Creating Sustainable and Economical Outdoor Environments–

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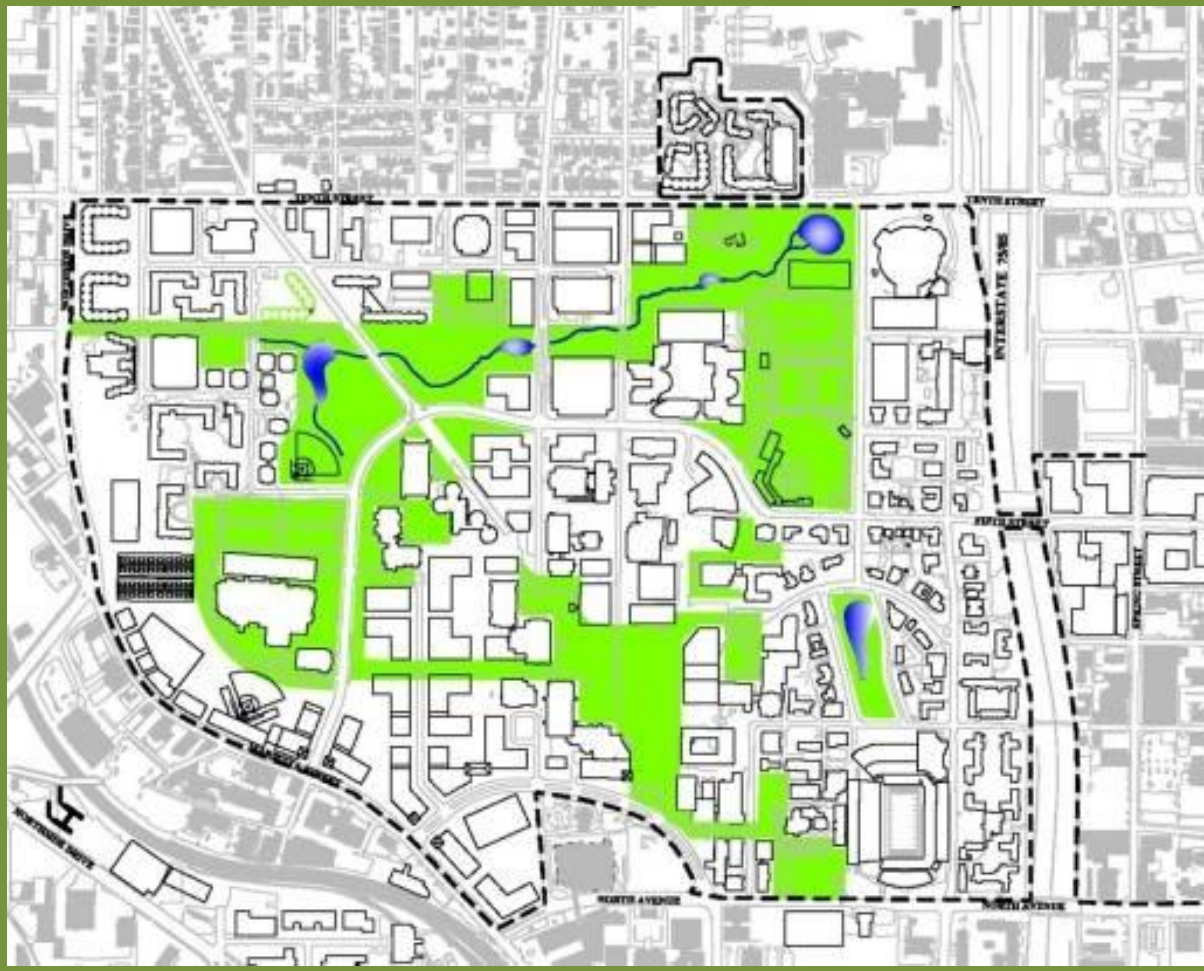
Georgia Tech Landscape Master Plan

Key Concepts:

- ***Ecological Landscape***
- ***Human Landscape***

Goals:

- Enhance living, working and learning environment.
- Unify the campus with a distinct sense of place.
- **Increase tree canopy**, replace aging trees
- **Identification and use of appropriate hardscape and plant material**



I. Leveraging the Potential of Existing Campus Elements with Minor Investment

Major points

Plan for your user groups,

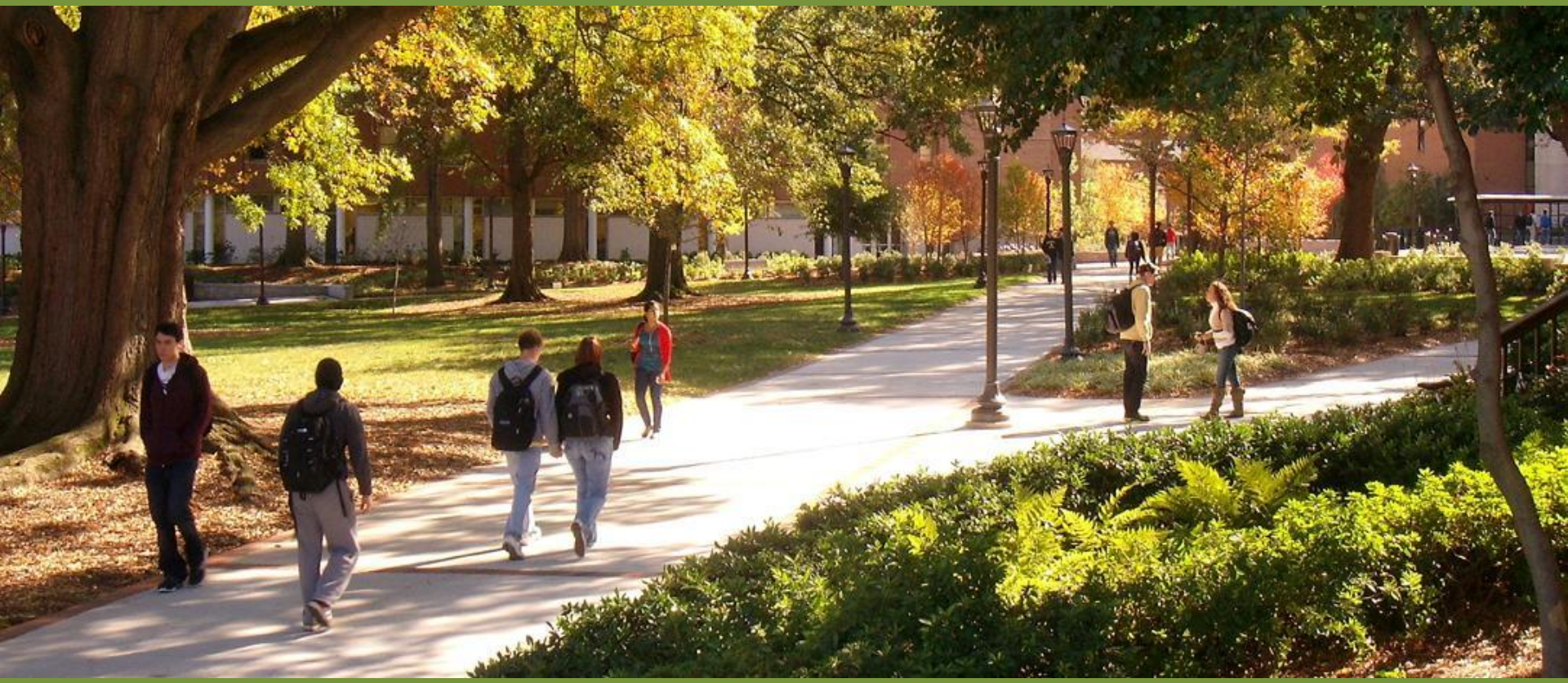
- Students
- Faculty
- Staff
- Maintenance
- Service/Deliveries

