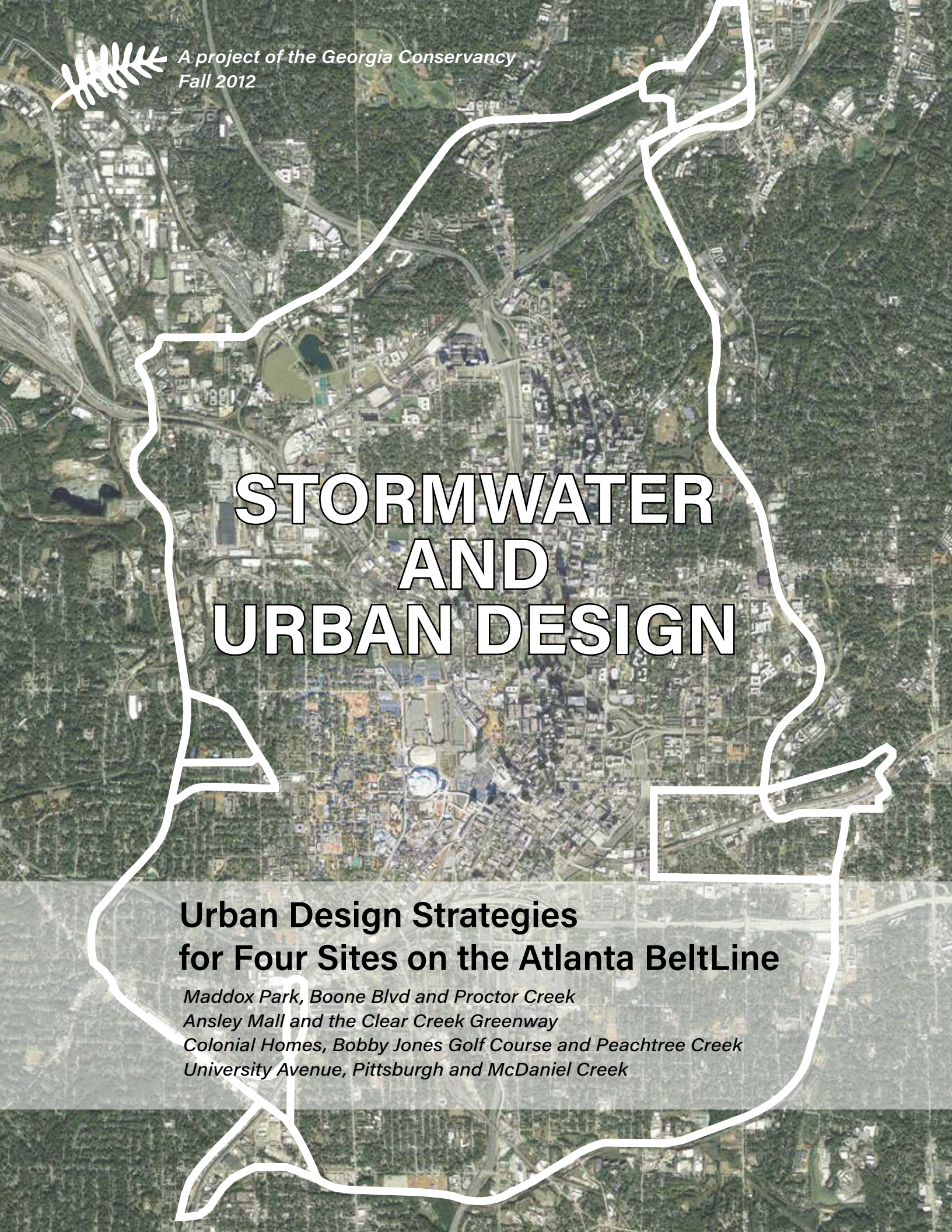

*A project of the Georgia Conservancy*
*Fall 2012*

# STORMWATER AND URBAN DESIGN

## Urban Design Strategies for Four Sites on the Atlanta BeltLine

*Maddox Park, Boone Blvd and Proctor Creek*
*Ansley Mall and the Clear Creek Greenway*
*Colonial Homes, Bobby Jones Golf Course and Peachtree Creek*
*University Avenue, Pittsburgh and McDaniel Creek*

