel for use where there are heavy vehicular loads, wheel turning movements or to prevent material creep or washing on slopes. Product:
   - *GravelPave 2* (Manufactured by Invisible Structures, Inc.)

NOTES

1. 6' Minimum Width Gravel Surface
2. 2" thickness of gravel
3. Slightly crown and compact subgrade or construct subgrade to infiltrate water if part of a stormwater management regimen.

Type H: Reinforced Turf or Gravel

This pavement type is a non visible reinforcement system for turf, mulch or gravel areas to support heavy vehicular loads even in wet weather.

MATERIALS

1. *GrassPave 2* (Manufactured by *Invisible Structures, Inc.*) for turf areas.
2. *GravelPave 2 (*Manufactured by *Invisible Structures, Inc.)* for gravel areas.

NOTES

1. Use without exposed concrete curbs or bands, when reinforcing areas for fire truck access.
2. Use in gravel areas for car parks.
3. Use in gravel paths when slope and drainage is an issue.

Figure 6-39: Mock-up showing the GrassPave2 turf reinforcement system.

6.3.3 SITE STAIRS AND HANDRAILS

Requirements: Site Stairs

- Tread and Riser dimensions shall comply with the formula:
  <u>2 x H(riser) + W(tread) = 27 inches</u>
- Risers may be no less than 4” nor greater than 6”.
- Minimum number of steps in a run: 3
- Materials: When part of a designated *Circulation Facility,* site stairs shall be brick, concrete, or granite.
- Stairs should be designed with a bicycle wheel gutter on the side or down the middle to transport bicycle. The gutter should have dimensions of no less than 3" wide x ½” deep.
- All stairs shall have a handrail.

Requirements: Site Stair Handrail

- Use the *Standard Site Stair Hand*rail throughout the campus, except where context suggests use of the *Traditional Site Stair Handrail.*
- Material for Standard Site Stair Handrail is stainless steel.
- Material for Traditional Site Stair Handrail is aluminum, painted dark bronze to match campus lampposts.

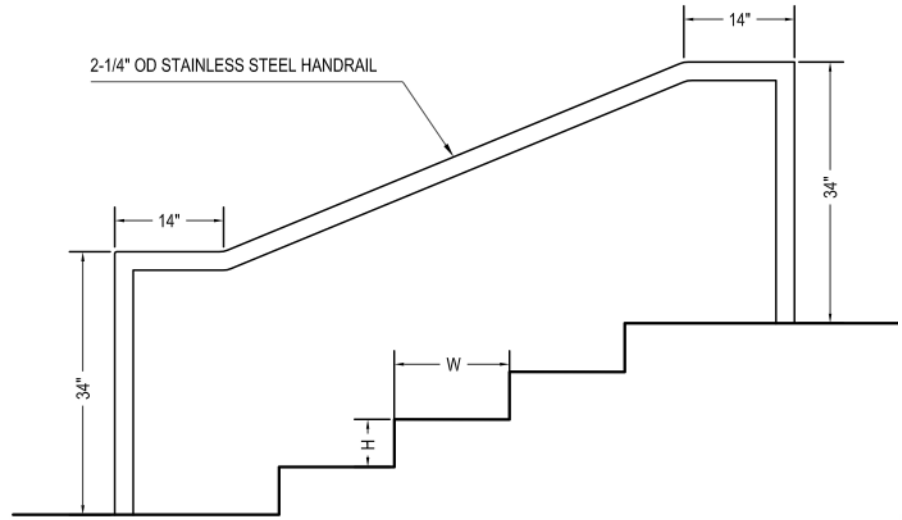


Figure 6-40: Standard Site Stair Handrail

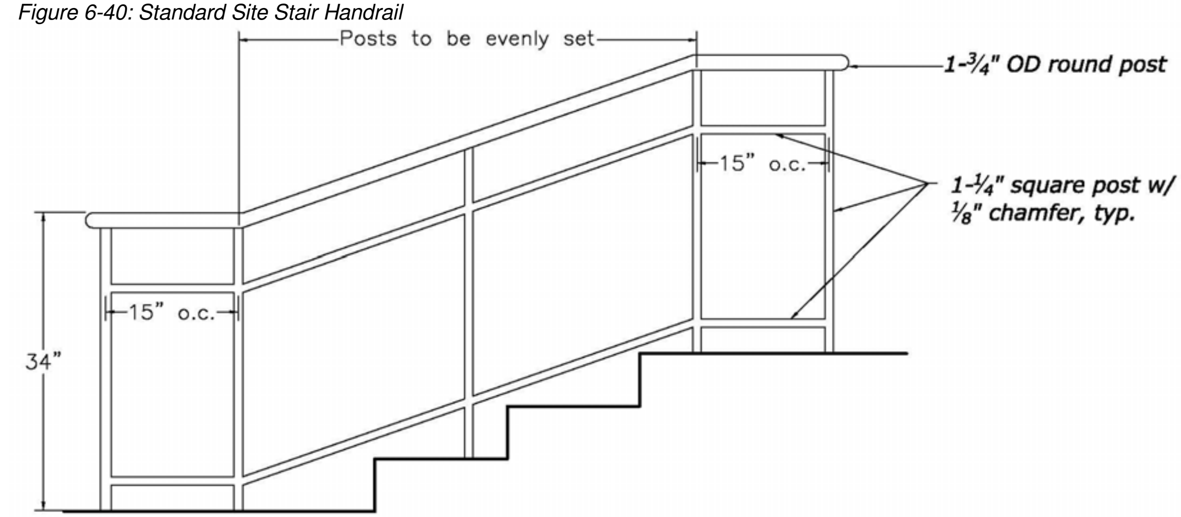


Figure 6-41: Traditional Site Stair Handrail

6.3.4 SITE WALLS

Objectives:

1. Integrate site walls into the overall landscape as a unifying campus element.
2. Use site walls to accomplish multiple purposes - e.g. seating, retaining, and stormwater management.

Requirements:

1. Material: Use 'Elberton Gray' Georgia granite rectangular rubble with broken face exposed. Any exception requires special permission. In no case are wood tie retaining walls permitted.
2. Retaining walls should be gravity type, unless prohibited by some condition.
3. Granite rubble walls shall be built with random rectangular units with predominant horizontal orientation in face of wall.
4. The top laying course shall be the same material as face of wall with no stone less than 6" thick. The top course may be laid in the following ways, but should blend with any existing adjacent walls:

a. Random rectangular units flush with face of wall.

b. Uniform rectangular units (with no dimension less than 16") flush with face of wall.

c. Uniform rectangular units (with no dimension less than 16") laid with 1-1/2" overhang(s).

Granite Rubble Site Walls

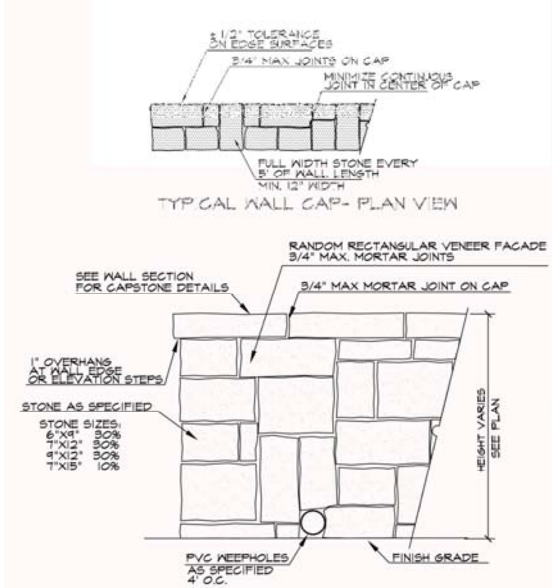


Figure 6-42: Section of Granite Freestanding Wall. W = Not less than 20 inches, H = Not more than 48 inches.

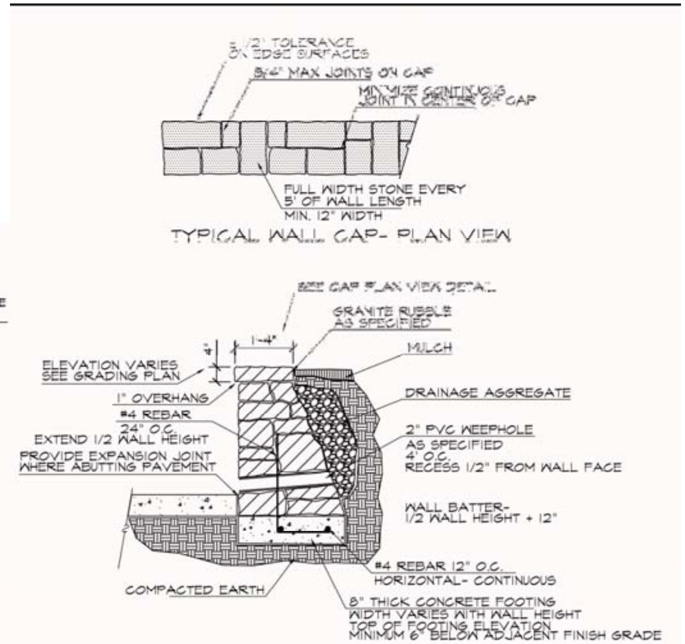


Figure 6-43: Section of Granite Retaining Wall (gravity type). W = Nott less than 16 inches, H = Not more than 60 inches.

5. Joints shall not be greater than 3/4" wide and shall be raked 1/2".
6. Minimum top width of a retaining wall: 16 "
7. Minimum top width of freestanding wall: 20"
8. Maximum height of a retaining wall: 60"
9. Maximum height of a freestanding wall: 48".
10. On slopes less than 5% the top of wall and coursing may follow the grade.
11. On slopes greater than 5% the top of wall and coursing shall be level.
12. No weep holes in face of walls—use back-of-wall drainage instead.
13. Utilize back of retaining wall for short term stormwater storage where appropriate.

6.3.5 BICYCLE FACILITIES

Objective:

1. Expand bicycle use as an integral part of daily life on the Georgia Tech campus by providing a bicycle network, bicycle parking, and end-of-trip facilities to encourage use.
2. Make the campus bicycle friendly.
3. Integrate bicycle circulation with campus streets and multi-purpose walks through design and management.

Requirements for Bicycle Circulation:

1. Accommodate on-street bicycle circulation.

– On-Street facilities should carry bicycle traffic in the same direction as adjacent motor vehicles.

– Dedicated, striped bicycle lanes are preferred for the campus's arterial and collector streets (Fifth-Ferst, Tenth, Hemphill, State, and Fowler). Lanes should be a minimum of 4' wide and conform to City of Atlanta and AASHTO Standards, including signage.

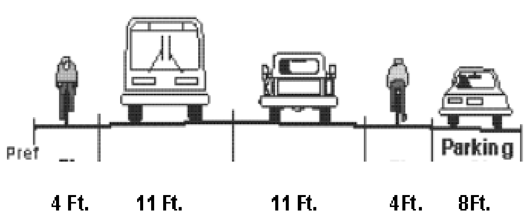


Figure 6-45: Street Section with Bicycle Lanes

2. Design multi-purpose walkways to accommodate bicycle circulation on them. *(See Chart 6-8: Allowable Use of Circulation Types)*

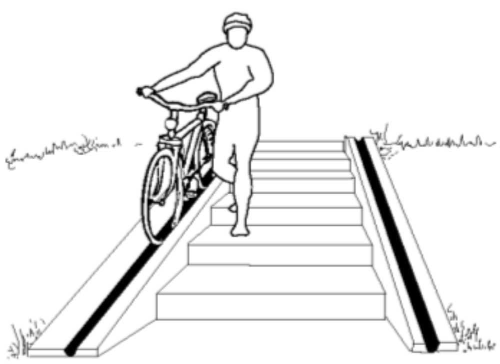
– The minimum width of major campus corridors should be 20'.

– Use pavement grates that are not a bicycle hazard.

– Avoid impeding circulation flows with furnishings and signs

– As necessary, establish cyclist dismounting zones in congested areas with signage and enforcement.

3. Staircases should be designed with a bicycle wheel runnel on the sides or down the middle to transport bicycle. The gutter should have dimensions of no less than 3" wide x ½. deep. Avoid conflict with handrails.



(Courtesy, City of Portland)

Figure 6-46: Bicycle Ramps on Stairs

4. Provide bicycle-related signs that conform to unified system of standard signs and pavement markings developed by Georgia Tech to indicate shared roads, bike lanes, directions to short and long-term parking areas, etc. Signage should be integrated with the PATH Foundation bicycle system in Atlanta.

Requirements for Bicycle Parking:

1. Provide **Long-term Parking** to accommodate staff and students who stay at a location or campus area for a half day or longer, including residence halls and family housing. In exchange for high security from theft and covered parking, long-term parking may be some distance from a building or cluster of building.

– Provide within a maximum of 750 feet for the area it serves.

– Cover at least half of a long-term facility.

– Provide heightened security by at least one of the following:

- Locked room or area
- Bicycle lockers
- Attendant or security guard
- Security camera
- High visibility from adjacent work area

2. Provide **Short-term Parking** to accommodate students and staff who come to a location for a relatively brief duration and are motivated by a high level of convenience.

– Provide at least 10% of required short-term parking within 50 feet of a building's entrance.

– Where there is more than one building on a site or where a building has more than one main entrance, locate bicycle parking to serve all buildings or entrances.

– Locate parking in highly visible locations.

3. Provide at least the minimum required parking spaces using Chart 6-16 Georgia Tech may consider phasing the implementation of the required number for a project, but in no case shall the first phase be less than 66%.

4. Provide no less than 10 spaces in a rack.

Chart 6-15

MINIMUM REQUIRED BICYCLE PARKING SPACES

BUILDING TYPE	LONG-TERM SPACES	SHORT-TERM SPACES
Classroom Buildings	2 per 20,000 SF of net building area or 1 per 15 staff/researchers, whichever is greater	1 per 12 seats
Dining Halls	2 per 20,000 SF of net building area or 1 per staff/researchers, whichever is greater	2 per 5000 SF of net building area or 1 per 15 seats, whichever is greater
Mixed Use Buildings	2 per 20,000 SF of net floor area	2 per 10,000 SF of net bulding area
Multi-family Housing	1 per 4 units	2 per 20 units
Offices and Laboratories	2 per 20,000 SF of net building area or 1 per 15 staff/researchers, whichever is greater	2 per 40,000 SF of net building area or 1 per 30 staff/researchers, whichever is greater
Residence Hall	1 per 6 residents	2 per 20 units

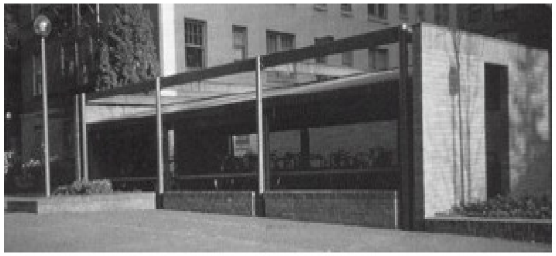


Figure 6-47: Example of Covered Long-term Parking

Requirements for Bicycle Rack Placement:

1. Racks located in the public right-of-way shall conform and be permitted by the City of Atlanta.

2. Provide the following setbacks at a minimum:

- Crosswalk: 10 feet
- Public Stairs: 10 feet
- Street Curb: 5 feet
- Bus Stop, Shelter: 5 feet
- Loading Zone: 5 feet

- Fire Hydrant: 5 feet
- Street Tree: 5 feet
- Tree in Pavement: 5 feet
- Kiosks: 5 feet
- Light or Sign Pole: 3 feet
- Newspaper rack: 3 feet
- Mailbox: 3 feet
- Trash or Recycling Can : 3 feet
- Bench: 3 feet
- Utility meter, Manhole: 3 feet

- Building Wall: 2 feet
- Major Doorway: 10 feet
- Minor Doorway: 5 feet

5. Racks shall be separated from car parking by a physical barrier to protect bicycles from damage by cars.

6. Provide an aisle of at least 5' between rows of bicycles.

7. Provide a minimum distance between racks of 3 feet.

8. Minimum bicycle space: 2 feet x 6 feet.

Bicycle Rack Requirements and Campus Standard:

1. Bike racks shall provide a parked bicycle with 2 points of support and accommodate a U-shaped locking device.

2. All bicycle racks shall be campus standard:

- Manufacturer: DERO BIKE RACKS
- Model: SWERVE RACK
- Finish: Stainless Steel
- www. dero.com

- Manufacturer: LANDSCAPE FORMS
- Model: PI RACK
- Finish: Bronze
- www.landscapeforms.com

- Manufacturer: HUNTCO
- Model: BR-SERIES
- Finish: Stainless Steel
- www.huntco.com

Figure 6-48: GT standard Bike Racks.