Minimize Disturbance to reduce construction cost and protect existing trees

Develop a palate of hardscape materials and stick to it

Develop planting plans around the sun exposure

Select proven non invasive plant materials



Georgia Tech - Transit Hub

Existing Conditions

Existing Conditions

Georgia Tech - Transit Hub

Georgia Tech Transit Hub – Existing Conditions

Georgia Tech - Transit Hub

Georgia Tech Transit Hub – Existing Conditions

Trees in less than desirable conditions

Georgia Tech Transit Hub – Existing Conditions

Be aware of existing root zone

Georgia Tech Transit Hub – Existing Conditions

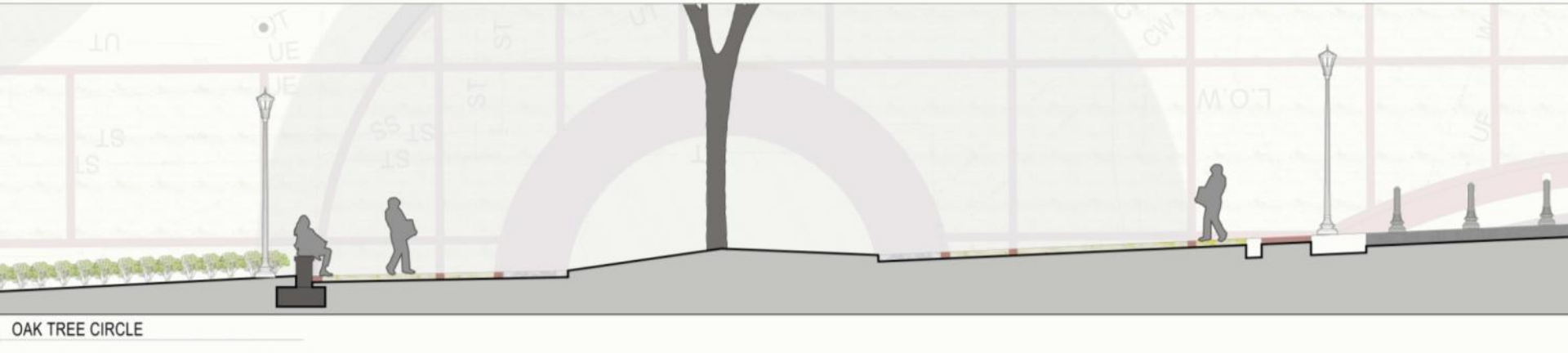
Schematic Design

CONSTRUCTION COST:
$1,743,000 ($14.45 / Sq Ft.)
SIZE: 2.77 Acres

Georgia Tech - Transit Hub

Schematic Design

Work with the existing topography to minimize cost and impacts to adjacent trees



Construction

Georgia Tech - Transit Hub

Protect Your Trees!

Georgia Tech - Transit Hub

Protect Your Trees!

Georgia Tech Transit Hub – Look out for Utilities

Georgia Tech - Transit Hub

Georgia Tech Transit Hub

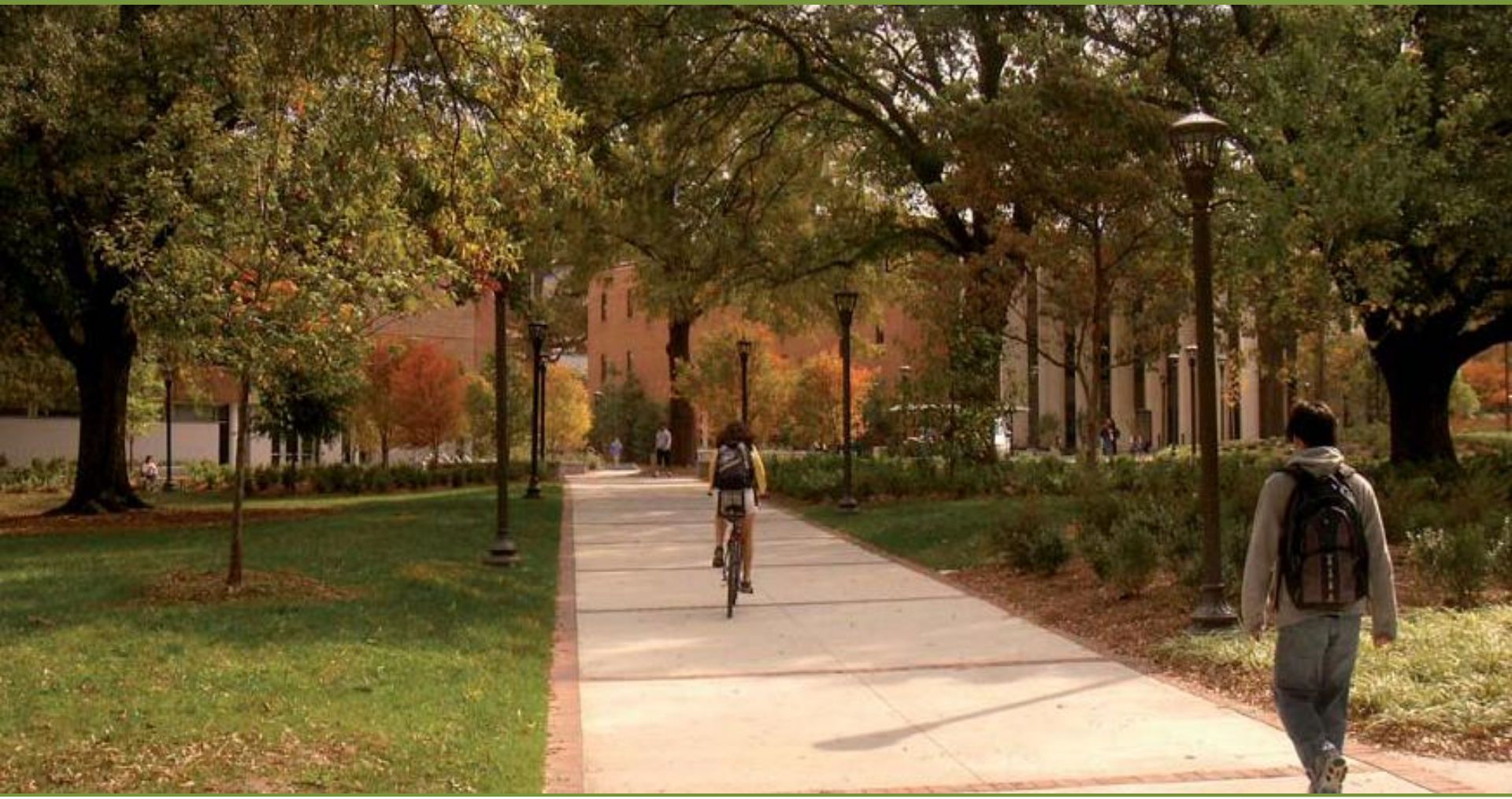
Georgia Tech - Transit Hub

Plan for Bikes

Facilities Officers Conference- Fall 2013

Case Study- Georgia Tech Transit Hub

Locate Lights in landscape to provide unobstructed walks for Bikes and Pedestrians