## Georgia Conservancy *Blueprints* Partners

American Council of Engineering Companies of Georgia
American Institute of Architects - Atlanta Chapter
American Society of Landscape Architects - Georgia Chapter
Association County Commissioners of Georgia
Atlanta Neighborhood Development Partnership
Atlanta Regional Commission
Georgia Institute of Technology - College of Architecture
Georgia Municipal Association
Georgia Planning Association
Institute of Transportation Engineers
Southface Energy Institute
Urban Land Institute - Atlanta District Council
U.S. Green Building Council - Georgia Chapter

## We are Grateful to the Generous Donors who Supported the Urban Design and Stormwater *Blueprints:*

The Home Depot Foundation
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THIS REPORT WAS CREATED IN PARTNERSHIP WITH

The Master of Science in Urban Design Program
The School of City and Regional Planning
The School of Architecture
College of Architecture
Georgia Institute of Technology
245 4th St. NW Atlanta, GA 30332

Georgia CONSERVANCY

Our mission is to protect Georgia's natural resources for present and future generations by advocating sound environmental policies, advancing sustainable growth practices and facilitating common-ground solutions to environmental challenges.

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## INTRODUCTION

The Atlanta flood of 2009 should have been a wake up call for municipalities across the state. In a matter of minutes, rain water swelled retention basins, sewers, creeks and rivers, eventually leading to the overflow of millions of cubic yards of surface runoff water into streets, backyards and structures. The devastating effects of the flash flood could have been mitigated through an increased focus on changes to runoff velocities and volumes, and proper urban growth planning.

The Georgia Conservancy's Blueprints for Successful Communities program, in partnership with graduate students from the College of Architecture at Georgia Institute of Technology, examined four different sites within metro Atlanta, adjacent to the Atlanta BeltLine (Ansley Mall - Peachtree Creek; Bobby Jones Golf Course/Colonial Homes - Peachtree and Clear Creeks; University Avenue - McDaniel Branch; and Boone Boulevard - Proctor Creek) and contrasted their development with existing drainage ordinances. These ordinances focus on controlling peak rates of runoff over more holistic, low impact development policies that could be adopted and implemented with great benefit to the community.

Each project focus is site and watershed specific, though is meant to demonstrate the creative stormwater management alternatives present in situations that are duplicated across the state and nation. The proposals all begin with an understanding of the site's position in its respective watershed, the hydrology, and its changing characteristics for the next generation, and the relationship of site conditions, stormwater management, and public spaces.

## *BLUEPRINTS* PRINCIPLES

**Maintain and enhance quality of life for residents**

**Employ regional strategies for transportation, land use, and economic growth**

**Consider the effect of the built environment on the natural environment as well as history and culture**

**Employ efficient land uses**

Blueprints for Successful Communities (Blueprints) is a 19-year-old sustainable community design effort within the Sustainable Growth program of the Georgia Conservancy. The Blueprints process uses a community-based approach to sustainable planning and design. It is unique in that it involves key stakeholders – including citizens, businesses, agency and institutional representatives, and elected and appointed officials – throughout the entire planning process of redeveloping a community to better incorporate and focus on natural resource protection, green space accessibility, sustainable land use, and live-work connectivity. The Blueprints process is one of the most highly respected planning processes in our state because of its inclusiveness, transparency and technical quality. This Blueprints project did not involve stakeholder engagement, beyond interactions with local experts knowledgeable about each site studied. Instead, this Blueprints served as a research endeavor whose results will inform future traditional Blueprints, as the stormwater management lessons learned can be applied to community design.