Small Bicycle Shelter Requirements and Campus Standard

1. Small shelter shall be modular, shall be able to accommodate horizontal and vertical racks with a minimum capacity of 10 bicycles per module. It shall have optional side panels for additional protection.

2. Small bicycle shelters shall be campus standard:

– Manufacturer: DERO BIKE RACKS
– Model: BIKE HAVEN
– Finish: Galvanized

OR

– Model: KOLO SHELTER
– Finish: Galvanized

Large Bicycle Shelter Requirements and Campus Standard

1. Large shelter shall be modular, shall be able to accommodate traditional, vertical or two-tiered bike racks with a minimum capacity of 22 bicycles and a maximum capacity of 56 per module. It shall have optional side panels for additional protection.

2. Large bicycle shelters shall be campus standard:

– Manufacturer: DERO BIKE RACKS
– Model: CYCLE STATION
– Finish: Galvanized

Figure 6-49: Small Shelter: Kolo Shelter by Dero Bike Racks

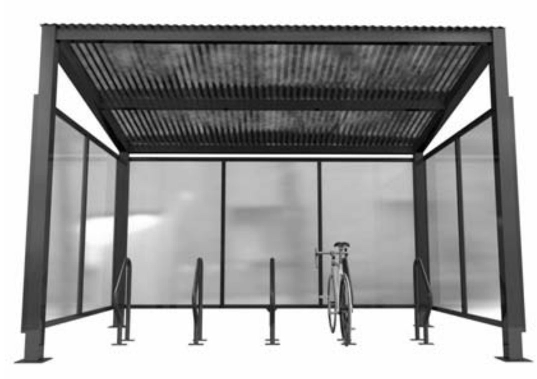


Figure 6-50: Small Shelter: Bike Haven by Dero Bike Racks

Figure 6-51: Large Shelter: Cycle Station by Dero Bike Racks

6.3.6 TRANSIT STOPS

Objectives

1. Establish a hierarchy of Transit Stops to support transit functions, user volumes, pedestrian traffic and urban design context.
2. To integrate and visually express public transportation as a vital part of the campus.

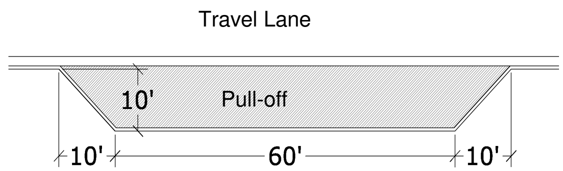


Figure 6-52: Plan of Transit Pull-off Bay.

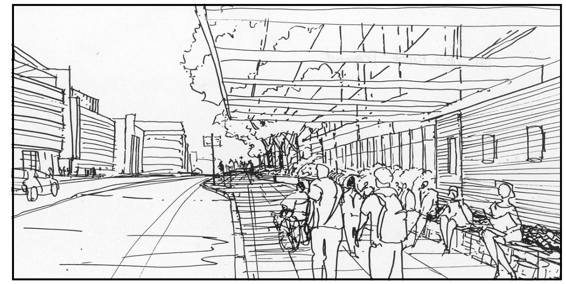


Figure 6-53: illustration of a Primary Transit Stop.

Requirements:

1. Utilize one of three sizes of transit stops to accommodate a transit need: Primary, Secondary, and Minor.
2. <u>Primary Transit Stop</u>

– Large covered waiting areas. located at the most important pedestrian intersections. should be custom-designed to architecturally integrate with corridor context. Where possible it should be an architectural extension of an adjacent building. (Figure 6-53)

– Pull-off bay for transit vehicle (Figure 6-52)

– Minimum 20'-foot wide pedestrian pavement along full length of pull-off.

– Seat along entire length of bay at back of sidewalk.

– Overhead rain canopy over entire pavement.

2. <u>Secondary Transit Stop</u>

– Standard bus shelter at intersections along primary roads (Figure 6-54).

– Pull-off bay for transit vehicle (Figure 6-52).

– Minimum 15' width of sidewalk pavement.

– (4) 8-foot benches.

2. <u>Minor Transit Stops</u>

– Curbside locations for minor stops. (Figure 6-55)

– No transit pull-off bay.

– No shelter.

– Minimum 10' width of sidewalk pavement.

– (2) 8-foot benches.

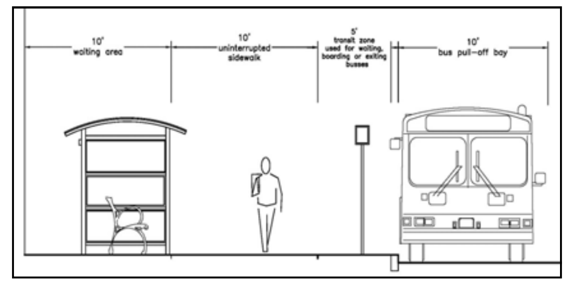


Figure 6-54: Secondary Transit Stop.

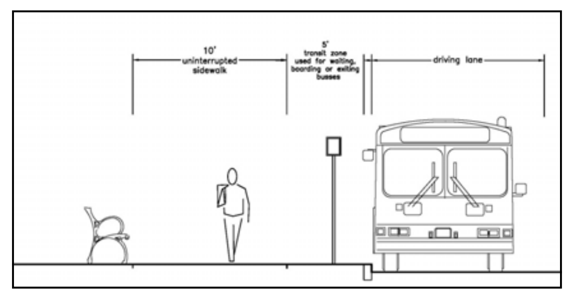


Figure 6-55: Minor Transit Stop

6.3.7 SITE FURNITURE

Requirements

1. All site furniture on campus shall be a campus standard.
2. Where there is a choice of furniture style, context shall determine appropriate selection.

Traditional Bench

Manufacturer: Landscape Forms, Inc.
Model: Plainwell
Finish: Metal-polyester Powdercoat
Color: Bronze
Slats: FSC Certified Ipe
Length: Minimum 6-foot
Notes: Preferred use in pairs

Contemporary Bench

Manufacturer: Landscape Forms, Inc.
Model: Gretchen's Bench, without arms
Finish: Metal-polyester Powdercoat
Color: Bronze
Slats: FSC Certified Ipe
Length: Minimum 6-foot
Notes: Preferred use in pairs

Trash Receptacles & Recycling Containers

Manufacturer: Victor Stanley, Inc.
Trash/Recycling Container Model VS-SD-42
36 Gallon Side Door & Latch
Finish: Powder Coat
Color Trash Containers: Bronze
Color Recycling Containers: VS Green

Moveable Tables and Chairs

Tables:
Manufacturer: Landscape Forms
Model: Parc Centre
Dimension: 28" square
Finish: Powdercoat
Color: Silver

Chairs:
Manufacturer: Landscape Forms
Model: Verona
Armrests: with Armrests
Seat: Perforated metal seat.
Finish: Powdercoat
Color: Silver

Picnic Table

Manufacturer: Landscape Forms, Inc.
Model: Gretchen Picnic Table
Finish: Metal-polyester Powdercoat
Color: Bronze
Slats: FSC Certified Ipe

Residence Halls Furniture

Round Picnic Table with Attached Seats
Manufacturer: Landscape Forms
Model: Carousel
Finish: Powder Coat - Color Bronze
Grill on Pedestal
Manufacturer: Pilot Rock (Thomas Manuf. Co Inc.)
Model: EC-26

Hot Coal Bin
Manufacturer: Pilot Rock (Thomas Manuf. Co Inc.)

Figure 6-56: Traditional Bench

Figure 6-57: Contemporary Bench

Figure 6-58: Trash and Recycling Containers

6.3.8 OUTDOOR LIGHTING

Requirements

All new and replacement pedestrian lighting shall be the campus standards below. Campus context should determine selection of traditional or contemporary fixtures.

1. Traditional Pedestrian Light Fixture

Manufacturer: Holophane Unique Solutions Outdoor Architectural Lighting

Model: Utility Luminaire Series-Arlington 100 W HPS IES typ III, with Full Cutoff

Pole: Single Luminaire:-Wadsworth Series 5" fluted aluminum pole, 10'-0" high, 19" base, #W12C/19-CA/DB;

Pole: Double Luminaire:-Columbia Series Cast Iron and Steel Pole, 17'-0" high, 20" base, #C17/20-CIS/DB.

Bracket: *Double Luminaire only:* Philadelphia Series 36" width, two luminaries at 180 degrees.

Banner Arm: *Double Luminaire only:*Two 26" long, 1" round bolt-on arms with half-sphere caps mounted minimum 12" below bottom of luminaire and 2 eye bolts mounted minimum of 10' above pavement with 24" x 72" maximum banner.

Finish: Fixture, pole, base, bracket and banner arm to be Dark Bronze

Spacing: 40' o.c. for single lamp, 60' o.c. for double lamp

Voltage: 120, 208 or 277

2. Contemporary Pedestrian Light Fixture

Manufacturer: Phoenix Products Company, Inc.

Model:Intrigue series pole top mounted *Large Eurotech* fixture with dome top, clear acrylic lens, Type V refractor, shade and silver finish. For locations next to walkways use Type III refractor #LET -PT-150HPS-D-CA-TY3(5)-SHD-480V-SIL.

Lamp: 150 watt HP.

Pole: 12' Type PA1-S-12, 4" diameter.

3. Roadway and Parking Lot Lighting

Manufacturer: GE Decashield 400 or equal.

Luminaire: Arm Mount with 400 watt HPS lamp when used alone: 250 watt HPS when used in combination with pedestrian pole mounted fixtures.

Pole: 5" square 30' high, steel, straight without taper.

Finish: Dark Bronze Anodized.

4. Lighted Bollards are not permitted.
5. Building Façade Lighting is not permitted.
6. Decorative landscape lighting is not permitted.

6.4 REQUIRED PLANS and SUBMISSIONS

Objectives:

1. To insure comprehensive project design and orderly project review.

Requirements:

1. Establish a project design process and schedule based on *Chart 6 –17: Required Plans and Submissions.*

Chart 6-16 : Required Plans & Submissions For Campus Landscape Projects

	REQUIRED PLANS & SUBMISSIONS	LMP SECTION	NOTES	PDC REVIEW	STAFF REVIEW	COMPETED
	DISCOVERY AND PROGRAM PHASE					
DP1	**Ecological Context**	1, 3, 4	Using the Master Plan Maps prepare a series of exhibits to discuss the Project's relationship to its existing and proposed campus context. This should extend beyond a project's limits and should address physiography and landform, stormwater hydrology and drainage basins, and vegetation communities. The goal is to highlight functional boundaries, opportunities, conflicts, and limiting factors that should directly or indirectly influence a project' design program and study area.	Ω	Δ	
DP2	**Human Context**	1, 3, 5	Using the Master Plan Maps prepare a series of exhibits to discuss the Project's relationship to its existing and proposed campus context. This should extend beyond a project's limits and should address existing conditions and the Campus Master Plan (2004), circulation, adjacencies, gathering places, entrances, design character, utilities, etc. The goal is to highlight functional boundaries, opportunities, conflicts, and limiting factors that should directly or indirectly influence a project's design program and study area.	Ω	Δ	
DP3	**Goals and Objectives**	1, 2	Address the Project's relationship to the Goals and Objectives of the *Landscape Master Plan* (Section 2).	Ω	Δ	
DP4	**Ecological Performance Requirements**	4, A.3	Show the project on the *Landscape Master Plan with Ecological Performance Zones*, and prepare a map and chart to identify the letter and location of Ecological Performance Requirements that the project must meet. Highlight the project's relationship with the Eco-Commons.	Ω	Δ	
DP5	**Plant Community Requirements**	A.3	Based on the *Landscape Master Plan with Vegetation Communities*, prepare a map and chart to identify the location and area of required plant communities.	Ω	Δ	

DP6	**Corridor Requirements**	5, A.3	Identify the Corridor Section(s) applicable to the project and prepare a chart of its requirements.	Ω	Δ	
DP7	**Utility Requirements**		Consult GT Facilties Engineering to identify utilities and potential conflicts.		Δ	
DP8	**Bicycle Facilities**	6.3.5	Requirement for bicycle parking.		Δ	
DP9	**Transit Stop (if applicable)**	6.3.6			Δ	
DP10	**PROGRAM REQUIREMENTS SUMMARY**		Prepare a summary chart of the requirements of the Landscape Master Plan that are applicable to the project and are to be part of the project's total program. This checklist will be used to insure that they are addressed throughout the project's design phases.	Ω	Δ	
C	**CONCEPT PHASE**					
C1	**Landform and Grading Requirements**	6.1.2	Prepare a grading plan and sections using 1' or 2' contours of the site, tying into adjacent areas; Coordinate with stormwater management.	Ω	Δ	
C2	**Stormwater Management Requirements**	6.1.3	Emphasis at the concept stage is on requirements 1 – 3.	Ω	Δ	
C3	**Pond Requirements (if applicable)**	6.1.4	Integrate with landform, grading, stormwater management, and vegetation.	Ω	Δ	
C4	**Water Course Requirements (if applicable)**	6.1.5	Integrate with landform, grading, stormwater management, and vegetation.	Ω	Δ	
C5	**Plant Communities Requirements**	6.2.5	Identify the plant community areas of the project.	Ω	Δ	
C6	**Circulation Type**	6.3.1	Concept designation	Ω	Δ	
C7	**Bicycle**	6.3.5	Concept designation		Δ	
C8	**Transit Stop (if applicable)**	6.3.6	Concept designation		Δ	

SD1	**SCHEMATIC DESIGN**					
SD2	**Landform and Grading Requirements**	6.1.2	Prepare a grading plan and sections using 1' or 2' contours of the site, tying into adjacent areas.	Ω	Δ	
SD3	**Stormwater Management Requirements**	6.1.3	Emphasis at Schematic Design is to refine the hydrological concept and address requirements 4 and 5.	Ω	Δ	
SD4	**Pond Requirements (if applicable)**	6.1.4	Integrate with landform, grading, stormwater management, and vegetation.	Ω	Δ	
SD5	**Water Course Requirements (if applicable)**	6.1.5	Integrate with landform, grading, stormwater management, and vegetation.	Ω	Δ	
SD6	**Tree Replacement**	6.2.2	Identify required number replacement trees.	Ω	Δ	
SD7	**Reforestation Requirements** (GT Staff Only)	6.2.3	Identify receiving zones for replacement trees.	Ω	Δ	
SD8	**Tree Canopy**	6.2.4	Identify required canopy coverage minus the existing canopy that will be retained to give the amount canopy that to be added.	Ω	Δ	
SD9	**Plant Communities Requirements**	6.2.5	Identify the areas of the project site required for plant communities per the Vegetation Communities map.	Ω	Δ	
SD10	**Plant Selection Requirements**	6.2.6	Submit preliminary *Plant Schedule*.	Ω	Δ	
SD11	**Circulation Types**	6.3.1	Designate all circulation elements in project and context	Ω	Δ	
SD12	**Pavement Types**	6.3.2	Designate and design pavements types.	Ω	Δ	
SD13	**Bicycle Facilities**	6.3.5	Location of facilities.	Ω	Δ	
SD14	**Transit Stop**	6.3.6	Location and type.	Ω	Δ	