Case Study- Georgia Tech Transit Hub

Specify proven plant materials and design for sun exposure

Case Study- Georgia Tech Edge Plaza

Case Study- Georgia Tech Edge Plaza

Facilities Officers Conference- Fall 2013

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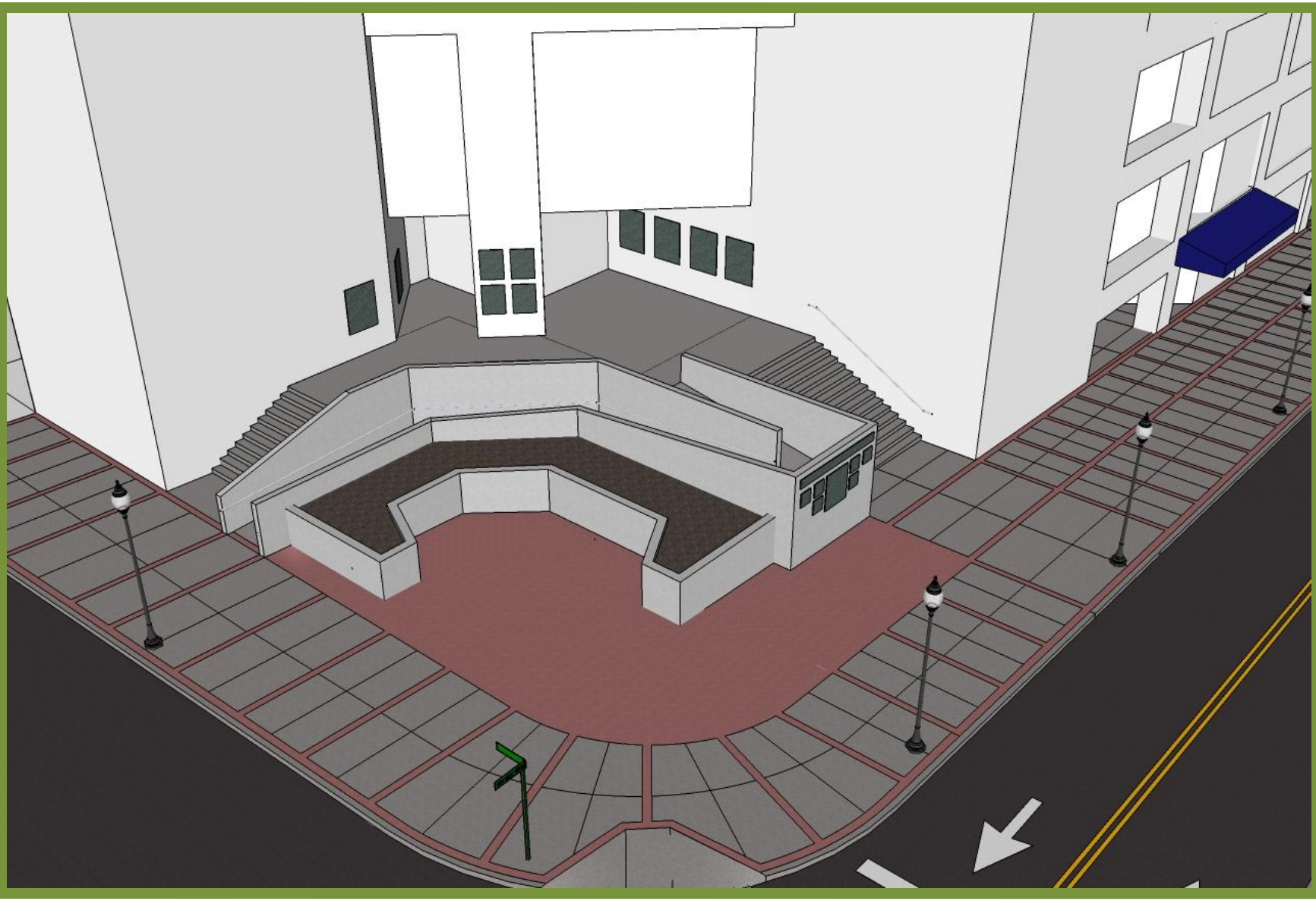
Case Study- Georgia Tech Edge Plaza



Facilities Officers Conference- Fall 2013

Case Study- Georgia Tech Edge Plaza

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Facilities Officers Conference- Fall 2013

II. Creatively Managing Stormwater and Improving Drainage While Enhancing your Campus

Stress on Facilities - Outdoor Landscape Management

- Reoccurring drought conditions make outdoor landscape management difficult.

- State budget and staff cuts have stressed maintenance operations.

- Competition/ Emphasis on revenue generation encourages facilities to maintain 'high end' aesthetic, regardless of these constraints.

- 2010- The Georgia Water Stewardship Act encourages State Agencies to use rain water and gray water, where appropriate, in lieu of potable water.

Stress on Facilities – Stormwater Quality Treatment

- Increasing regulatory emphasis on treating post construction stormwater pollutants:
  - Sediment
  - Nutrients
  - Hydrocarbons
  - Microbial Contamination
- Embracing green building practices (Green Globes, LEED) demands certain treatment targets.
- Reliance on structural or proprietary treatment can significantly impact site budget.

Bioretention

- A properly designed, installed, and maintained bioretention cell can be expected to filter and remove pollutants using physical, chemical and biological mechanisms.
- The fundamental principles of bioretention areas are to infiltrate, filter, store, evaporate, and detain runoff and pollutants as close to the source as possible.
- In addition to the unparalleled pollutant removal and runoff reduction capacities, the aesthetic value of bioretention cells is another major benefit.
- Unlike traditional landscape areas, the landscaping within bioretention cells requires little or no irrigation or fertilization.

Pollutant Removal Capabilities:
Total Suspended Solids: 80%
Heavy Metals: 80%
Total Phosphorous: 60%
Fecal Coliform: no data
Total Nitrogen: 50%

Bioretention

Bioretention

Bioretention

Bioretention

Bioretention

Bioretention

Rain Garden

- Rain Gardens are depressed low points in the landscape planted with native or adapted vegetation that are capable of withstanding durations of standing water.
- Rain Gardens are typically sunk 4-6” at a low point, contain an amended soil and aggregate base to enhance infiltration
- 1/10 to 1/3 of the size of the impervious areas draining to them
- Ideal for residential environments as owners can take responsibility of long term maintenance, landscaping and improvements.

Pollutant Removal Capabilities:
Total Suspended Solids: varies
Heavy Metals: varies
Total Phosphorous: varies
Fecal Coliform: varies
Total Nitrogen: varies

Rain Garden

Rain Garden

Rain Garden

Enhanced Swale

- Enhanced Swales are vegetated open channels that are intended to capture and treat stormwater water runoff.
- These channels can be designed to be either wet or dry; a factor which is dependant on whether an underdrain system is designed integral with the swale.
- Berms and check dams are typically integrated help slow stormwater velocity, promote infiltration, limit erosive forces, and settle pollutants.
- The decision to use a wet or dry enhanced swale system is dependant on the depth of the water table, the slope of existing topography, sub soil conditions and soil series types.

Pollutant Removal Capabilities:
Total Suspended Solids: 80%
Heavy Metals: 40%
Total Phosphorous: 50%
Fecal Coliform: No data
Total Nitrogen: 50%

Enhanced Swale

Enhanced Swale

Enhanced Swale

Enhanced Swale

Design Considerations- Expose Stormwater

Design Considerations- Expose Stormwater

Design Considerations- Design for Long Term

Design Considerations- Utilize Correct Soil Mix

Design Considerations- Control Velocity

Design Considerations- Control Velocity

Design Considerations- Control Velocity

Design Considerations- Control Velocity

Design Considerations- Plant Material Selection

BIORETENTION PLANT MATERIAL SCHEDULE

SHURBS AND RUSHES:

BOTANICAL NAME	COMMON NAME	QUANTITY	SIZE	CONDITION	REMARKS
CLETHRA ALNIFOLIA	SWEET PEPPERBUSH		3 GAL.	CG	4' O.C., FULL
CEPHALANTHUS OCCIDENTALIS	BUTTON BUSH		5 GAL.	CG	8' O.C., FULL
JUNCUS EFFUSUS	SOFT RUSH		3 GAL.	CG	3' O.C., FULL
LEUCOTHOE AXILLARIS	COASTAL LEUCOTHOE		3 GAL.	CG	5' O.C., FULL
ITEA VIRGINICA	VIRGINIA SWEETSPIRE		3 GAL.	CG	5' O.C., FULL
MYRICA CERIFERA	WAX MYRTLE		5 GAL.	CG	8' O.C., FULL

PERENNIALS, GRASSES AND GROUNDCOVERS

BOTANICAL NAME	COMMON NAME	QUANTITY	SIZE	CONDITION	REMARKS
ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER		1 GAL.	CG	18" O.C.
CHASMANTHIUM LATIFOLIUM	RIVER OATS		1 GAL.	CG	18" O.C.
EUPATORIUM FISTULOSUM	JOE PYE WEED		1 GAL.	CG	18" O.C.
HELIANTHIS ANGUSTIFOLIAS	SWAMP SUNFLOWER		1 GAL.	CG	24" O.C.
IRIS FULVA	LOUSIANNA IRIS		1 GAL.	CG	24" O.C.
IRIS VIRGINICA	SOUTHERN BLUE FLAG		1 GAL.	CG	18" O.C.
LOBELIA CARDINALIS	CARDINAL FLOWER		1 GAL.	CG	18" O.C.
LYSIMACHIA CILIATA	FRINGED LOOSESTRIFE		1 GAL.	CG	24" O.C.
MUHLENBERGIA CAPILLARIS	MUHLY GRASS		1 GAL.	CG	3' O.C.
OSMUNDA REGALIS	ROYAL FERN		1 GAL.	CG	24" O.C.
PANICUM VIRGATUM	SWITCH GRASS		1 GAL.	CG	24" O.C.