Water – quality, quantity and/or access to – is a central issue within the State of Georgia and globally. All program areas at the Georgia Conservancy are working to address water challenges - through statewide advocacy, education and research on coastal sea level rise, and advancing awareness through our stewardship trips and land conservation. Thus, it is a natural progression for the Sustainable Growth program to look at stormwater and how our built environment negatively and positively impacts our streams, rivers, and overall quality of life.

“Healthy watersheds are essential for providing clean drinking water, recreational activities and wildlife habitat. Traditionally, most water pollution control efforts addressed point source pollution commonly associated with industrial activities and sewage treatment plants. While these regulations have become effective at controlling point source pollution, we have come to learn that non-point source pollution (stormwater runoff) is the leading cause of water quality problems.

As land in a watershed is developed, natural areas are converted to impervious surfaces such as streets, sidewalks and parking lots. Stormwater that would normally soak into the ground becomes runoff. While some stormwater runoff is normal, the increased volume of runoff associated with impervious surfaces can cause streambank erosion, flooding, property damage and even the loss of life. Additionally, this runoff can pick up pollutants such as sediment and chemicals and dump them directly to the streams and rivers we depend on to sustain life.

Because land, and the water that runs over and through it are intimately connected, a watershed approach to managing water quality is important. A watershed approach considers all the activities within a landscape that affect watershed health. A watershed approach is essential to protecting, restoring and maintaining healthy ecosystems.” (From the Atlanta Department of Watershed Management website – accessed April 2014).

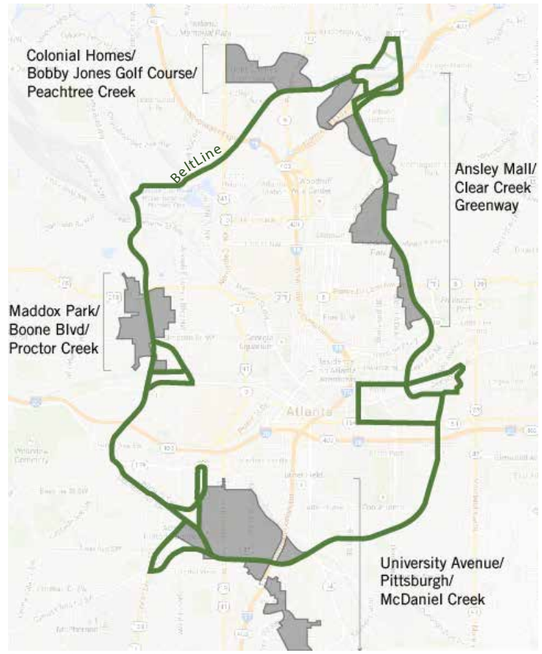
The Blueprints for Successful Communities program adheres to values that protect communities and the environment, and it respects the link between health of our environment, our economic stability and the way we use land. The Blueprints for Successful Communities principles are shown at the top of the page.
By following these principles, we raise public awareness in Georgia about alternative land use, transportation, and design development strategies that are good for the environment and good for the economy.

## BLUEPRINTS PROCESS

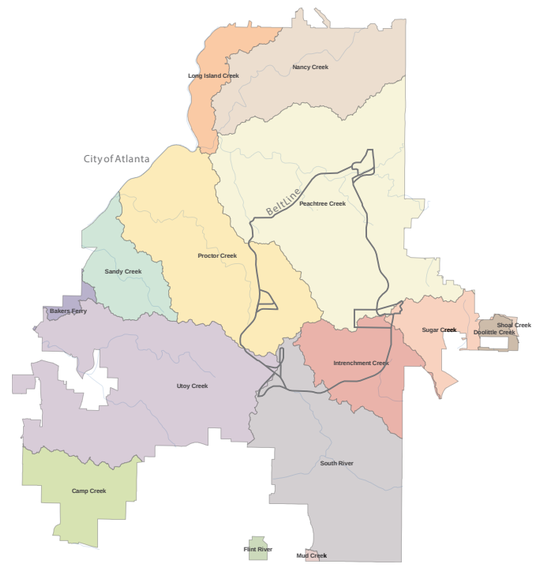
The Blueprints model (completed in 36 communities around the state) focuses on community needs, challenges and assets informed by stakeholder engagement. This Design + Research Blueprints concentrates on stormwater and built environment conditions through site specific analysis. Stakeholder engagement was not part of this study; the project focus was to reflect on typical development processes and identify creative ways to solve water issues on-site after understanding the site’s placement within a watershed. The intent is to share these findings around the state, as well as for this work to influence future stakeholder-based Blueprints projects.