DD	DESIGN DEVELOPMENT PHASE					
DD1	**Tree Replacement Requirements**	6.2.2	Confirm required number of replacement trees and show where they will be planted.	Ω	Δ	
DD2	**Tree Canopy Requirements**	6.2.4	Demonstrate compliance with all requirements, including the *Project Canopy Chart*, backed up by *Reflected Canopy Plans*.	Ω	Δ	
DD3	**Soil Development Requirements**	6.1.2	Soil Protection and Improvement Plan	Ω	Δ	
DD4	**Woodland Plant Community** (if applicable)	6.2.5.1	Demonstrate planting plan compliance.	Ω	Δ	
DD5	**Parkland Plant Community Requirements** (if applicable)	6.2.5.2	Demonstrate planting plan compliance.	Ω	Δ	
DD6	**Meadowland Plant Community Requirements** (if applicable)	6.2.5.3	Demonstrate planting plan compliance.	Ω	Δ	
DD7	**Ornamental Planting Requirements** (if applicable)	6.2.5.4	Demonstrate planting plan compliance.	Ω	Δ	
DD8	**Lawn Requirements** (if applicable)	6.2.5.5	Demonstrate planting plan compliance.	Ω	Δ	
DD9	**Plant Selection Requirements**	6.2.6	Submit a final *Plant Schedule* that conforms to all requirements.	Ω	Δ	
DD10	**Plants for Special Purposes**	6.2.8	Where applicable, identify selected plants.		Δ	
DD11	**Plant Material Size Requirements**	6.2.7	Specify the size (per requirement) of all proposed plant material.		Δ	
DD12	**Circulation Types**	6.3.1	Final designation with pavement widths.	Ω	Δ	
DD13	**Pavement Types**	6.3.2	Final designation pavement design.	Ω	Δ	
DD14	**Stairs and Handrails**	6.3.3	Final designation of type.		Δ	
DD15	**Site Walls**	6.3.4	Final layout, height, materials.	Ω	Δ	
DD16	**Bicycle Facilities**	6.3.5	Final inventory and location of factilities.	Ω	Δ	

DD17	**Transit Stop**	6.3.6	Final location, and designation of type.	Ω	Δ	
DD18	**Site Furniture**	6.3.7	Final designation of types.	Ω	Δ	
DD19	**Outdoor Lighting**	6.3.8	Final designation of types	Ω	Δ	
DD20	**Final Project Requirements Comprehensive Checklist**		Prepare a chart of all the specific and numerical requirements of the Landscape Master Plan that are applicable to the project and are part of the APPROVED FINAL DESIGN DEVELOPMENT PHASE. This checklist will be used to verify compliance of the Construction Documents and their implementation.	Ω	Δ	
DD21	**Specifications for Campus Landscape Projects**	6.5	Identify all sections to be included in Construction Documents.		Δ	
CD	**CONSTRUCTION DOCUMENTS PHASE**					
CD1	**Final Project Requirements Comprehensive Checklist**		Use to validate satisfactory inclusion in Final CD's.		Δ	
CD2	**Specifications for Campus Landscape Projects**		Use to validate satisfactory inclusion in Final CD's.		Δ	

6.5 SPECIFICATIONS FOR CAMPUS LANDSCAPE PROJECTS

Objective:

1. To promote consistent, effective, and high quality implementation of campus landscape projects.

Requirements:

1. Use the appropriate specification sections in <u>*Chart 6 -: Specifications Required for Campus Landscape Projects*</u> in the Construction Documents for all campus landscape projects.
2. When provided, use specification sections by Georgia Tech.

Chart 6-17 : Specifications Required For Campus Landscape Projects

SPECIFICATIONS REQUIRED FOR CAMPUS LANDSCAPE PROJECTS		
CSI Master Format Number	TITLE	Provided By GT
01 00 00	DIVISION 1 - GENERAL REQUIREMENTS	
01 56 39	Temporary Tree and Plant Protection	X
01 57 13	Erosion and Sediment Control	
01 89 13	Site Preparation Performance Requirements	X
10 00 00	DIVISION 10 - SPECIALTIES	
10 42 00	Bollards - Access Control	X
12 00 00	DIVISION 12 - FURNISHINGS	
12 93 00	Site Furnishings	
12 93 13	Bicycle Racks	X
12 93 23	Trash and Recycling Receptacles	X
12 93 33	Manufactured Planters	
12 93 43	Site Seating and Tables	X
26 00 00	DIVISION 26 - ELECTRICAL	
26 56 00	Exterior Lighting	
26 51 01	GT Lampposts	X
31 00 00	DIVISION 31 - EARTHWORK	

31 10 00	Site Clearing, Grubbing, Topsoil Stockpiling, etc	X
31 20 00	Earthmoving	X
31 22 00	Grading	X
31 23 00	Excavation and Fill	X
32 00 00	DIVISION 32 - EXTERIOR IMPROVEMENTS	
32 30 00	Site Improvements	
32 31 00	Fences, Gates, Railings	X
32 32 00	Retaining Walls	
32 32 53	Granite Rubble Walls	X
32 10 00	Bases, Ballasts, and Paving	
32 11 00	Base Courses	
32 12 00	Flexible Paving	
32 12 16	Asphalt Paving	X
32 12 43	Pervious Asphalt Paving	X
32 12 00	Rigid Paving	
32 13 13	Concrete Paving	X
32 13 43	Pervious Concrete Paving	X
32 14 00	Unit Paving	
32 14 13	Precast Concret Unit Paving	X
32 14 16	Brick Unit Paving	X
32 15 00	Aggregate Surfacing	X
32 16 40	Granite Curbs	X
32 17 00	Paving Specialties - markings, tactile, etc.	X
32 17 40	Stone Paving	X
32 17 43	Porous Unit Paving	X

32 70 00	Wetlands	X
32 80 00	Irrigation	X
32 90 00	Planting	X
32 91 12	Soil Rehabilitation	X
32 91 00	Planting Preparation	X
32 91 13	Soil Preparation	X
32 91 19	Landscape Grading	X
32 92 00	Turf and Grasses	X
32 93 00	Trees, Shrubs, Groundcovers, Etc.	X
33 00 00	DIVISION 33 - UTILITIES	
33 40 00	Storm Drainage Utilities	X
33 47 00	Ponds and Reservoirs	X

APPENDIX

Contents:

A.1 TREE INVENTORY

The Georgia Tech Tree Inventory can be viewed on line via the Campus Landscape Master Plan web site. The tree survey was conducted in the summer of 2004. The information that it provided was the starting point for a database that will allow Georgia Tech to manage and nurture its tree population.

Objective:

1. Georgia Tech shall manage its tree population and canopy coverage to achieve the minimum standards of the Landscape Master Plan.

Summary:

- Each tree was given a unique identification number.
- Data for each tree included:
  –**Species** (common name of each tree is given)
  –**dbh** (Diameter at Breast Height; value given in inches)
    - The dbh of a tree is the diameter of the trunk approximately 4-1/2” above the ground (given in inches). In the case of a multi-branched tree, the largest vertical branch is measured.

–**Condition** (Good, Fair, Poor)
- Trees were decided to be in GOOD condition if they appeared healthy and vigorous with no signs of stress.
- Trees were valued as FAIR in condition if signs of stress, disease or rot were apparent.
- Trees were labeled as POOR if they were in obvious decline. Many of these were recommended for immediate removal.

–**Canopy** (approximate diameter; value given in feet)
- This is estimated by averaging the largest and smallest axes of each tree (value given in feet).

–**Canopy status** (single or grouped)
- If trees were so close so as to interfere with one another’s canopy growth, they were categorized as GROUPED. All others were classified as SINGLE

–**Overhead Wires** (yes/no)
- If utility lines were above, below or within the canopy of a tree, this item was checked as a yes. (1=yes, 0=no)

–**Utility Pruning** (yes/no)
- If the tree had been pruned to accommodate any sort of utility, this item was checked as a yes. (1=yes, 0=no)

–**Comments**
- Any further notes can be added to this section.

Management:

– The database functions through the interaction of two computer programs. A CADD program presents a digital map of the campus including the location of all trees. A Database program manages the specific records of each tree and allows the user to perform various queries of the information. The operator is able to manage the database through the simultaneous use of the two programs.

– It is important to note that this is a living and evolving body of knowledge. As trees deteriorate or die, this information is recorded. As new trees are planted, they are incorporated into the database. Active participation and meticulous record-keeping will result in an optimal tool.

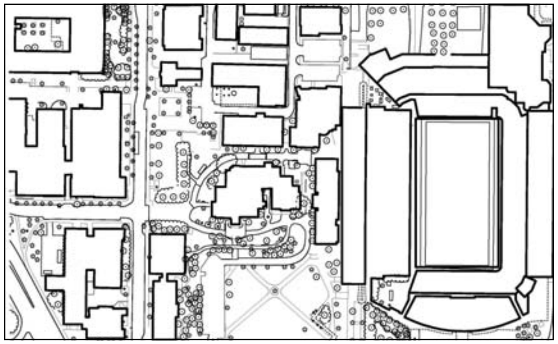


Figure A-1: View of Campus

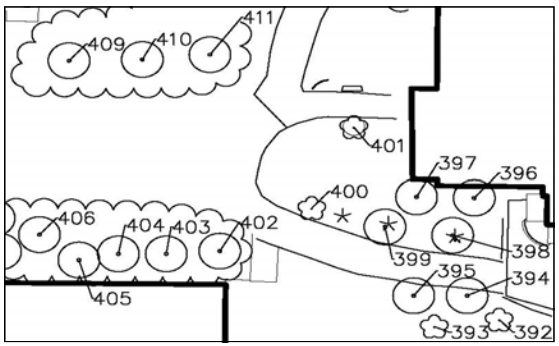


Figure A-2: Each tree with a unique identification number

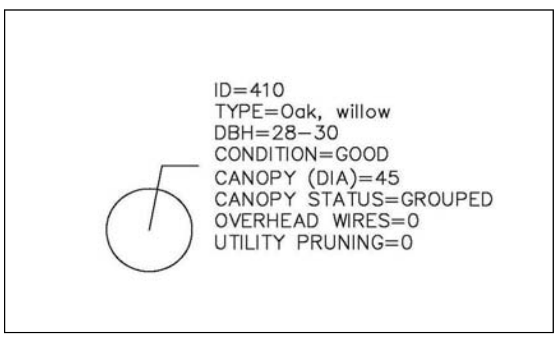


Figure A-3: Detailed information is listed for each tree. The number "0" is equivalent to "NO." Conversely, the numeral "1" is equivalent to "YES."

Applications:

– This database can serve a variety of users as an analytical and informative tool. It is a simple source of information for anyone who has questions about trees on the Georgia Tech campus. At a more complex scale, the database will enable users to analyze the cumulative health of this valuable resource, to organize efficient maintenance regimes to support it, and to encourage the diversity of its population in the years to come.

– The Tree Database will be operated and managed by a primary administrator. This person is responsible for updating all information to the database including the revision of existing data and the addition of new trees. In addition, the database manager will be able to perform various queries of the campus tree population, using the data collected from the tree inventory. The manager will be able to inquire about individual species, populations within a specified region, or ask general questions regarding the collective canopy. For example, one can easily locate all of the large trees (>36"DBH) on campus that are in poor condition. This knowledge can then direct personnel to attend to these trees as well as to plant new trees in these locations. Managing the canopy of the Tech campus is a form of urban forestry. The database will greatly enable personnel to manage this urban forest.

– The tree inventory and all of the collected information about each tree can be viewed online. This is a primary tool for consultants to learn about the specific trees within their construction zone. From the earliest planning stages, they will have detailed knowledge of the health and size of all the relevant trees. This information will influence decisions regarding grading, drainage, stormwater management and plant selection. If the consultant has specific questions that can be answered through a query, they can make a request with the database manager for that specific information.

A.2 GLOSSARY

2-Year Storm: The largest amount of rain that will statistically fall within 24 hours during a 2- year period, in a given location.

ADA: Americans with Disabilities Act of 1991; forbids discrimination against persons who are disabled.

Aeration: supplying soil and roots with oxygen or air.

Autecology: The ecological study of a single organism or species.

Basal Area: The cross-sectional area of a tree at breast height; an expression of tree biomass.

Biodiversity: Biological diversity in an environment as indicated by numbers of different species of plants and animals.

Biomass: The total quantity of living material within a given area; usually expressed as mass or weight.

Bioretention: Shallow storm-water basins that utilize engineered soils and vegetation to capture and treat runoff.

Bosque: A dense woodland in a human setting, like the Tuilleries in Paris.

Bulkhead: A retaining wall along a water edge.

C-Factor: (*See runoff coefficient)* Abbreviation for Cover Factor; it is a value based on soils, land use and slope that indicates the amount of runoff produced in a given area.

Caliper: A measurement of a tree trunk at either six inches or twelve inches above the ground, depending upon the size of the tree; referred to as dbh - "diameter above breast height".

Campus Landscape: The total open space of the campus, which is everything outside of buildings, including roads, service areas, walks, plazas, sports facilities, and vegetated areas.

Canopy Coverage: The area of the ground covered by overhead trees canopy.

cfs: cubic feet per second; standard unit measurement for the amount of water travelling past a known point in a given period of time.

Composting: The controlled biological decomposition of organic matter into a humus or soil-like material.

Corridor: Common landscapes of human and ecological importance on the Tech campus. These are the spaces between building zones that function as circulation routes for people and stormwater.

Cultural Landscape: A landscape that reflects the past and present of the people who live in it.

Detention: The temporary storage of stormwater runoff to control peak discharge rates and provide gravity settling of pollutants.

Diameter at Breast Height (dbh): A standard forestry measurement; the diameter of a tree at 4.5 feet above ground level.

Drainage Basin: The entire surface area that drains to a common watercourse.

Drip Line: Boundary of a tree's canopy.

Eco-Commons: Designated open space that will receive and treat stormwater runoff from the campus.

Eco-mimicry: Studies nature's best ideas and then imitates these designs and processes to solve human processes. The goal is to produce sustainable, socially-responsible designs.

Ecological Design: The incorporation of built systems into natural systems with minimal levels of disturbance.

Ecological Landscape: A built environment whose systems coexist with those of the natural environment.

Ecological Performance Zone:
A designated zone that has specific ecological performance requirements associated

with it. All areas of campus fall within one of eight ecological performance zones

Enhanced Swale: Vegetated open channel designed to capture and treat stormwater runoff.

Evapo-transpiration: Loss of water from the soil both by evaporation and by transpiration from plants.

First Flush: The first flow of rainfall that carries with it the vast majority of accumulated pollutants.

Fluvial: Pertaining to streams or rivers

"Giant Soaker Hose": A metaphor for a method of soaking stormwater runoff into the ground.

Green Roof: Building whose roof is partially or completely covered with plants.

Groundlayer: Vegetation on the surface of the ground comprised of mosses, lichens, fungi and herbaceous species.

Groundwater: Subsurface water; aquifer. .

Hardscape: Constructed elements of a landscape such as walks, walls, patios, fences, etc.