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Case Study- Richard B. Russell Special Collections Library

Existing Conditions:
Campus Parking, Highly Impervious
Impervious > 50%

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Facilities Officers Conference- Fall 2013

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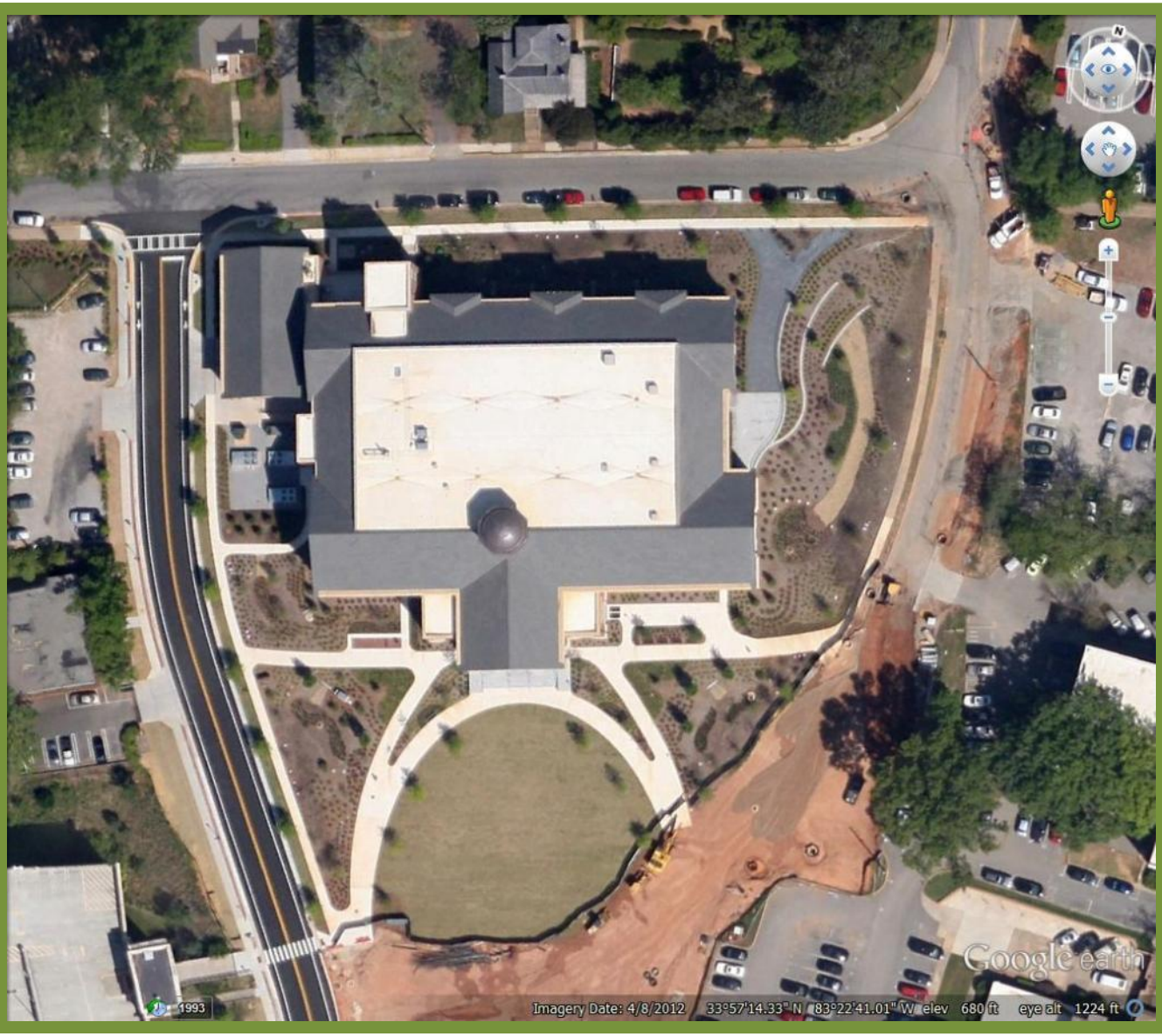

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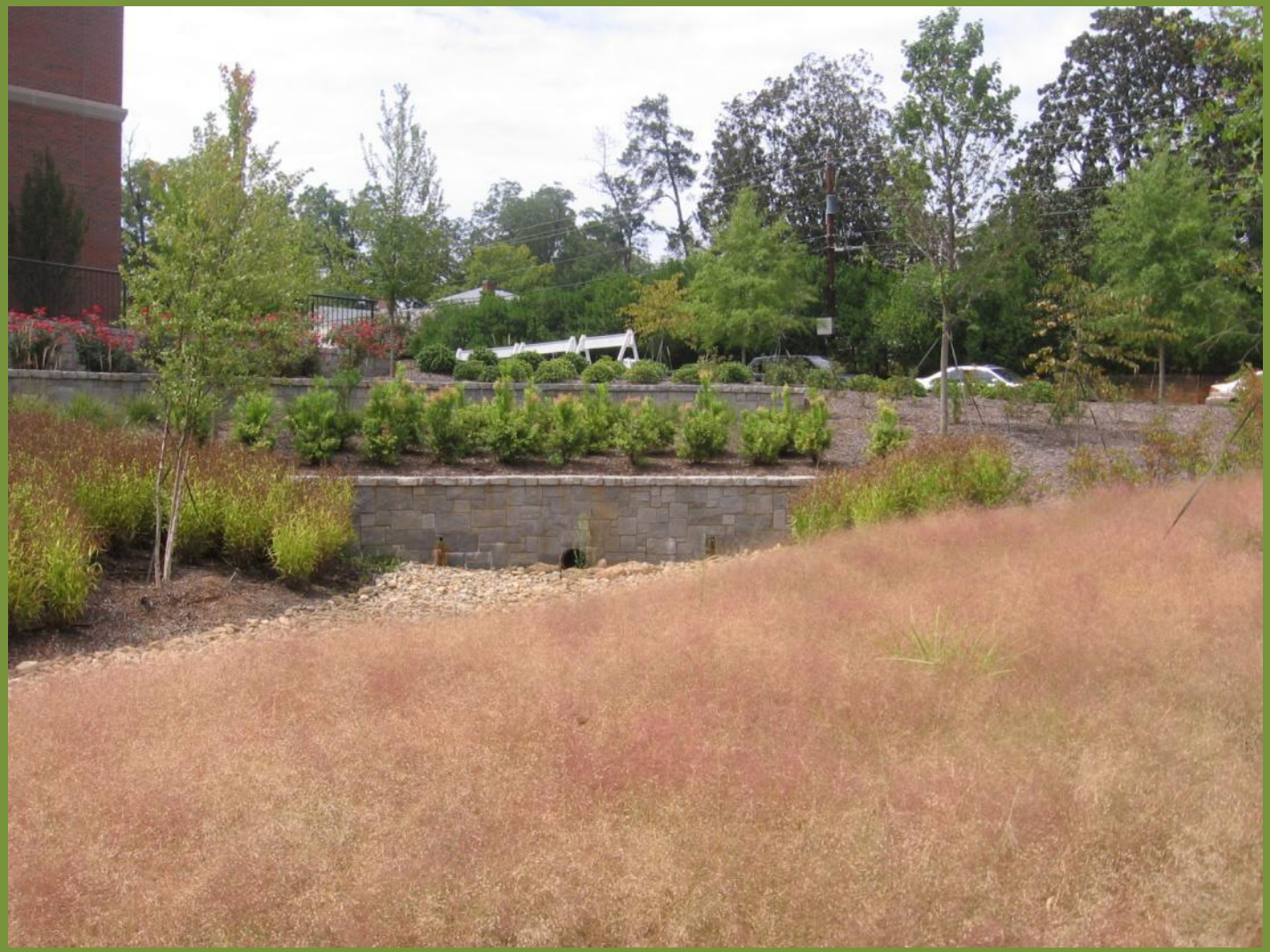

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III. Planning Ahead to Reduce the Cost of Future Site Projects