Over the course of a semester, the Blueprints team (composed of Blueprints staff, Professor Richard Dagenhart, Dr. Tom Debo and a Georgia Tech graduate urban design studio) conducted an urban design studio to look at four sites along the Atlanta BeltLine. These sites were chosen based on a combination of publicly known local flooding locations, sites easily accessed for evaluation and by suggestions from Ryan Gravel, Perkins+Will staff, BeltLine consultant and originator of the BeltLine concept. Each site has particular and varying struggles managing water, creating opportunities for creative site design to address these challenges. The studio involved multiple site visits, presentations, collected information and maps, hydrological analysis and calculations to help develop a set of draft recommendations for consideration. These recommendations are supported by technical advisors and form the basis of this report.

The studio members were required to take a one-hour stormwater course in addition to their studio hours to better understand water flow and effects on the watershed. Furthermore, there are four parts to the studio methodology. First, the research was collaborative across the studio. It is one project, with four teams participating, each with specific



Project sites and BeltLine context



Atlanta Watershed Sub-basins and BeltLine context

site and situation. Thus, certain deliverables, measures and evaluations and graphics will be common to the four studio products.

Second, each team prepared an urban design scheme, reflecting and improving upon existing plans for the selected sites. Following that, each team redesigned their site with three alternative approaches: (1) water capture and reuse, (2) water infiltration to minimize flow at the outlet, and (3) maximize water quality.

Third, each team measured the four proposals (urban design, water capture and reuse, water infiltration, and water quality) for direct comparisons among the four teams and the alternative approaches. This provides the metric for demonstrating the potentials for urban design approaches to stormwater management.

Fourth, each team prepared a final proposal, incorporating parts of their alternatives most appropriate for the site situations. The aim is to demonstrate that urban design can produce a project that is feasible and performs at the highest levels of urban design and stormwater management.

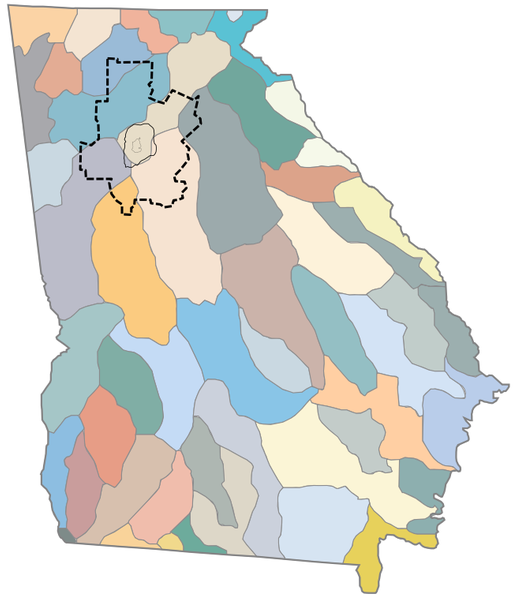
The Blueprints process was directed and managed by the Georgia Conservancy. Technical support for the project was provided by Professor Richard Dagenhart, R.A. of Georgia Tech's College of Architecture and Professor Emeritus Thomas Debo, PhD, P.E., of Georgia Tech's School of City and Regional Planning, along with a fall of 2012 urban design studio composed of graduate students studying urban design, city and regional planning, and/or architecture. Additional expertise was provided by professionals from our Blueprints Partners program, the City of Atlanta Department of Watershed Management, and professors in the College of Architecture at Georgia Tech.