Heat Island Effect: A dome of elevated temperatures over an urban area caused by structural and pavement heat fluxes, and pollutant emissions.

Hydrologic Soil Group: A designation developed by the SCS which describes the infiltration capacity of a soil. Used in the SCS-Method of runoff calculation.

Hydrology: The science dealing with the properties, distribution and circulation of water.

Impervious Area: The area of a site occupied by surfaces that do not allow penetration of water.

Impervious Surface: A surface that does not allow water to infiltrate. such as pavement, rooftops, etc.

Infiltration: The ability of the soil surface to absorb water.

Leaf Litter: A mixture of fallen and dead plant material on the forest floor.

Limnology: The study of lakes, ponds and streams.

Logging Mat: Thick material used to prevent soil compaction cause by heavy machinery.

Maximum Impervious Coverage: A performance requirement that limits the amount of site area occupied by impervious surfaces.

Meadowland: A plant community characterized grasses, shrubs, and a few trees

Micro-climate: Climate of a localized area.

Micro-detention: Small depressions in the landscape that accept and infiltrate stormwater.

Minimum Tree Canopy Coverage: Minimum required site area covered by tree canopy.

Minimum Woodland Area: Minimum required site area occupied by a woodland plant community.

Overstory: The highest leaf mass in a forest.

Parkland: A plant community characterized by mature hardwood trees over an open understory and groundlayer.

Pattern Language: a design language of typologies.

Performance Landscape: A landscape that performs valuable services for the human community, such as stormwater management.

Permeability: A measure of the rate at which water will flow through a soil.

Phenology: The study of the timing of biological events in plants in relation to the changes in seasons and climate

Physiognomy: Here referred to the form and structure of a plant community- e.g. vertical layering typical of a woodland.

Physiography: The non-living part of the landscape, i.e. landfrom, soil and water.

Plant Community: A recognizable physiognomic assemblage of plants, like a woodland, or a meadowland.

Planting Strip: Unpaved space between a sidewalk and road for street trees especially.

Porous Material: A surface with adequate pore space to allow for the infiltration of storm-water.

Rain Sensor: An instrument used to temporarily disable irrigation systems in the event of rain.

Receiving Zone: A component of the hydrologic system pertaining to the Eco-commons that receives and holds stormwater for some period of time. A more comprehensive concept, however, than a detention pond.

Root Zone: Boundary of a tree's roots.

Runoff Coefficient (C factor): A value used in a formula to compute runoff.

Sheet Flow: water flowing overland in a thin layer,as opposed to concentrated flow.

Soil: The layer of minerals and organic matter on the land surface that contains moisture and air and supports life.

Soil Compaction: The compression of soil that removes pores and eliminates water- and air- holding capacity.

Soil Development: *see soil rehabilitation.*

Soil Horizon: A layer in a soil profile.

soil pH: A measure of acidity and alkalinity of a soil.

Soil Protection: Measures used to prevent the compaction and erosion of exposed soil.

Soil Reconstruction: *see soil rehabilitation.*

Soil Rehabilitation: The process of amending and manipulating soil to improve its structure and texture.

Soil Structure: The arrangement of particles in a soil.

Staging: Temporary storage area for materials on a construction site.

Stormwater: Generally refers to the portion of rainfall that does not infiltrate into the soil.

Stormwater Detention: The temporary storage and controlled release of stormwater used to protect fluvial channels and prevent excessive flooding.

Stormwater Discharge: Runoff that is typically directed to gutters, storm drains and sewer systems.

Stormwater Runoff: Precipitation that does not infiltrate into the ground and flows overland to surface water.

Structural Soil: A mixture of loose aggregate and fine soil particles; combined in the correct manner, they can provide a suitable growing medium in areas that are typically compacted.

Sub-surface Detention: Temporary detention of storm-water underground,

Succession: The natural, gradual replacement of one plant community by another.

Structural Soils: Soils that have been developed to safely bear pavement loads and still allow root penetration and vigorous tree growth.

Synecology: The ecology of relationships among species within communities.

Target C Factor: Minimum runoff coefficient as outlined in the Ecological Performance section of the Landscape Master Plan. *(see runoff coefficient).*

Transfer Zone: Refers to portions of the campus that infiltrate stormwater and move it non-structurally to receiving zones, such as the Eco-commons.

Tree Inventory: A survey of Georgia Tech's trees was conducted during the summer of 2004. (See Appendix)

Understory: The level of forest vegetation beneath the canopy.

Water Course: A natural water route such as a creek, river or stream.

Watershed: A region or area bounded peripherally by a divide and draining ultimately to a particular watercourse or body of water.

Wet Retention Pond: Ponds that maintain a permanent pool of water and also purify and temporarily detain stormwater runoff.

Woodland: A plant community, characterized by many layers form understory to overstory; represents the maximum biomass potential for a site.

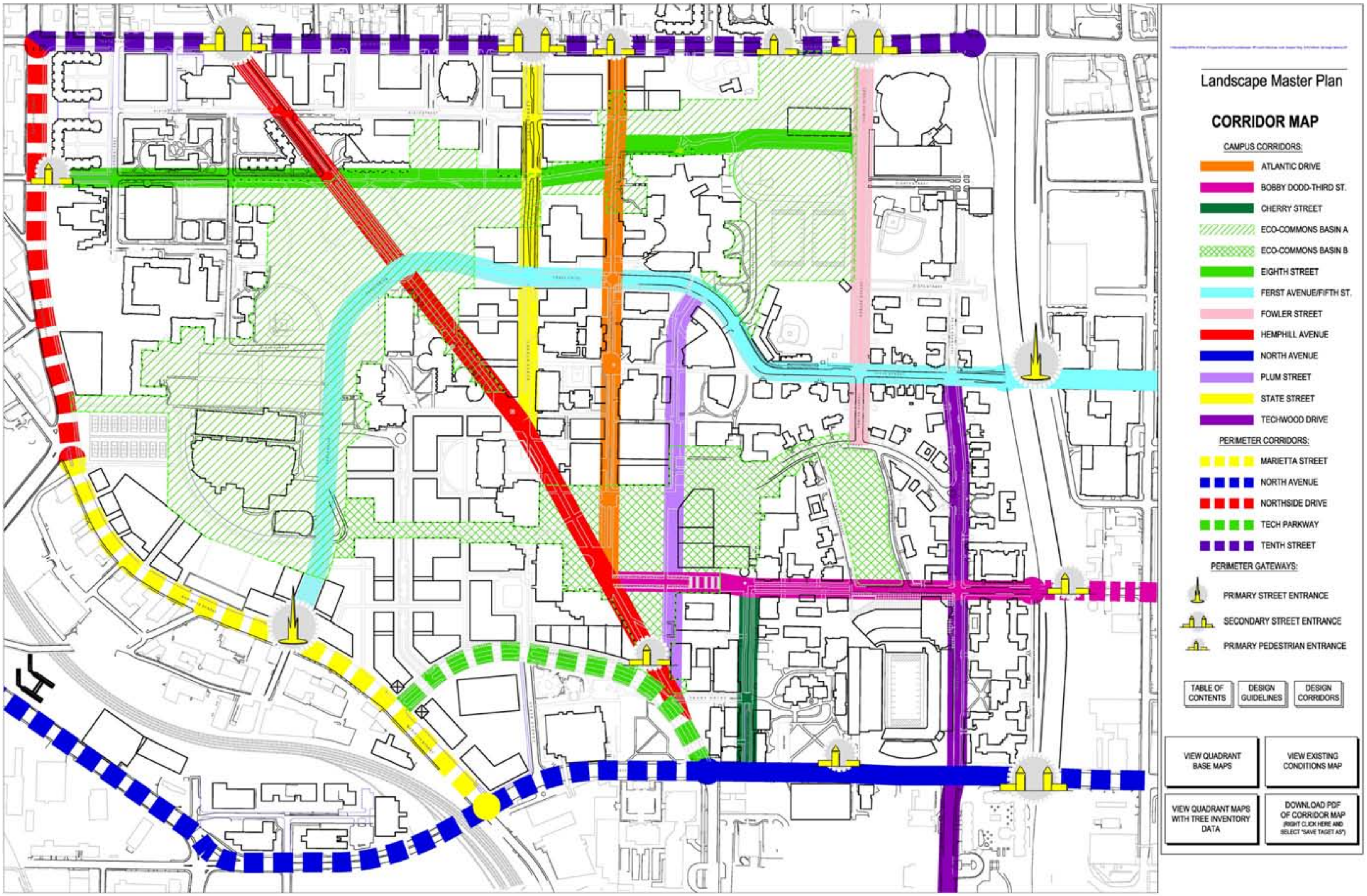
A.3 SUPPLEMENTAL MAPS, ALSO AVAILABLE ONLINE

www.space.gatech.edu/landscapeplan/

Contents:

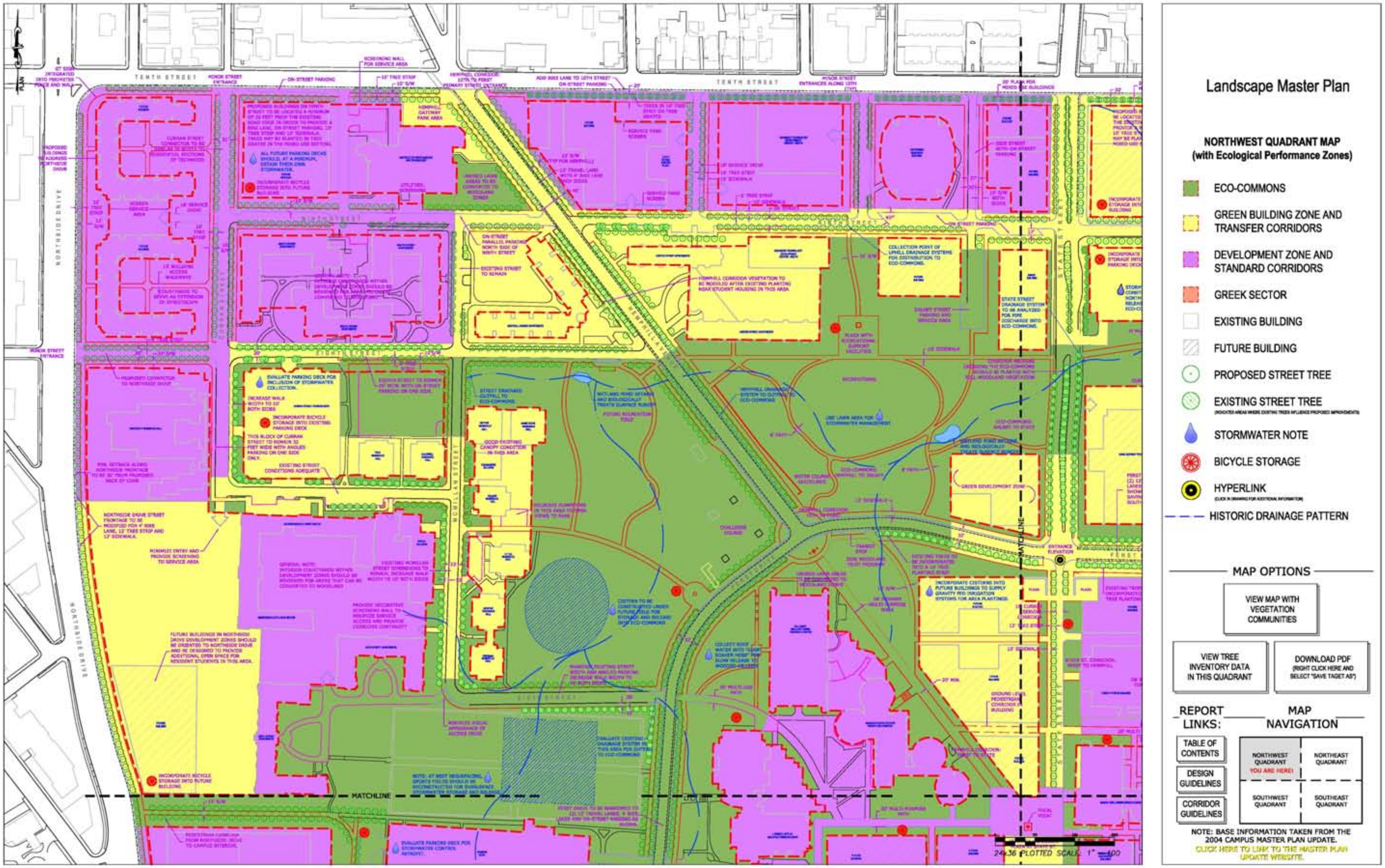
- Corridor Map
- Quadrant Maps with Ecological Performance Zones
- Quadrant Maps with Vegetation Communities
- Existing Conditions—August 2011
- Aerial Photograph—June 23, 2010
- 2005 Campus Tree Inventory—available upon request from CPSM