Creating Sustainable & Economical Outdoor Environments

Board of Regents Facilities
Officers Conference- Fall 2013

Breedlove Land Planning, Inc.
Landscape Architects • Site Planners • Consulting Engineers

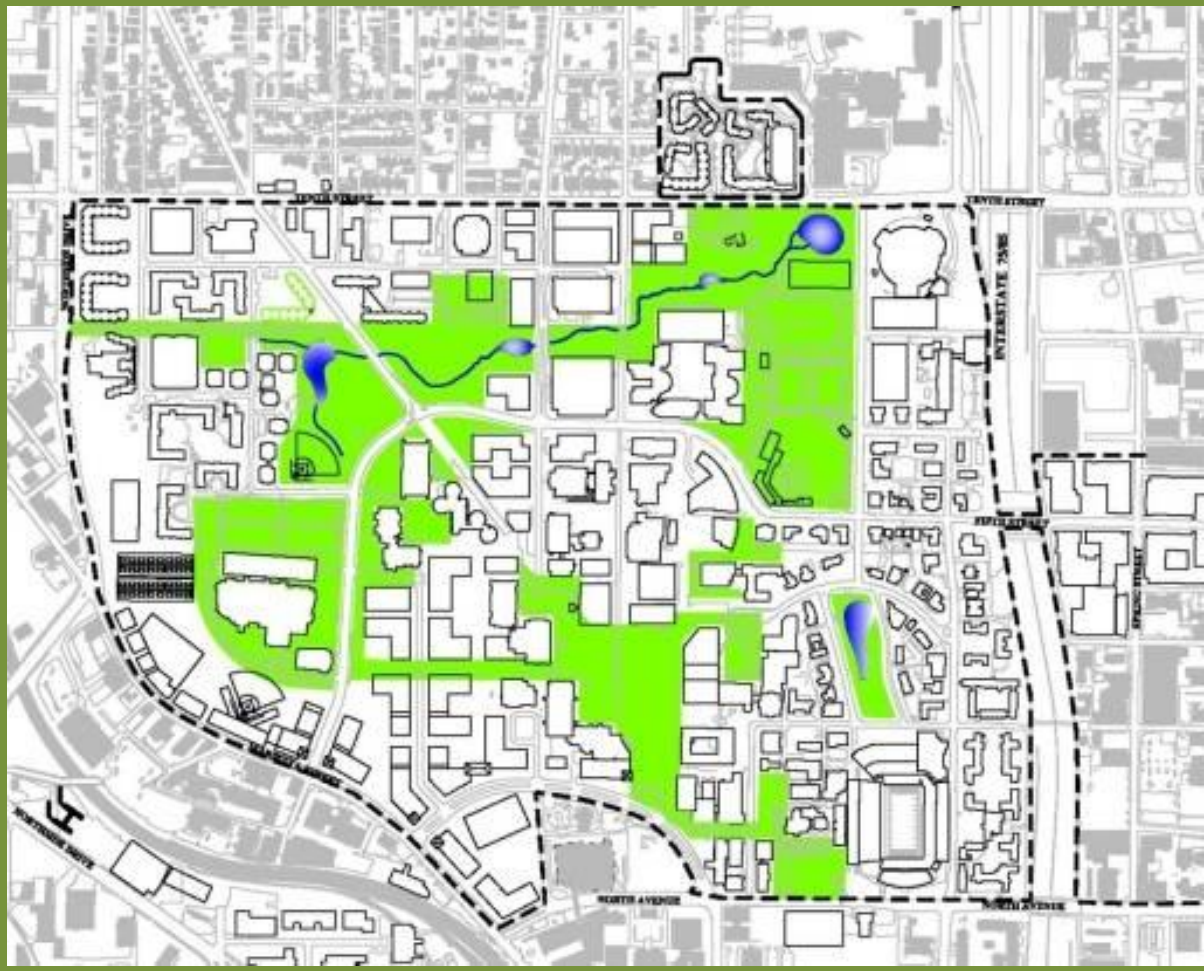
Georgia Tech Landscape Master Plan

Key Concepts:

- ***Ecological Landscape***
- ***Human Landscape***

Goals:

- Develop **integrated, ecologically-based landscape** and **open space systems (storm water management).**
- **Create an Eco-Commons** (80 acres)
- Implement ecological performance requirements of **50% reduction of storm water runoff**



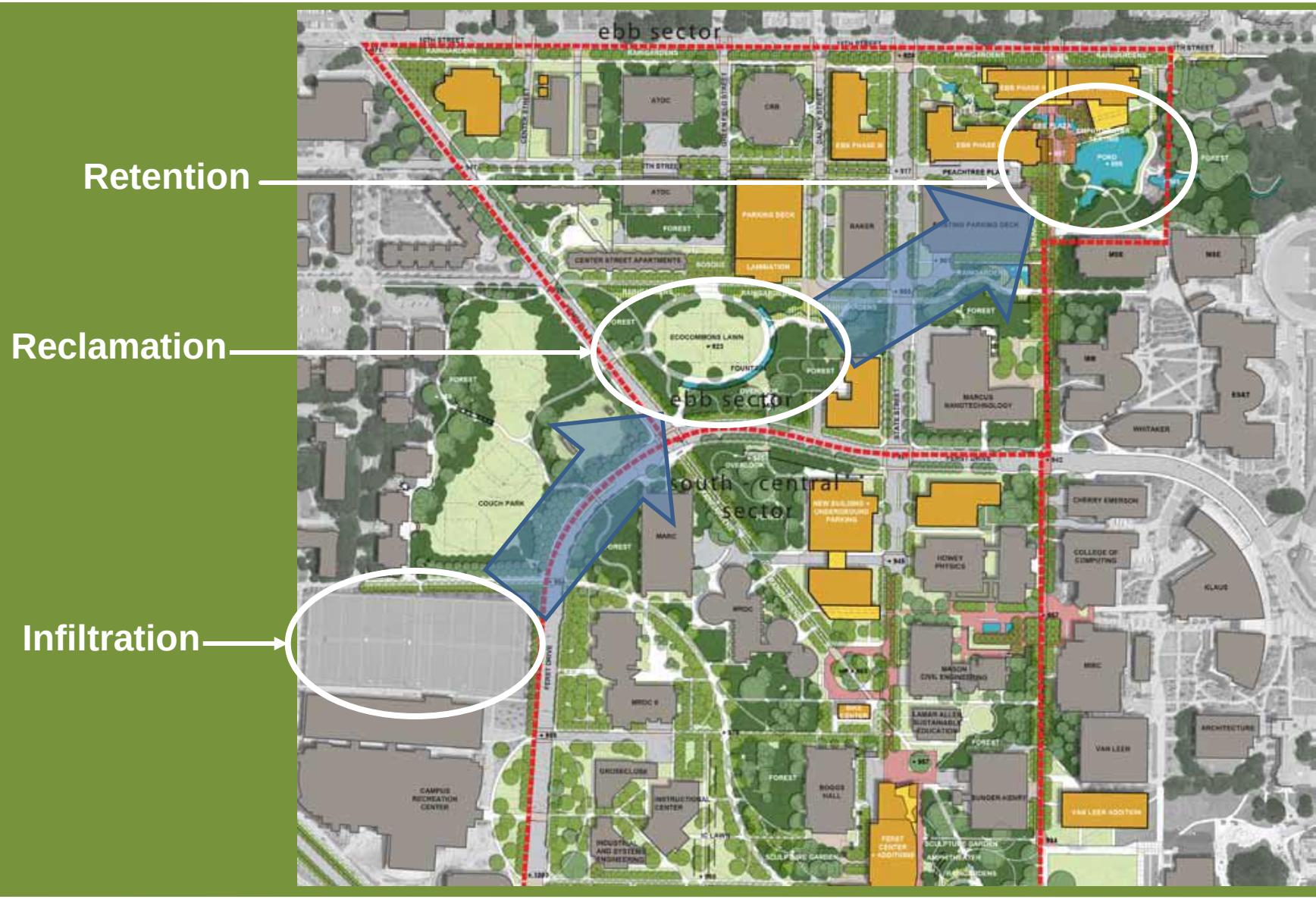
Water: Georgia Tech Vision

- Protect the health of the river
- Supply all non-potable demands with harvested sources
- Water is the organizing principle of the landscape
- Set the future standard for water strategies for the campus
- Demonstrable water systems and innovation