Final recommendations found in this report reflect, as best as possible, the professional judgment of the Blueprints team – Georgia Conservancy staff, Richard Dagenhart, Dr. Tom Debo, participating graduate students and professional experts.

The Urban Design and Stormwater Blueprints for Successful Communities began in the summer of 2012 with data collection, site visits and assessments, and project preparation. From August to December of 2012, the analysis and studio work occurred, coinciding with the semester calendar of Georgia Tech. From May 2012 to March 2014, the Georgia Conservancy compiled, edited and added to the urban design studio's work to create this final report.

## PARTNERSHIPS

Partner organizations and decision-makers will be instrumental with the implementation of the recommendations found in this Blueprints report in their own communities. As previously mentioned, this Design + Research Blueprints will have the greatest impact if the ideas, techniques and process are shared statewide to influence smarter policy and decision-making. Thus, this will influence our partnerships as dissemination of the information is a critical component to the success of the project. The Sustainable Growth team hopes to share the project information in presentations and reports to various audiences including municipalities, planning departments, water management departments, developers, engineers, etc. As additional partner organizations are identified, they should be included in implementation discussions. Because water is a critical element for all of our communities, we see this report and outreach as impactful for anyone who would like to learn more about potential improvements that can be made through low impact development infrastructure.



State of Georgia Watersheds (with Atlanta region, I-285 and BeltLine outlined in black) www.brownsguides.com

## EXECUTIVE SUMMARY
by Richard Dagenhart, R.A., Associate Professor

### Stormwater Management and Urban Design

For the past several decades stormwater management policies, regulations and design practices focused on end-of-pipe solutions. The stormwater problem was defined simply as the control of peak rates of runoff from new urban development, and the primary aim was to control post-development peak runoff of specific storms (i.e., 5-, 10-, 100-year rainfall events) so they did not exceed pre-development runoff rates. However, this method addresses only the short-term impacts of a storm event by constructing detention basins at the site's drainage outlet. Other approaches have included regulating new development based on the percentage of impervious surfaces to reduce peak runoff. For many years, it has been clear that these stormwater management methods do not consider the hydrologic changes induced by new development nor do they address issues of stormwater quality, as water moves from individual development sites into public waterways or into groundwater.

Best Management Practices (BMP's) for stormwater control were introduced more recently to address some of these shortcomings. However, most BMP's were developed to supplement hardscape engineering end-of-pipe and pipe-and-pond practices. In addition, parcel-by-parcel applications ignore the larger water quantity and water quality problems in the new development site's associated hydrologic unit and watershed.

The U.S. Environmental Protection Agency (EPA) has more recently redefined BMP's as "a practice or combination of practices that are an effective, practicable means of preventing or reducing the amount of pollution generated by non-point sources." Thus, stormwater management practices are moving toward runoff quantity and quality by incorporating mechanical and biological processes. In addition, EPA has also begun to emphasize the importance of stormwater management practices combined with smart growth practices to escape the limitations of parcel-by-parcel regulations and only hard engineering solutions. These new directions from EPA are following research and demonstration projects known generally as Low Impact Development (LID).

The result of this expanded focus of stormwater management practices means that the design of the development site is central to accomplish both smart growth and stormwater management. The goal is to allow urban development to occur in many situations, but requires that the project be designed to limit hydrologic impacts. Thus, it is possible to have urban development with hydrologic characteristics of rural or undeveloped land. When this approach is broadened beyond a single parcel of land, the design challenge expands from site design to urban design – how the land is subdivided, how the public domain of the streets and parks and open space is organized and designed, and how private parcels and buildings are designed and constructed.

It is clear that the challenge of stormwater management extends from the building to the site to the street and public spaces and eventually to the network of surface water and groundwater. This means that knowledge of stormwater hydrology and LID practices must be central to urban design practice, whether projects are re-inhabiting the urban core, retrofitting problem sites, or designing new development of vacant sites in existing urban areas or on the urban fringe.