Corridor Map



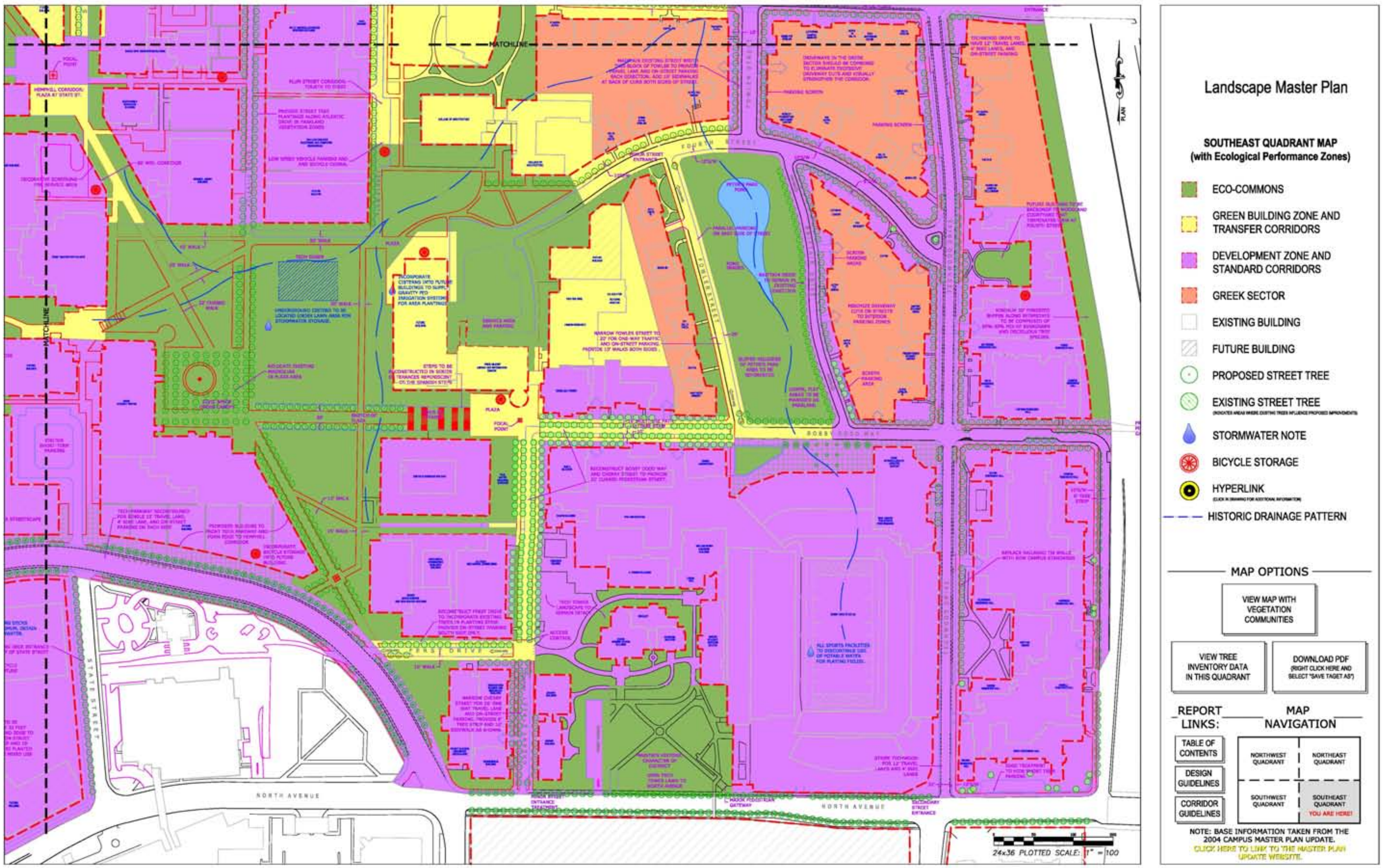
GUIDELINES

Ecological Performance Zone : Northwest Quadrant

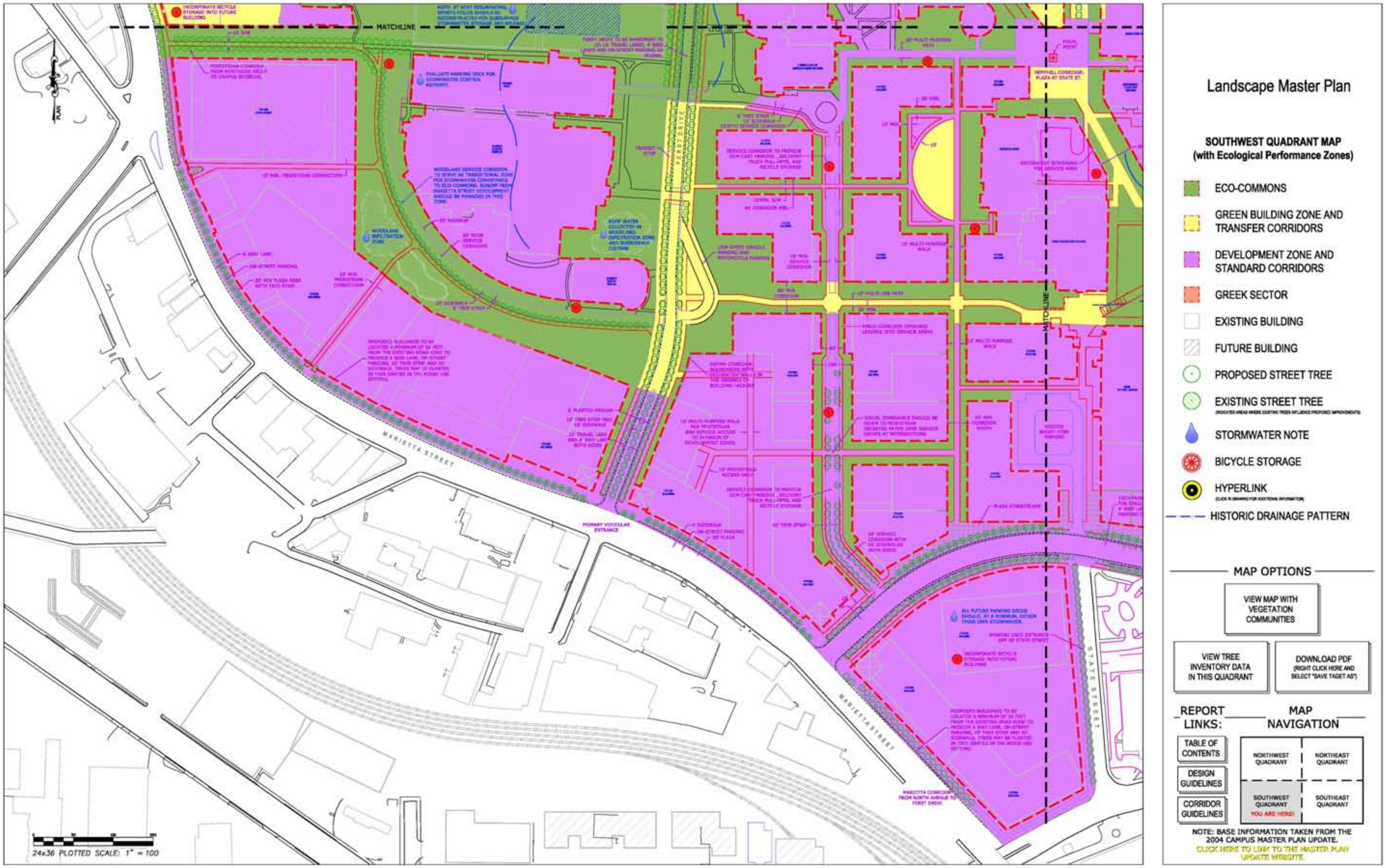


Ecological Performance Zone : Northeast Quadrant

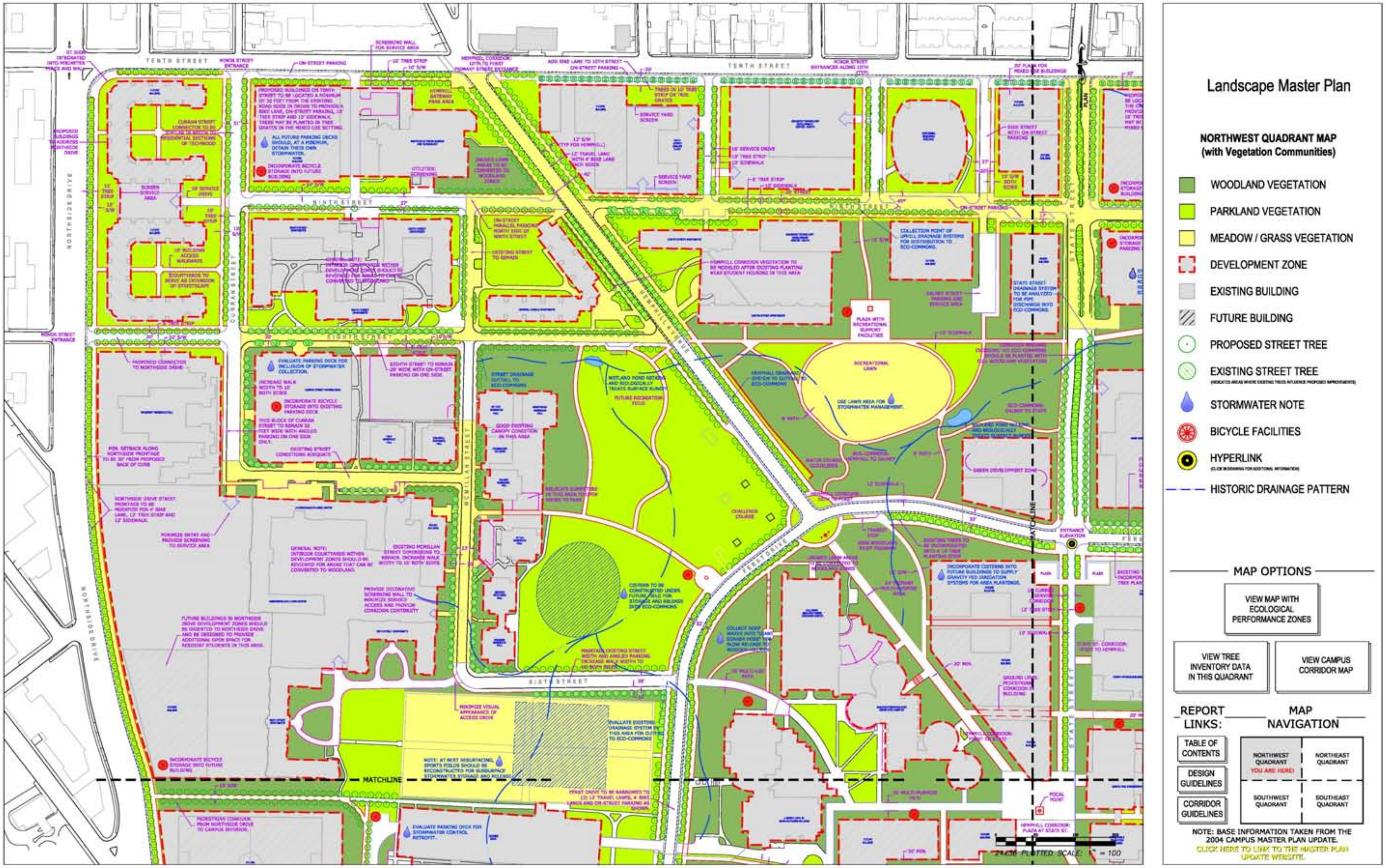
Ecological Performance Zone : Southeast Quadrant