Georgia Tech – 1892 Aerial View

1892 Aerial View of the sectors showing historic drainage patterns (aerial perspective with highlighted watersheds)

Sector Plan


Retention
Reclamation
Infiltration
ebb sector
ebb sector
south - central sector

Stormwater Master Plan Goals

Promote campus sustainability:

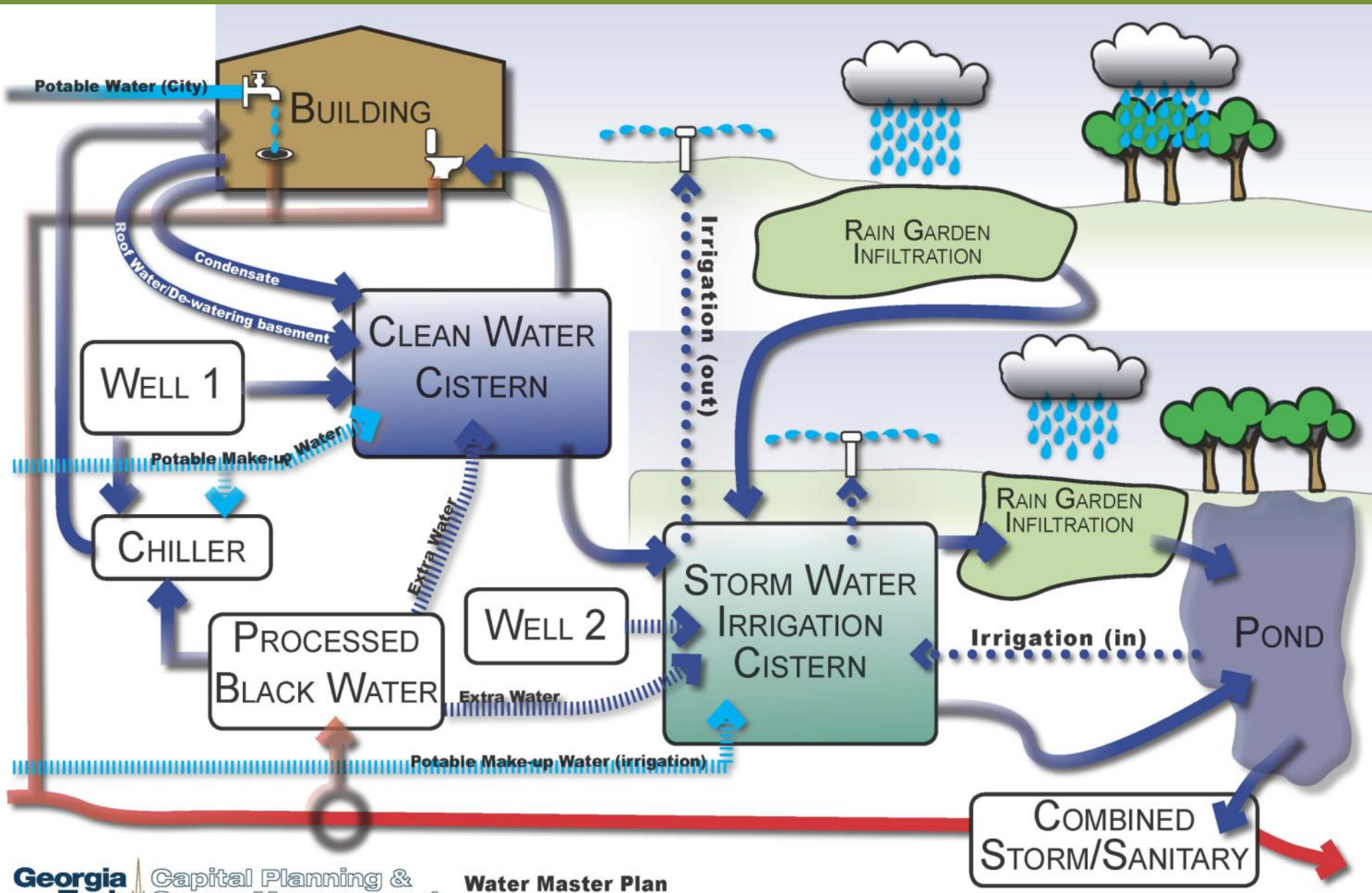
Rainwater harvesting

Reduce stormwater runoff, which contributes to City of Atlanta combined sewer

Create visible campus amenities that functionally contribute to stormwater management

Exceed the newly adopted City of Atlanta stormwater regulations

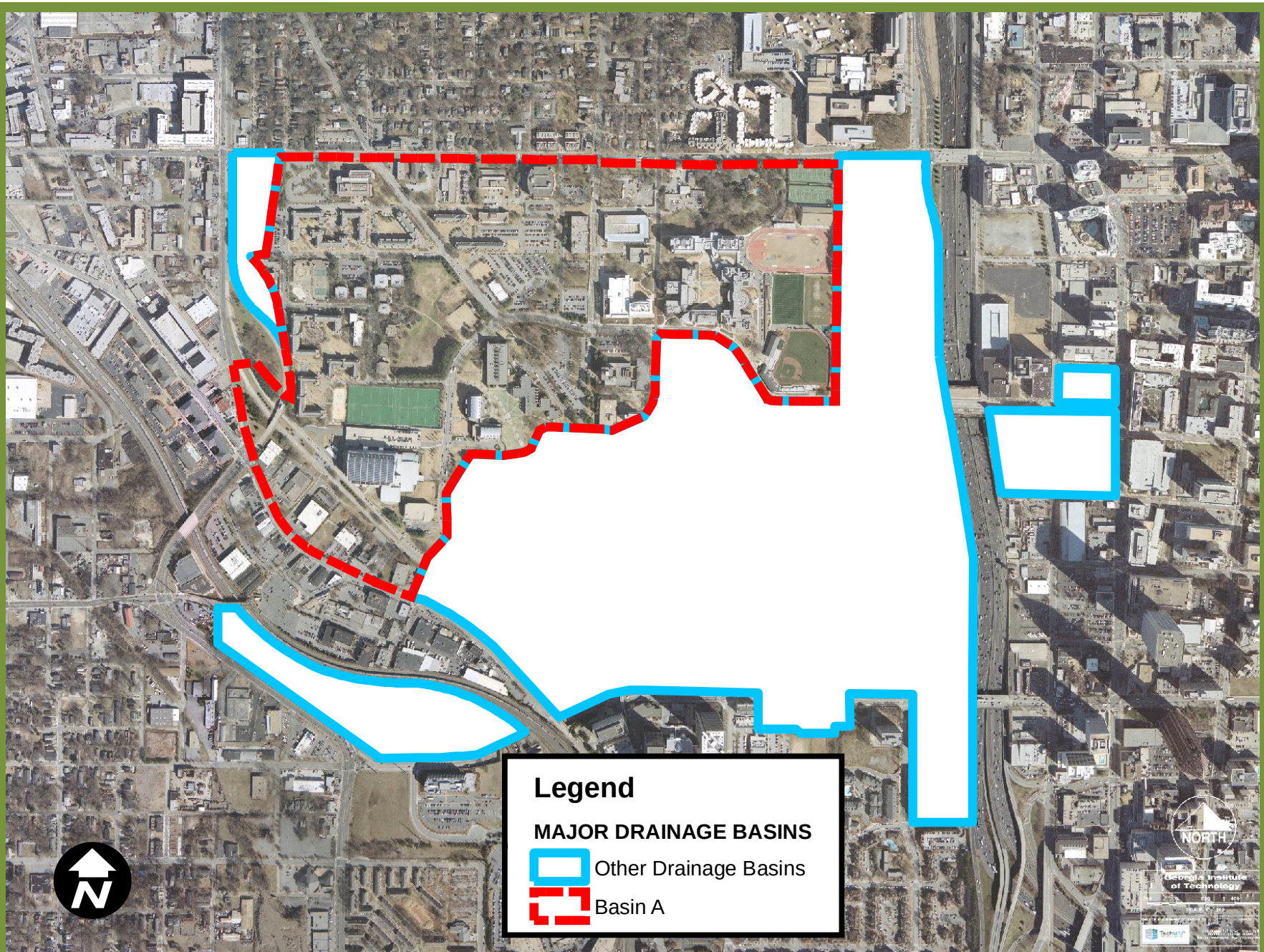
Stormwater Master Plan – Flow Diagram



Georgia Tech Capital Planning & Space Management

Water Master Plan
Flow Diagram - 04.10.2013

Define your Basins



Develop a Model

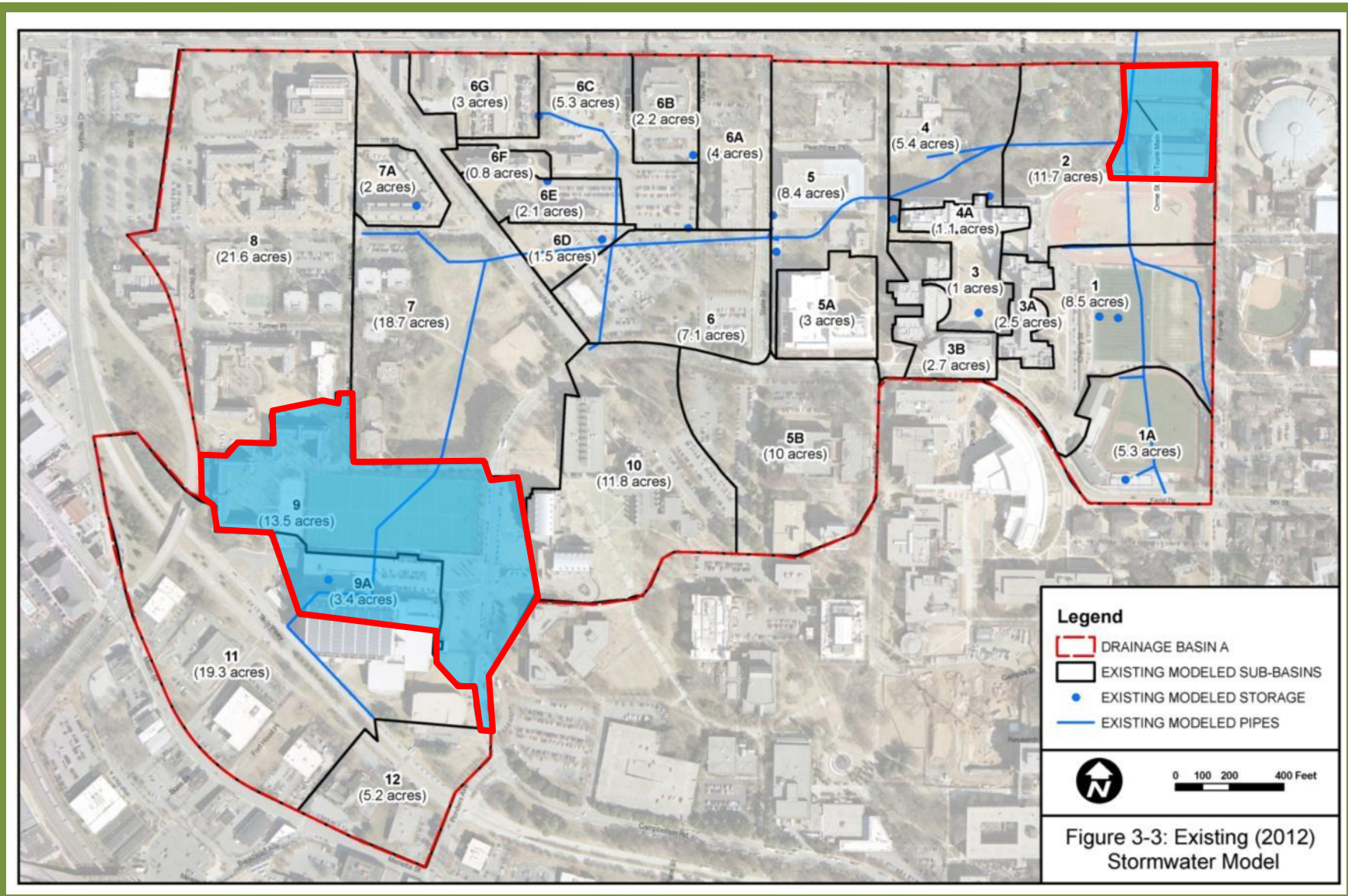
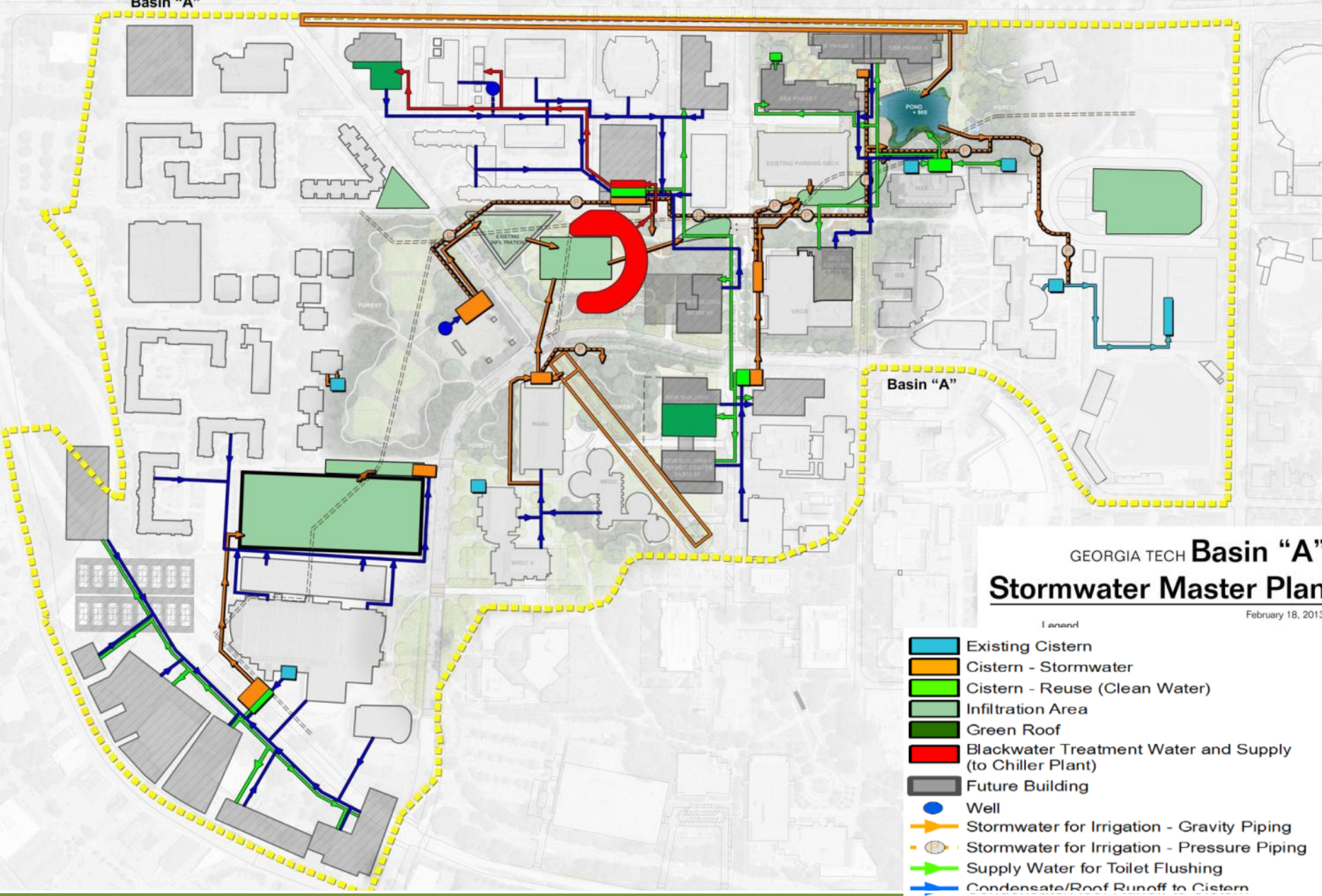