Ecological Performance Zone : Southwest Quadrant

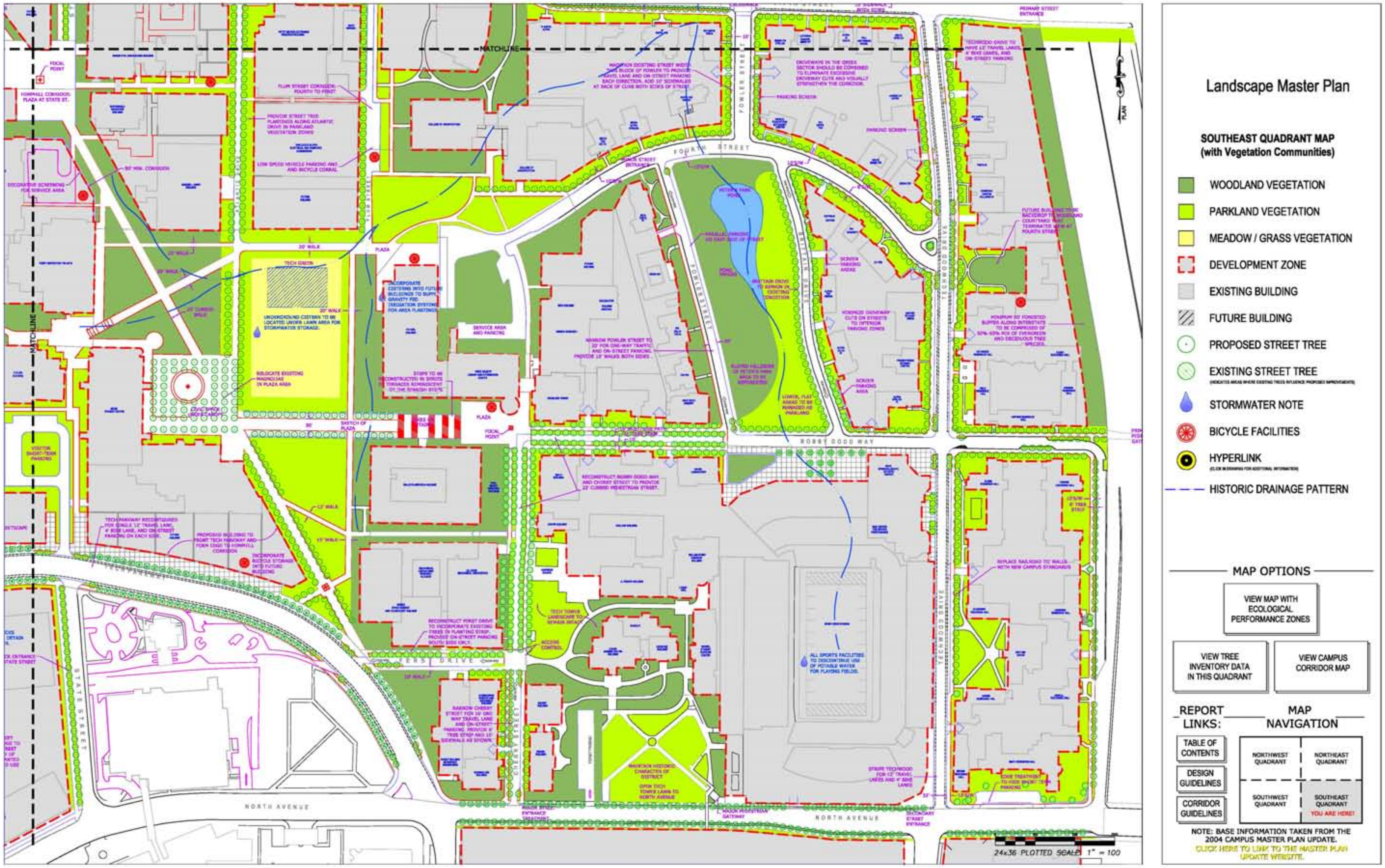


Vegetation Communities: Northwest Quadrant

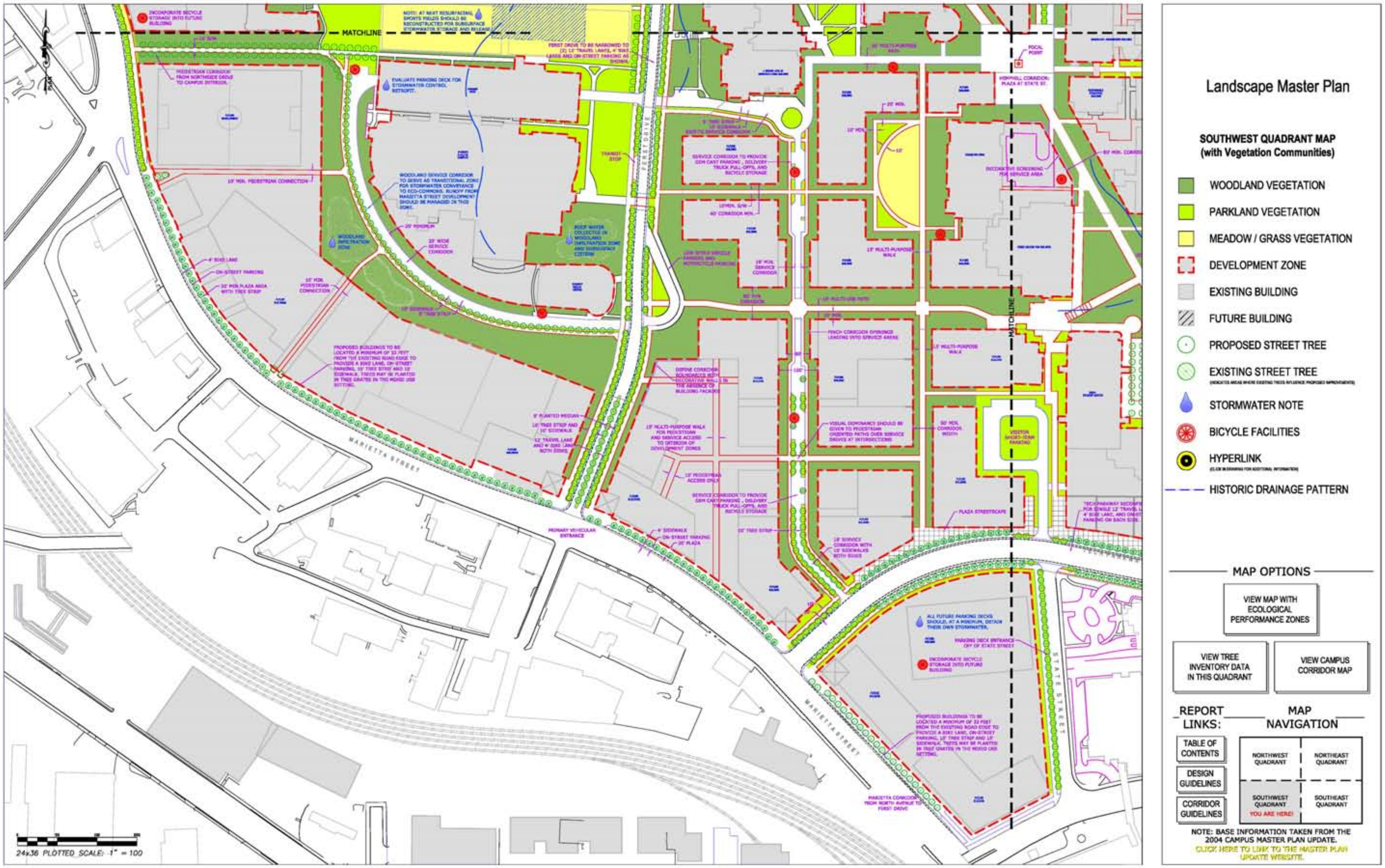


Vegetation Communities: Northeast Quadrant

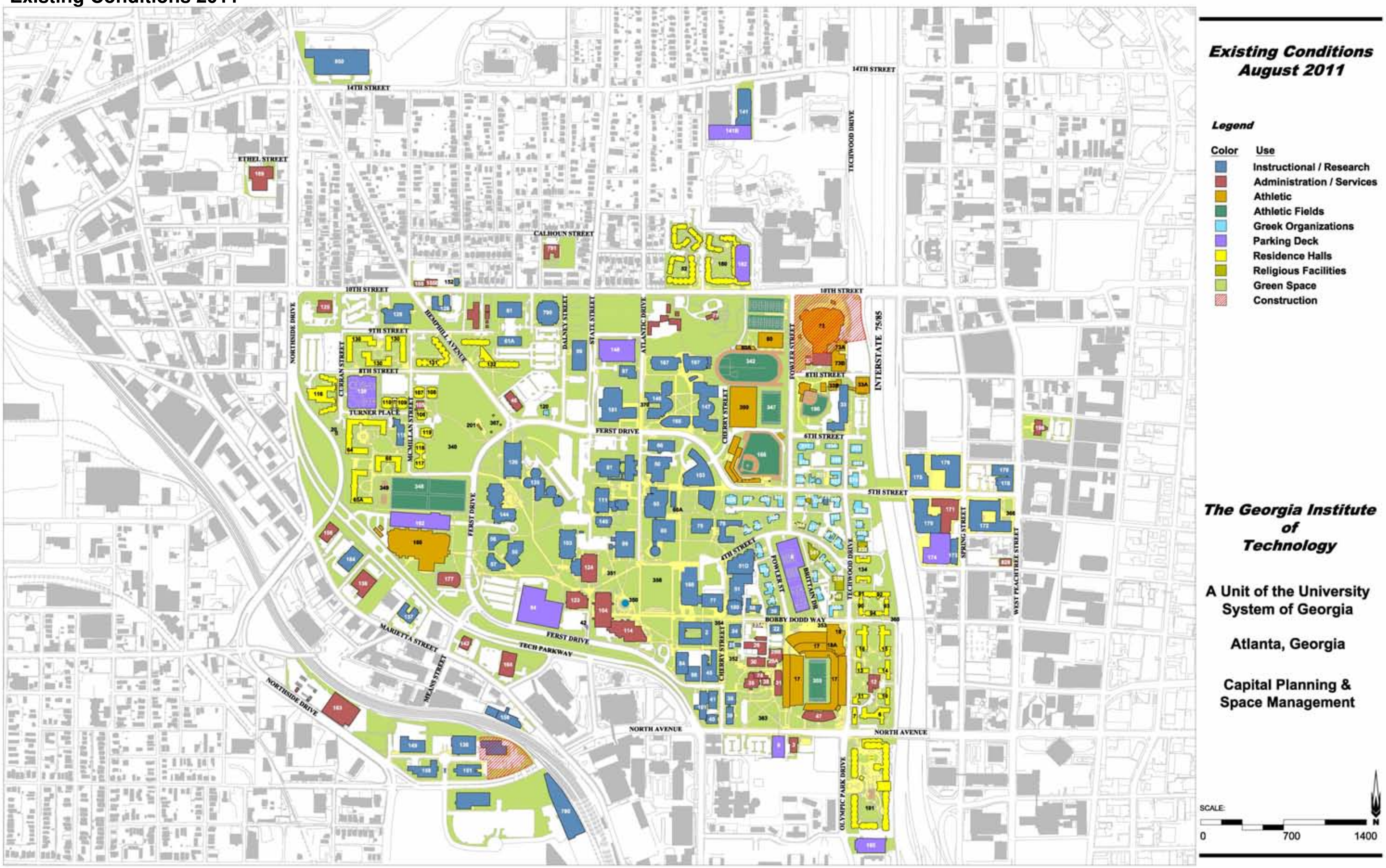
Vegetation Communities: Southeast Quadrant



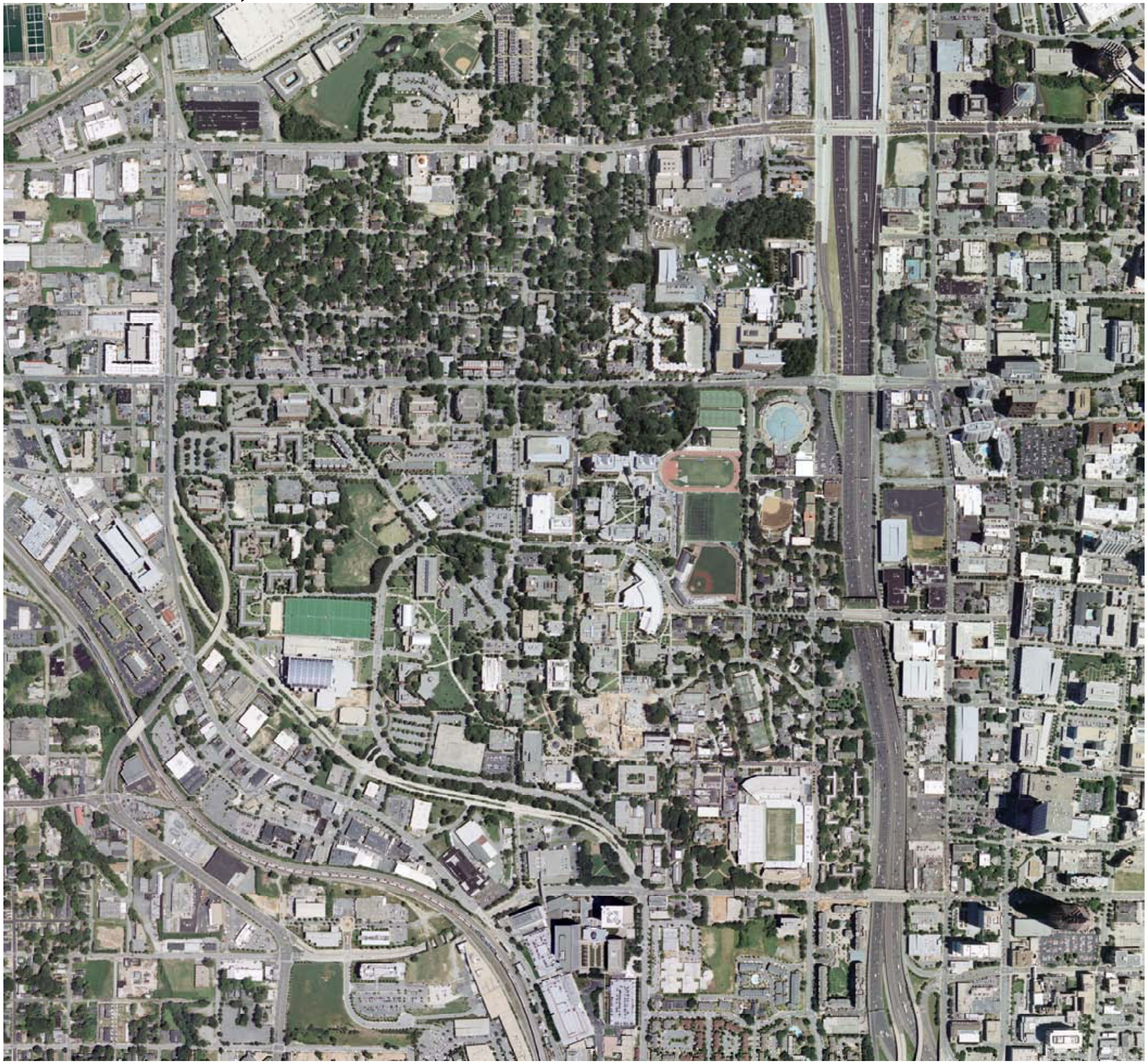
Vegetation Communities: Southwest Quadrant



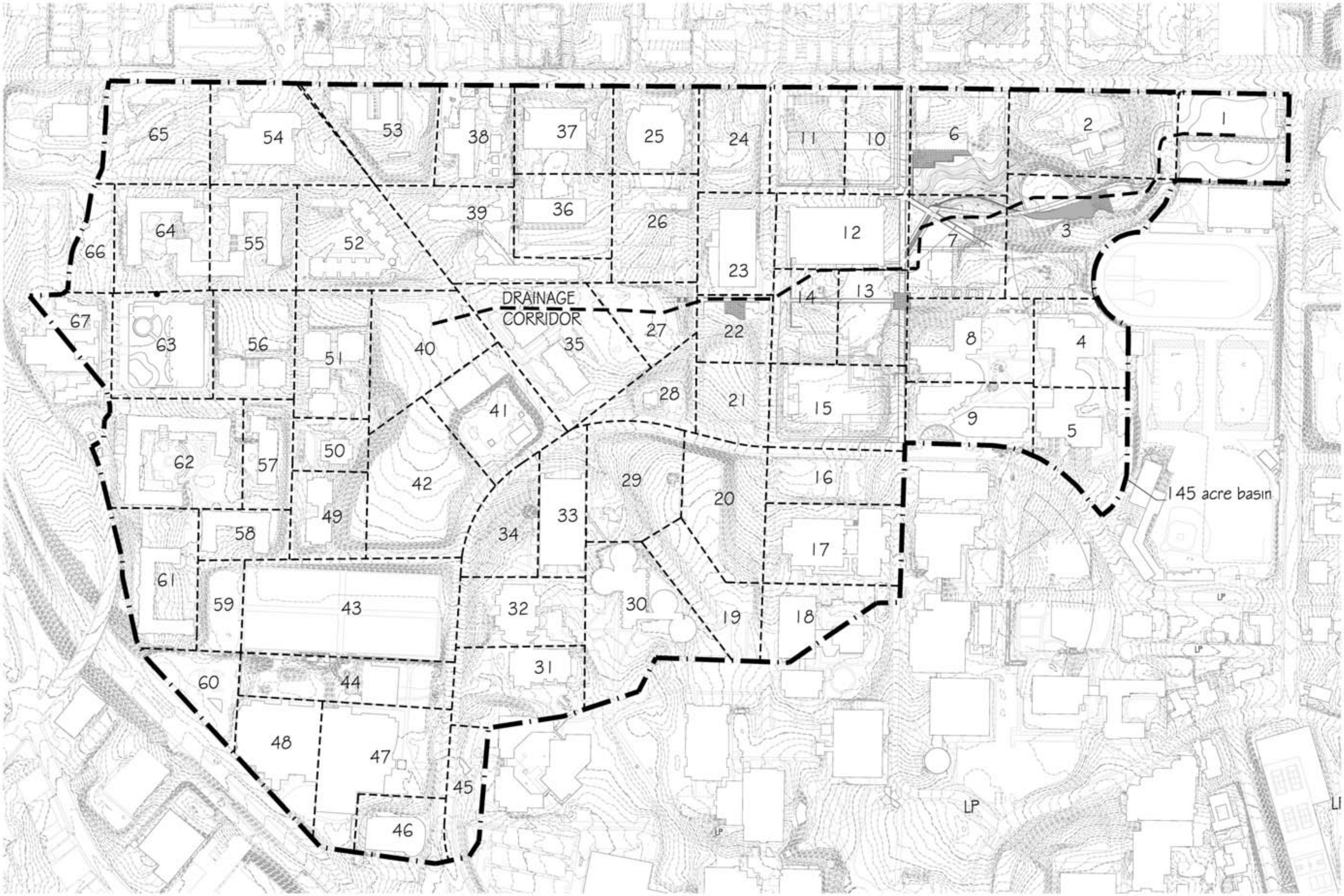
Existing Conditions 2011



Aerial Photo: June 23, 2010



A.4 GT BASIN HYDROLOGY



Eco-Commons
at The Georgia Institute of Technology
Basin 1 Analysis

Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-1	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	7,112	0.163	98	16.00		0.95	0.16		SWALE WEST TO 10TH STREET	9.77
Parking/Sidewalk	74,433	1.709	98	167.46		0.95	1.62			
Roads	0	0.000	98	0.00		0.95	0.00			
Landscaping	20,405	0.468	61	28.57		0.35	0.16			
Openspace	25	0.001	60	0.03		0.25	0.00			
Total	101,975	**2.341**		212.07	**91**		1.94	**0.83**		

Block 1-2	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	5,392	0.124	98	12.13		0.95	0.12		**1.36 AC** - 10TH STREET / **2.08 AC** - BLOCK 3	6.97
Parking/Sidewalk	2,688	0.062	98	6.05		0.95	0.06			
Roads	5,241	0.120	98	11.79		0.95	0.11			
Landscaping	136,404	3.131	61	191.02		0.35	1.10			
Openspace	0	0.000	60	0.00		0.25	0.00			
Total	149,725	**3.437**		220.98	**64**		1.39	**0.40**		

Block 1-3	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	26,708	0.613	98	60.09		0.95	0.58		**2.96 AC** - ON BLOCK L P NORTH / **0.58 AC** OFFSITE SE	9.01
Parking/Sidewalk	11,461	0.263	98	25.78		0.95	0.25			
Roads	1,924	0.044	98	4.33		0.95	0.04			
Landscaping	114,200	2.622	61	159.92		0.35	0.92			
Openspace	0	0.000	60	0.00		0.25	0.00			
Total	154,293	**3.542**		250.12	**71**		1.79	**0.51**		

Eco-Commons
at The Georgia Institute of Technology
Basin 1 Analysis

Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-4	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	33,907	0.778	98	76.28		0.95	0.74			7.60
Parking/Sidewalk	28,387	0.652	98	63.86		0.95	0.62			
Roads		0.000	98	0.00		0.95	0.00			
Landscaping	18,968	0.435	61	26.56		0.35	0.15			
Openspace		0.000	60	0.00		0.25	0.00			
Total	81,262	**1.866**		166.71	**89**		1.51	**0.81**		

Block 1-5	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	28,587	0.656	98	64.31		0.95	0.62		**1.95 AC** CHERRY ST. / **0.25 AC** FERST DR.	**6.82**
Parking/Sidewalk	13,965	0.321	98	31.42		0.95	0.30			
Roads		0.000	98	0.00		0.95	0.00			
Landscaping	53,158	1.220	61	74.44		0.35	0.43			
Openspace		0.000	60	0.00		0.25	0.00			
Total	95,710	**2.197**		170.17	**77**		1.36	**0.62**		

Block 1-6	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	24,367	0.559	98	54.82		0.95	0.53		**0.38 AC** - 10TH STREET / **2.01 AC** - BLOCK 7	**9.50**
Parking/Sidewalk	52,078	1.196	98	117.16		0.95	1.14			
Roads		0.000	98	0.00		0.95	0.00			
Landscaping	27,603	0.634	61	38.65		0.35	0.22			
Openspace		0.000	60	0.00		0.25	0.00			
Total	104,048	**2.389**		210.64	**88**		1.89	**0.79**		