Figure 3-3: Existing (2012) Stormwater Model

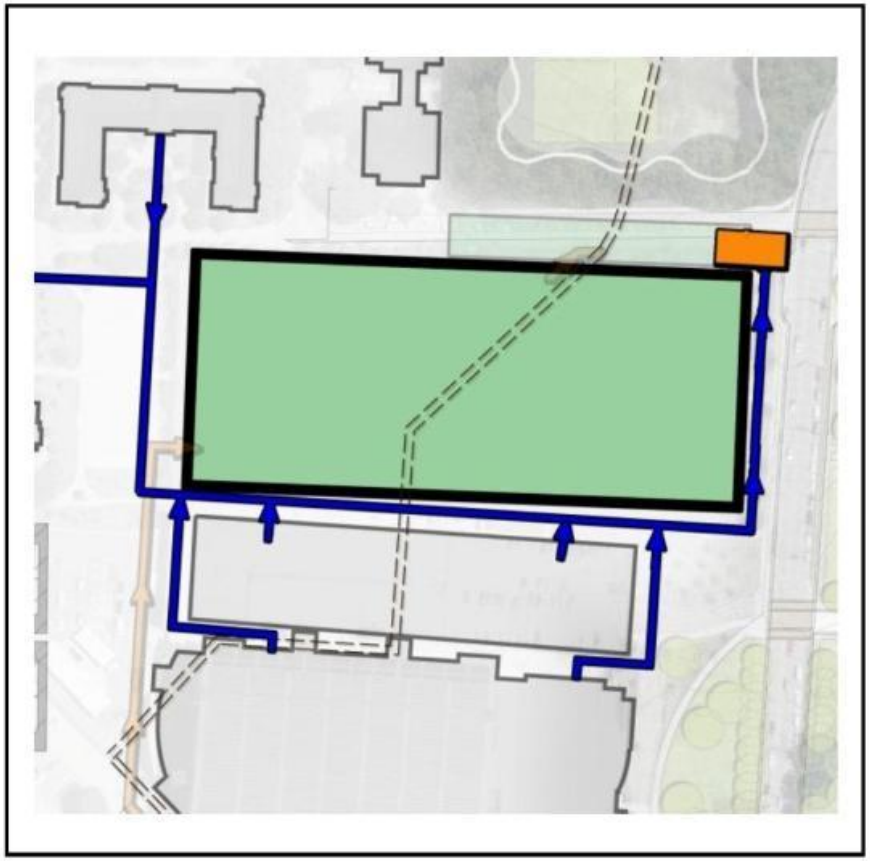


Georgia Tech - Stormwater Master Plan – Basin A

Case Study- Georgia Tech Roe Stamps Field

Phased Approach to
Coordinate with Development Projects

Stormwater Master Plan Phase 1 – Sub-basin 9



LEGEND

- Existing Cistern
- Cistern - Stormwater
- Cistern - Reuse (Clean Water)
- Infiltration Area
- Green Roof
- Blackwater Treatment Water and Supply (to Chiller Plant)
- Future Building
- Well
- Stormwater for Irrigation - Gravity Piping
- Stormwater for Irrigation - Pressure Piping
- Supply Water for Toilet Flushing
- Condensate/Roof Runoff to Cistern
- Treated Blackwater for Chiller Plant & Toilet Flushing
- Existing Condensate/Roof Runoff to Cistern

Implementation Benefits:

☑ Volume Reduction

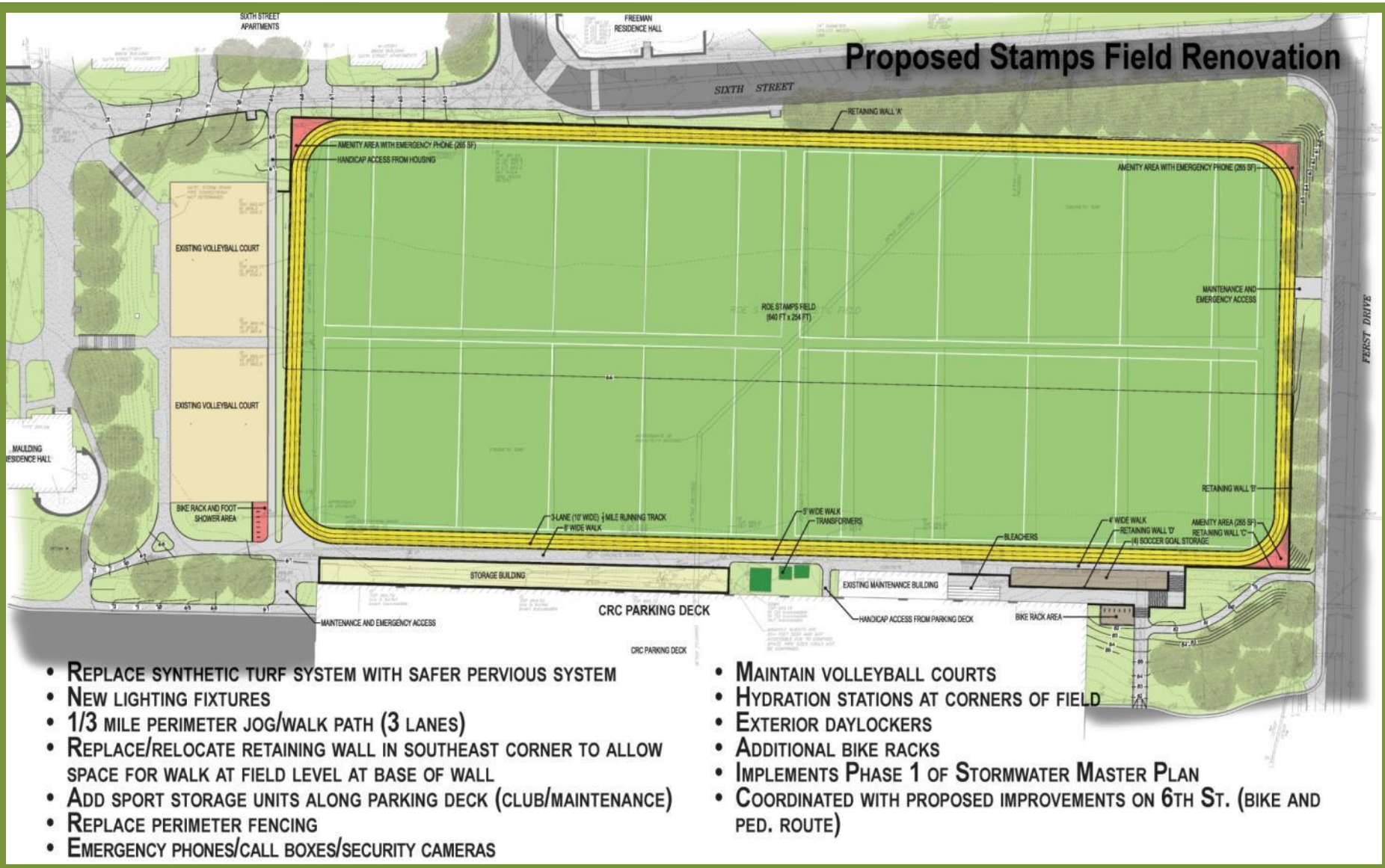
☑ Water Quality

Probable Cost Opinion:

$270,000*

*Does not include field resurfacing

Stamps Field – Schematic Design



- Replace synthetic turf system with safer pervious system
- New lighting fixtures
- 1/3 mile perimeter jog/walk path (3 lanes)
- Replace/relocate retaining wall in southeast corner to allow space for walk at field level at base of wall
- Add sport storage units along parking deck (club/maintenance)
- Replace perimeter fencing
- Emergency phones/call boxes/security cameras
- Maintain volleyball courts
- Hydration stations at corners of field
- Exterior daylockers
- Additional bike racks
- Implements Phase 1 of Stormwater Master Plan
- Coordinated with proposed improvements on 6th St. (bike and ped. route)

Infiltration Cell installation

Provides 44,500 Cubic Feet of Stormwater Infiltration Volume

Over 9.5 times the City of Atlanta requirements.

Providing storage for future development and flow reductions for projects with insufficient land area to meet city requirements

Infiltration Cell installation

Infiltration Cell installation

Infiltration Cell installation

Questions?

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