Eco-Commons
at The Georgia Institute of Technology
Basin 1 Analysis

Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-7	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	25,710	0.590	98	57.84		0.95	0.56			
Parking/Sidewalk	22,238	0.511	98	50.03		0.95	0.48			
Roads	0	0.000	98	0.00		0.95	0.00			
Landscaping	56,175	1.290	61	78.67		0.35	0.45			**7.53**
Openspace	0	0.000	60	0.00		0.25	0.00			
Total	104,123	**2.390**		186.54	**78**		1.50	**0.63**		

Block 1-8	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	29,184	0.670	98	65.66		0.95	0.64			
Parking/Sidewalk	22,155	0.509	98	49.84		0.95	0.48			
Roads		0.000	98	0.00		0.95	0.00			
Landscaping	58,919	1.353	61	82.51		0.35	0.47			**8.01**
Openspace		0.000	60	0.00		0.25	0.00			
Total	110,258	**2.531**		198.01	**78**		1.59	**0.63**		

Block 1-9	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	36,527	0.839	98	82.18		0.95	0.80			
Parking/Sidewalk	24,253	0.557	98	54.56		0.95	0.53			
Roads		0.000	98	0.00		0.95	0.00			
Landscaping	22,622	0.519	61	31.68		0.35	0.18			**7.58**
Openspace		0.000	60	0.00		0.25	0.00			
Total	83,402	**1.915**		168.42	**88**		1.51	**0.79**		

Eco-Commons
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Basin I Analysis

Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-10	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	4,736	0.109	98	10.65		0.95	0.10		ATLANTIC DR.	7.04
Parking/Sidewalk	41,355	0.949	98	93.04		0.95	0.90			
Roads	13,808	0.317	98	31.06		0.95	0.30			
Landscaping	11,639	0.267	61	16.30		0.35	0.09			
Openspace	0	0.000	60	0.00		0.25	0.00			
Total	71,538	**1.642**		151.06	**92**		1.40	**0.85**		

Block 1-11	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	5,110	0.117	98	11.50		0.95	0.11		BLOCK 10	6.95
Parking/Sidewalk	36,142	0.830	98	81.31		0.95	0.79			
Roads	10,874	0.250	98	24.46		0.95	0.24			
Landscaping	30,526	0.701	61	42.75		0.35	0.25			
Openspace	0	0.000	60	0.00		0.25	0.00			
Total	82,652	**1.897**		160.02	**84**		1.38	**0.73**		

Block 1-12	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	55,685	1.278	98	125.28		0.95	1.21			10.01
Parking/Sidewalk	9,908	0.227	98	22.29		0.95	0.22			
Roads	18,455	0.424	98	41.52		0.95	0.40			
Landscaping	19,486	0.447	61	27.29		0.35	0.16			
Openspace		0.000	60	0.00		0.25	0.00			
Total	103,534	**2.377**		216.38	**91**		1.99	**0.84**		

Eco-Commons
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Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-13	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	22,171	0.509	98	49.88		0.95	0.48			6.01
Parking/Sidewalk	11,638	0.267	98	26.18		0.95	0.25			
Roads	10,380	0.238	98	23.35		0.95	0.23			
Landscaping	25,140	0.577	61	35.21		0.40	0.23			
Openspace		0.000	60	0.00		0.35	0.00			
Total	69,329	**1.592**		134.62	**85**		1.19	**0.75**		

Block 1-14	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building		0.000	98	0.00		0.95	0.00		BLOCK 12 & 13	3.51
Parking/Sidewalk	9,040	0.208	98	20.34		0.95	0.20			
Roads	5,959	0.137	98	13.41		0.95	0.13			
Landscaping	46,196	1.061	61	64.69		0.35	0.37			
Openspace		0.000	60	0.00		0.25	0.00			
Total	61,195	**1.405**		98.44	**70**		0.70	**0.50**		

Block 1-15	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	19,949	0.458	98	44.88		0.95	0.44		STATE STREET	7.39
Parking/Sidewalk	32,499	0.746	98	73.12		0.95	0.71			
Roads		0.000	98	0.00		0.95	0.00			
Landscaping	40,583	0.932	61	56.83		0.35	0.33			
Openspace		0.000	60	0.00		0.25	0.00			
Total	93,031	**2.136**		174.83	**82**		1.47	**0.69**		

Eco-Commons
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Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-16	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	40	0.001	98	0.09		0.95	0.00		STATE STREET / PARKING (WEST)	6.93
Parking/Sidewalk	40,730	0.935	98	91.63		0.95	0.89			
Roads	13,829	0.317	98	31.11		0.95	0.30			
Landscaping	23,244	0.534	61	32.55		0.35	0.19			
Openspace		0.000	60	0.00		0.25	0.00			
Total	77,843	**1.787**		155.39	**87**		1.38	**0.77**		

Block 1-17	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	51,681	1.186	98	116.27		0.95	1.13		BLOCKS 16 & 20 (PARKING WEST)	9.50
Parking/Sidewalk	12,627	0.290	98	28.41		0.95	0.28			
Roads	6,669	0.153	98	15.00		0.95	0.15			
Landscaping	42,297	0.971	61	59.23		0.35	0.34			
Openspace	0	0.000	60	0.00		0.25	0.00			
Total	113,274	**2.600**		218.91	**84**		1.89	**0.73**		

Block 1-18	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	24,624	0.565	98	55.40		0.95	0.54			6.04
Parking/Sidewalk	20,387	0.468	98	45.87		0.95	0.44			
Roads	1,184	0.027	98	2.66		0.95	0.03			
Landscaping	23,248	0.534	61	32.56		0.35	0.19			
Openspace	1,026	0.024	60	1.41		0.25	0.01			
Total	70,469	**1.618**		137.90	**85**		1.20	**0.74**		

Eco-Commons
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Basin 1 Analysis

Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-19	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building	0	0.000	98	0.00		0.95	0.00		BLOCK 29	**7.14**
Parking/Sidewalk	59,006	1.355	98	132.75		0.95	1.29			
Roads	0	0.000	98	0.00		0.95	0.00			
Landscaping	10,723	0.246	61	15.02		0.35	0.09			
Openspace	8,024	0.184	60	11.05		0.25	0.05			
Total	77,753	**1.785**		158.82	**89**		1.42	**0.80**		

Block 1-20	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building	0	0.000	98	0.00		0.95	0.00		FERST DR.	**9.54**
Parking/Sidewalk	68,154	1.565	98	153.33		0.95	1.49			
Roads	6,826	0.157	98	15.36		0.95	0.15			
Landscaping	32,628	0.749	61	45.69		0.35	0.26			
Openspace	0	0.000	60	0.00		0.25	0.00			
Total	107,608	**2.470**		214.38	**87**		1.90	**0.77**		

Block 1-21	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building	0	0.000	98	0.00		0.95	0.00		STATE STREET	**5.57**
Parking/Sidewalk	29,739	0.683	98	66.91		0.95	0.65			
Roads	15,963	0.366	98	35.91		0.95	0.35			
Landscaping	13,824	0.317	61	19.36		0.35	0.11			
Openspace	0	0.000	60	0.00		0.25	0.00			
Total	59,526	**1.367**		122.18	**89**		1.11	**0.81**		

Eco-Commons
at The Georgia Institute of Technology
Basin I Analysis

Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-22	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	0	0.000	98	0.00		0.95	0.00			
Parking/Sidewalk	9,033	0.207	98	20.32		0.95	0.20			
Roads	9,862	0.226	98	22.19		0.95	0.22			
Landscaping	33,525	0.770	61	46.95		0.35	0.27			**3.43**
Openspace	0	0.000	60	0.00		0.25	0.00			
Total	52,420	**1.203**		89.46	**74**		0.68	**0.57**		

Block 1-23	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	29,880	0.686	98	67.22		0.95	0.65			
Parking/Sidewalk	6,778	0.156	98	15.25		0.95	0.15			
Roads	16,417	0.377	98	36.93		0.95	0.36			
Landscaping	28,636	0.657	61	40.10		0.35	0.23			**6.98**
Openspace	0	0.000	60	0.00		0.25	0.00			
Total	81,711	**1.876**		159.51	**85**		1.39	**0.74**		

Block 1-24	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	3,185	0.073	98	7.17		0.95	0.07		**0.17 AC** -10TH ST/**1.09 AC** STATE ST/**0.54 AC**-BLOCK 23	
Parking/Sidewalk	18,093	0.415	98	40.71		0.95	0.39			
Roads	11,058	0.254	98	24.88		0.95	0.24			
Landscaping	46,004	1.056	61	64.42		0.35	0.37			**5.41**
Openspace	0	0.000	60	0.00		0.25	0.00			
Total	78,340	**1.798**		137.17	**76**		1.07	**0.60**		

Eco-Commons
at The Georgia Institute of Technology
Basin 1 Analysis

Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-25	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	34,359	0.789	98	77.30		0.95	0.75			5.97
Parking/Sidewalk	3,227	0.074	98	7.26		0.95	0.07			
Roads	3,489	0.080	98	7.85		0.95	0.08			
Landscaping	36,213	0.831	61	50.71		0.35	0.29			
Openspace	0	0.000	60	0.00		0.25	0.00			
Total	77,288	**1.774**		143.12	**81**		1.19	**0.67**		

Block 1-26	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	0	0.000	98	0.00		0.95	0.00		DALNEY ST. (SE CORNER)	8.85
Parking/Sidewalk	67,098	1.540	98	150.96		0.95	1.46			
Roads	4,580	0.105	98	10.30		0.95	0.10			
Landscaping	24,543	0.563	61	34.37		0.35	0.20			
Openspace	0	0.000	60	0.00		0.25	0.00			
Total	96,221	**2.209**		195.63	**89**		1.76	**0.80**		

Block 1-27	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	0	0.000	98	0.00		0.95	0.00		DALNEY ST (NE CORNER)	5.44
Parking/Sidewalk	40,847	0.938	98	91.90		0.95	0.89			
Roads	2,228	0.051	98	5.01		0.95	0.05			
Landscaping	17,692	0.406	61	24.78		0.35	0.14			
Openspace	0	0.000	60	0.00		0.25	0.00			
Total	60,767	**1.395**		121.68	**87**		1.08	**0.78**		

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Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-28	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building	1,911	0.044	98	4.30		0.95	0.04		**0.43 AC-** BLOCK 27 & 35/**0.49 AC-** FERST/**0.39 AC**-DALNEY	**4.35**
Parking/Sidewalk	12,714	0.292	98	28.60		0.95	0.28			
Roads	14,225	0.327	98	32.00		0.95	0.31			
Landscaping	29,218	0.671	61	40.92		0.35	0.23			
Openspace		0.000	60	0.00		0.25	0.00			
Total	58,068	**1.333**		105.82	**79**		0.86	**0.65**		

Block 1-29	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building		0.000	98	0.00		0.95	0.00		**0.84 AC-** FERST /**1.7 AC** - BLOCK 33	**6.13**
Parking/Sidewalk	17,123	0.393	98	38.52		0.95	0.37			
Roads	6,630	0.152	98	14.92		0.95	0.14			
Landscaping	87,253	2.003	61	122.19		0.35	0.70			
Openspace		0.000	60	0.00		0.25	0.00			
Total	111,006	**2.548**		175.63	**69**		1.22	**0.48**		

Block 1-30	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building	41,858	0.961	98	94.17		0.95	0.91			**10.44**
Parking/Sidewalk	29,244	0.671	98	65.79		0.95	0.64			
Roads		0.000	98	0.00		0.95	0.00			
Landscaping	37,091	0.851	61	51.94		0.35	0.30			
Openspace	39,645	0.910	60	54.61		0.25	0.23			
Total	147,838	**3.394**		266.51	**79**		2.08	**0.61**		

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Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-31	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building	24,714	0.567		98	55.60			0.95	0.54				7.49
Parking/Sidewalk	21,758	0.499		98	48.95			0.95	0.47				
Roads	6,291	0.144		98	14.15			0.95	0.14				
Landscaping	24,250	0.557		61	33.96			0.35	0.19				
Openspace	24,984	0.574		60	34.41			0.25	0.14				
Total	101,997	**2.342**			187.08	**80**			1.49	**0.64**			

Block 1-32	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building	22,446	0.515		98	50.50			0.95	0.49				7.47
Parking/Sidewalk	31,847	0.731		98	71.65			0.95	0.69				
Roads	5,575	0.128		98	12.54			0.95	0.12				
Landscaping		0.000		61	0.00			0.35	0.00				
Openspace	31,153	0.715		60	42.91			0.25	0.18				
Total	91,021	**2.090**			177.60	**85**			1.48	**0.71**			

Block 1-33	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building	41,618	0.955		98	93.63			0.95	0.91				6.64
Parking/Sidewalk	9,607	0.221		98	21.61			0.95	0.21				
Roads	4,261	0.098		98	9.59			0.95	0.09				
Landscaping	13,601	0.312		61	19.05			0.35	0.11				
Openspace		0.000		60	0.00			0.25	0.00				
Total	69,087	**1.586**			143.88	**91**			1.32	**0.83**			

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Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-34	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building		0.000		98	0.00			0.95	0.00			FERST DRVIE	4.23
Parking/Sidewalk	14,967	0.344		98	33.67			0.95	0.33				
Roads	11,026	0.253		98	24.81			0.95	0.24				
Landscaping	7,430	0.171		61	10.40			0.35	0.06				
Openspace	37,212	0.854		60	51.26			0.25	0.21				
Total	70,635	**1.622**			120.14	**74**			0.84	**0.52**			

Block 1-35	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building	22,962	0.527		98	51.66			0.95	0.50			**1.98 AC -** BLOCK 27/ **1.98 AC -** LOW PT BLOCK 35	**14.59**
Parking/Sidewalk	80,206	1.841		98	180.45			0.95	1.75				
Roads	13,447	0.309		98	30.25			0.95	0.29				
Landscaping	44,461	1.021		61	62.26			0.35	0.36				
Openspace		0.000		60	0.00			0.25	0.00				
Total	161,076	**3.698**			324.62	**88**			2.90	**0.78**			

Block 1-36	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building	15,744	0.361		98	35.42			0.95	0.34				**7.11**
Parking/Sidewalk	37,159	0.853		98	83.60			0.95	0.81				
Roads		0.000		98	0.00			0.95	0.00				
Landscaping	32,364	0.743		61	45.32			0.35	0.26				
Openspace		0.000		60	0.00			0.25	0.00				
Total	85,267	**1.957**			164.34	**84**			1.41	**0.72**			

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Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-37	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building	26,744	0.614	98	60.17		0.95	0.58		BLOCK 36	**7.21**
Parking/Sidewalk	24,755	0.568	98	55.69		0.95	0.54			
Roads		0.000	98	0.00		0.95	0.00			
Landscaping	38,618	0.887	61	54.08		0.35	0.31			
Openspace		0.000	60	0.00		0.25	0.00			
Total	90,117	**2.069**		169.94	**82**		1.43	**0.69**		

Block 1-38	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building	18,178	0.417	98	40.90		0.95	0.40		**1.55 AC -** BLOCK 38 / **0.31 AC -** BLOCK 37	**6.09**
Parking/Sidewalk	17,568	0.403	98	39.52		0.95	0.38			
Roads	4,831	0.111	98	10.87		0.95	0.11			
Landscaping	40,580	0.932	61	56.83		0.35	0.33			
Openspace		0.000	60	0.00		0.25	0.00			
Total	81,157	**1.863**		148.12	**79**		1.21	**0.65**		

Block 1-39	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building	27,317	0.627	98	61.46		0.95	0.60		BLOCK 35	**9.71**
Parking/Sidewalk	27,029	0.621	98	60.81		0.95	0.59			
Roads	12,644	0.290	98	28.45		0.95	0.28			
Landscaping	58,537	1.344	61	81.97		0.35	0.47			
Openspace		0.000	60	0.00		0.25	0.00			
Total	125,527	**2.882**		232.69	**81**		1.93	**0.67**		

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Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-40	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building		0.000	98	0.00		0.95	0.00		HEMPHILL AVE.	4.37
Parking/Sidewalk	4,068	0.093	98	9.15		0.95	0.09			
Roads	7,857	0.180	98	17.68		0.95	0.17			
Landscaping		0.000	61	0.00		0.35	0.00			
Openspace	105,966	2.433	60	145.96		0.25	0.61			
Total	117,891	**2.706**		172.79	**64**		0.87	**0.32**		

Block 1-41	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	15,633	0.359	98	35.17		0.95	0.34			9.60
Parking/Sidewalk	43,625	1.001	98	98.15		0.95	0.95			
Roads	16,600	0.381	98	37.35		0.95	0.36			
Landscaping	31,538	0.724	61	44.16		0.35	0.25			
Openspace		0.000	60	0.00		0.25	0.00			
Total	107,396	**2.465**		214.83	**87**		1.91	**0.77**		

Block 1-42	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building		0.000	98	0.00		0.95	0.00		BLOCK 40	5.73
Parking/Sidewalk	5,441	0.125	98	12.24		0.95	0.12			
Roads	10,410	0.239	98	23.42		0.95	0.23			
Landscaping		0.000	61	0.00		0.35	0.00			
Openspace	138,364	3.176	60	190.58		0.25	0.79			
Total	154,215	**3.540**		226.25	**64**		1.14	**0.32**		

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Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-43	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building		0.000		98	0.00			0.95	0.00				
Parking/Sidewalk	4,403	0.101		98	9.91			0.95	0.10				
Roads	16,363	0.376		98	36.81			0.95	0.36				
Landscaping		0.000		61	0.00			0.35	0.00				**8.00**
Openspace	198,332	4.553		60	273.18			0.25	1.14				
Total	219,098	**5.030**			319.90	**64**			1.59	**0.32**			

Block 1-44	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building	63,985	1.469		98	143.95			0.95	1.40				
Parking/Sidewalk	6,083	0.140		98	13.69			0.95	0.13				
Roads	3,508	0.081		98	7.89			0.95	0.08				
Landscaping	12,380	0.284		61	17.34			0.35	0.10				**8.98**
Openspace	14,279	0.328		60	19.67			0.25	0.08				
Total	100,235	**2.301**			202.53	**88**			1.79	**0.78**			

Block 1-45	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building		0.000		98	0.00			0.95	0.00				
Parking/Sidewalk	6,282	0.144		98	14.13			0.95	0.14				
Roads	15,118	0.347		98	34.01			0.95	0.33				
Landscaping	19,638	0.451		61	27.50			0.35	0.16				**3.33**
Openspace	6,369	0.146		60	8.77			0.25	0.04				
Total	47,407	**1.088**			84.42	**78**			0.66	**0.61**			

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Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-46	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building	20,956	0.481		98	47.15			0.95	0.46				
Parking/Sidewalk	3,579	0.082		98	8.05			0.95	0.08				
Roads	5,031	0.115		98	11.32			0.95	0.11				
Landscaping		0.000		61	0.00			0.35	0.00				4.06
Openspace	28,185	0.647		60	38.82			0.25	0.16				
Total	57,751	**1.326**			105.34	**79**			0.81	**0.61**			

Block 1-47	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building	70,477	1.618		98	158.56			0.95	1.54				
Parking/Sidewalk	8,288	0.190		98	18.65			0.95	0.18				
Roads	6,392	0.147		98	14.38			0.95	0.14				
Landscaping	10,474	0.240		61	14.67			0.35	0.08				11.18
Openspace	49,137	1.128		60	67.68			0.25	0.28				
Total	144,768	**3.323**			273.93	**82**			2.22	**0.67**			

Block 1-48	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building	61,899	1.421		98	139.26			0.95	1.35				
Parking/Sidewalk	4,717	0.108		98	10.61			0.95	0.10				
Roads		0.000		98	0.00			0.95	0.00				
Landscaping	7,432	0.171		61	10.41			0.35	0.06				7.93
Openspace	11,173	0.256		60	15.39			0.25	0.06				
Total	85,221	**1.956**			175.67	**90**			1.58	**0.81**			

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Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-49	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building	14,438	0.331	98	32.48		0.95	0.31		**1.26 AC -** BLOCK 42 / **0.32 AC** McMILLAN ST	**4.46**
Parking/Sidewalk	7,713	0.177	98	17.35		0.95	0.17			
Roads	6,491	0.149	98	14.60		0.95	0.14			
Landscaping	13,801	0.317	61	19.33		0.35	0.11			
Openspace	26,240	0.602	60	36.14		0.25	0.15			
Total	68,683	**1.577**		119.91	**76**		0.89	**0.56**		

Block 1-50	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building	7,465	0.171	98	16.79		0.95	0.16		BLOCK 42	**3.33**
Parking/Sidewalk	15,410	0.354	98	34.67		0.95	0.34			
Roads	2,039	0.047	98	4.59		0.95	0.04			
Landscaping	10,553	0.242	61	14.78		0.35	0.08			
Openspace	6,019	0.138	60	8.29		0.25	0.03			
Total	41,486	**0.952**		79.12	**83**		0.66	**0.70**		

Block 1-51	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building	21,715	0.499	98	48.85		0.95	0.47		8TH ST / MCMILLAN ST	**8.91**
Parking/Sidewalk	41,736	0.958	98	93.90		0.95	0.91			
Roads	6,780	0.156	98	15.25		0.95	0.15			
Landscaping	29,787	0.684	61	41.71		0.35	0.24			
Openspace		0.000	60	0.00		0.25	0.00			
Total	100,018	**2.296**		199.72	**87**		1.77	**0.77**		

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Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-52	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building	26,397	0.606	98	59.39		0.95	0.58		8TH ST	**10.41**
Parking/Sidewalk	27,721	0.636	98	62.37		0.95	0.60			
Roads	20,126	0.462	98	45.28		0.95	0.44			
Landscaping	56,156	1.289	61	78.64		0.35	0.45			
Openspace		0.000	60	0.00		0.25	0.00			
Total	130,400	**2.994**		245.67	**82**		2.07	**0.69**		

Block 1-53	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building	15,754	0.362	98	35.44		0.95	0.34		9TH ST	**9.20**
Parking/Sidewalk	44,087	1.012	98	99.19		0.95	0.96			
Roads	12,558	0.288	98	28.25		0.95	0.27			
Landscaping	31,016	0.712	61	43.43		0.35	0.25			
Openspace		0.000	60	0.00		0.25	0.00			
Total	103,415	**2.374**		206.31	**87**		1.83	**0.77**		

Block 1-54	**SQ. FT.**	**Acreage**	**CN**	**Ac*CN**	**Avg CN**	**C**	**Ac*C**	**Avg C**	**Tributary to**	**Rational Peak Flow (cfs)**
Building	35,409	0.813	98	79.66		0.95	0.77			**9.57**
Parking/Sidewalk	10,829	0.249	98	24.36		0.95	0.24			
Roads	13,826	0.317	98	31.11		0.95	0.30			
Landscaping	73,835	1.695	61	103.40		0.35	0.59			
Openspace		0.000	60	0.00		0.25	0.00			
Total	133,899	**3.074**		238.53	**78**		1.90	**0.62**		

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Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-55	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	27,620	0.634	98	62.14		0.95	0.60		McMILLAN ST	8.35
Parking/Sidewalk	26,708	0.613	98	60.09		0.95	0.58			
Roads	10,999	0.253	98	24.75		0.95	0.24			
Landscaping	29,270	0.672	61	40.99		0.35	0.24			
Openspace		0.000	60	0.00		0.25	0.00			
Total	94,597	**2.172**		187.96	**87**		1.66	**0.76**		

Block 1-56	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	15,550	0.357	98	34.98		0.95	0.34		McMILLAN ST	7.90
Parking/Sidewalk	36,272	0.833	98	81.60		0.95	0.79			
Roads	8,646	0.198	98	19.45		0.95	0.19			
Landscaping	31,456	0.722	61	44.05		0.35	0.25			
Openspace		0.000	60	0.00		0.25	0.00			
Total	91,924	**2.110**		180.09	**85**		1.57	**0.74**		

Block 1-57	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	13,995	0.321	98	31.49		0.95	0.31		McMILLAN ST	4.52
Parking/Sidewalk	13,461	0.309	98	30.28		0.95	0.29			
Roads	5,824	0.134	98	13.10		0.95	0.13			
Landscaping	17,428	0.400	61	24.41		0.35	0.14			
Openspace	5,769	0.132	60	7.95		0.25	0.03			
Total	56,477	**1.297**		107.22	**83**		0.90	**0.69**		

Eco-Commons
at The Georgia Institute of Technology
Basin 1 Analysis

Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-58	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building	18,573	0.426		98	41.78			0.95	0.41			CORNER OF McMILLAN ST & PARKING	**3.64**
Parking/Sidewalk	6,487	0.149		98	14.59			0.95	0.14				
Roads		0.000		98	0.00			0.95	0.00				
Landscaping	19,670	0.452		61	27.55			0.35	0.16				
Openspace	3,302	0.076		60	4.55			0.25	0.02				
Total	48,032	**1.103**			88.47	**80**			0.72	**0.66**			

Block 1-59	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building		0.000		98	0.00			0.95	0.00			BLOCK 43	**1.96**
Parking/Sidewalk	9,010	0.207		98	20.27			0.95	0.20				
Roads		0.000		98	0.00			0.95	0.00				
Landscaping		0.000		61	0.00			0.35	0.00				
Openspace	33,825	0.777		60	46.59			0.25	0.19				
Total	42,835	**0.983**			66.86	**68**			0.39	**0.40**			

Block 1-60	SQ. FT.	Acreage		CN	Ac*CN	Avg CN		C	Ac*C	Avg C		Tributary to	Rational Peak Flow (cfs)
Building		0.000		98	0.00			0.95	0.00				**4.74**
Parking/Sidewalk	37,085	0.851		98	83.43			0.95	0.81				
Roads		0.000		98	0.00			0.95	0.00				
Landscaping	16,582	0.381		61	23.22			0.35	0.13				
Openspace		0.000		60	0.00			0.25	0.00				
Total	53,667	**1.232**			106.65	**87**			0.94	**0.76**			

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Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-61	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	23,876	0.548	98	53.72		0.95	0.52			
Parking/Sidewalk	20,417	0.469	98	45.93		0.95	0.45			
Roads		0.000	98	0.00		0.95	0.00		BLOCK 59	
Landscaping	47,415	1.088	61	66.40		0.35	0.38			**7.21**
Openspace	15,121	0.347	60	20.83		0.25	0.09			
Total	106,829	**2.452**		186.88	**76**		1.43	**0.58**		

Block 1-62	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	37,531	0.862	98	84.44		0.95	0.82			
Parking/Sidewalk	49,233	1.130	98	110.76		0.95	1.07			
Roads	6,444	0.148	98	14.50		0.95	0.14			
Landscaping	48,919	1.123	61	68.50		0.35	0.39			**12.68**
Openspace	16,538	0.380	60	22.78		0.25	0.09			
Total	158,665	**3.642**		300.98	**83**		2.52	**0.69**		

Block 1-63	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	66,041	1.516	98	148.58		0.95	1.44			
Parking/Sidewalk		0.000	98	0.00		0.95	0.00			
Roads	12,281	0.282	98	27.63		0.95	0.27		BLOCK 56	
Landscaping	34,872	0.801	61	48.83		0.35	0.28			**10.00**
Openspace		0.000	60	0.00		0.25	0.00			
Total	113,194	**2.599**		225.04	**87**		1.99	**0.77**		

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Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-64	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	31,634	0.726	98	71.17		0.95	0.69		BLOCK 55	**8.35**
Parking/Sidewalk	27,826	0.639	98	62.60		0.95	0.61			
Roads		0.000	98	0.00		0.95	0.00			
Landscaping	45,267	1.039	61	63.39		0.35	0.36			
Openspace		0.000	60	0.00		0.25	0.00			
Total	104,727	**2.404**		197.16	**82**		1.66	**0.69**		

Block 1-65	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building		0.000	98	0.00		0.95	0.00		9TH ST	**9.63**
Parking/Sidewalk	72,378	1.662	98	162.83		0.95	1.58			
Roads		0.000	98	0.00		0.95	0.00			
Landscaping	41,706	0.957	61	58.40		0.35	0.34			
Openspace		0.000	60	0.00		0.25	0.00			
Total	114,084	**2.619**		221.24	**84**		1.91	**0.73**		

Block 1-66	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building		0.000	98	0.00		0.95	0.00		BLOCK 64	**4.25**
Parking/Sidewalk	38,174	0.876	98	85.88		0.95	0.83			
Roads		0.000	98	0.00		0.95	0.00			
Landscaping	1,424	0.033	61	1.99		0.35	0.01			
Openspace		0.000	60	0.00		0.25	0.00			
Total	39,598	**0.909**		87.88	**97**		0.84	**0.93**		

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Basin I Analysis

Rational Flow Data		
TOC Per Block	5	min
Storm Recurrence	2	yr
Intensity	5.03	in/hr

Block 1-67	SQ. FT.	Acreage	CN	Ac*CN	Avg CN	C	Ac*C	Avg C	Tributary to	Rational Peak Flow (cfs)
Building	14,812	0.340	98	33.32		0.95	0.32		BLOCK 63 & 64	**3.45**
Parking/Sidewalk	1,839	0.042	98	4.14		0.95	0.04			
Roads	6,965	0.160	98	15.67		0.95	0.15			
Landscaping	21,198	0.487	61	29.68		0.35	0.17			
Openspace		0.000	60	0.00		0.25	0.00			
Total	44,814	**1.029**		82.82	**80**		0.69	**0.67**		

LANDSCAPING (ACREAGE)	47.75	AC
IRRIGATION REQUIREMENT	1	IN/WEEK
VOLUME REQUIRED PER WEEK	47.75	(AC-IN)/WEEK
VOLUME REQUIRED PER WEEK	173,318	C.F./WEEK

BASIN TO PARKING GARAGE (based on grades only)

Acreage	C	I(1)	I(2)	I(5)	I(10)	I(25)	I(50)	I(100)
		in/hr	in/hr	in/hr	in/hr	in/hr	in/hr	in/hr
28.16	0.66	4.18	4.72	5.51	6.10	6.99	7.68	8.38
		Q(1)	Q(2)	Q(5)	Q(10)	Q(25)	Q(50)	Q(100)
		cfs	cfs	cfs	cfs	cfs	cfs	cfs
		78.02	88.10	102.85	113.86	130.48	143.36	156.42
		I(1)	I(2)	I(5)	I(10)	I(25)	I(50)	I(100)
		in	in	in	in	in	in	in
		3.30	3.70	4.80	5.70	6.60	7.60	7.90
		Q(1)	Q(2)	Q(5)	Q(10)	Q(25)	Q(50)	Q(100)
		(ac-in)	(ac-in)	(ac-in)	(ac-in)	(ac-in)	(ac-in)	(ac-in)
		61.60	69.06	89.60	106.40	123.20	141.86	147.46
Rainfall Required (inches) per Week	2.56							

A.5 LIST OF FIGURES AND CHARTS

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A.7 AMENDMENTS TO THE LANDSCAPE MASTER PLAN (This place reserved for future amendments)