## Urban Design + Research

There is increasing evidence coming from the research community and the experiences of professionals within the urban stormwater arena that to efficiently and economically control the hydrologic impacts from urban development, factors other than peak flow and amount of impervious surfaces should be considered. Three factors that should receive consideration include:

1. Velocity of flow through the local drainage system.
2. Volume of flow increase from urbanization.
3. Time of Concentration, or the time it takes runoff to flow through the drainage system to some downstream exit point.

Instead of end-of-pipe calculations, these additional factors emphasize the manner in which the water flows from the building to site to street and park and finally to surface water and ground water. It is the design of this network of water flow – using the knowledge from LID strategies – that must be the focus of stormwater management. Simply stated, when considering these additional factors, stormwater management is a central urban design problem.

This Blueprints studio assignment is a design research effort to examine how urban design strategies can contribute to stormwater management and, further, provide evidence for future revisions of stormwater policy, regulations and ordinances.

SITES: THE ATLANTA BELTLINE

The Atlanta BeltLine was an obvious choice for four sites. All of the subarea plans have been completed by urban design firms, so the public has access to basic existing conditions as well as the adopted plans. Four sites stood out for their severe stormwater issues, for their north-south-east-west locations in the city, and the fact that none of the four had incorporated little, if any, stormwater concerns in their subarea plans.

Each of the sites has a separate chapter within this report that includes the team's analysis of the situation and their design proposals in detail. The four sites are:

(1) Proctor Creek Watershed: This site includes Maddox Park, and the vacant land and deteriorated buildings in the area between Boone Boulevard/Simpson Street and Donald Lee Hollowell Parkway, where the BeltLine, MARTA, and an active rail line cross.

(2) Peachtree Creek Watershed: This site includes the Colonial Homes condominiums, the Bobby Jones Golf Course, Atlanta Memorial Park, and the area around the future BeltLine stop for Piedmont Hospital and surroundings.

(3) McDaniel Creek Watershed: This focuses on a specific site – the larger vacant site between University Avenue and the BeltLine. This location also requires examination north of the site, in the Pittsburgh Neighborhood, as well as south along the creek.

(4) Clear Creek Watershed: This includes private and public developments along Clear Creek, including the Old Fourth Ward Park, Piedmont Park, and the North Woods area. The Ansley Mall property is included as a redevelopment example, due to its critical location within this watershed.

## Conclusions

During the semester, visiting critics joined the faculty for project reviews and technical assistance. These included Conservancy staff and Blueprints Partners, City of Atlanta Department of Watershed Management staff and experienced professionals from Atlanta architecture, landscape and urban design firms. Discussion continued throughout, focusing on possible conclusions from the four projects and examining the evidence to support such conclusions. In the final review, with all projects completed, five conclusions were evident.

(1) Debris in Proctor Creek

(2) Peachtree Creek at the Bobby Jones Golf Course

(3) Pedestrian bridge over the McDaniel Branch


(4) Health Hazard sign on Clear Creek at Ansley Mall

WATERSHEDS ALWAYS COME FIRST.

The first conclusion is obvious and the most important of all, whether or not stormwater is the primary issue. The first step in assessing the existing situation of a project is to determine its watershed and the current stormwater situations in that watershed – it is as important as transportation, accessibility and other infrastructure issues. The design of every urban design project must begin with an understanding of the watershed.

A SITE'S POSITION IN THE WATERSHED YIELDS IMPORTANT CLUES FOR URBAN DESIGN STRATEGIES.

The University Avenue site is a perfect example of this conclusion. University Avenue, along with the Pittsburgh neighborhood, sits near the top of the McDaniel Creek Watershed. This led to the primary urban design strategy, focusing on increasing the runoff time of concentration in the upper part of the watershed and greatly decreasing the time of concentration downstream. This enabled the design of the University Avenue site to mitigate current downstream flooding and create an infrastructure landscape for the future development of the site along the BeltLine.

FLOODPLAINS ARE STORMWATER AND URBAN DESIGN RESOURCES.

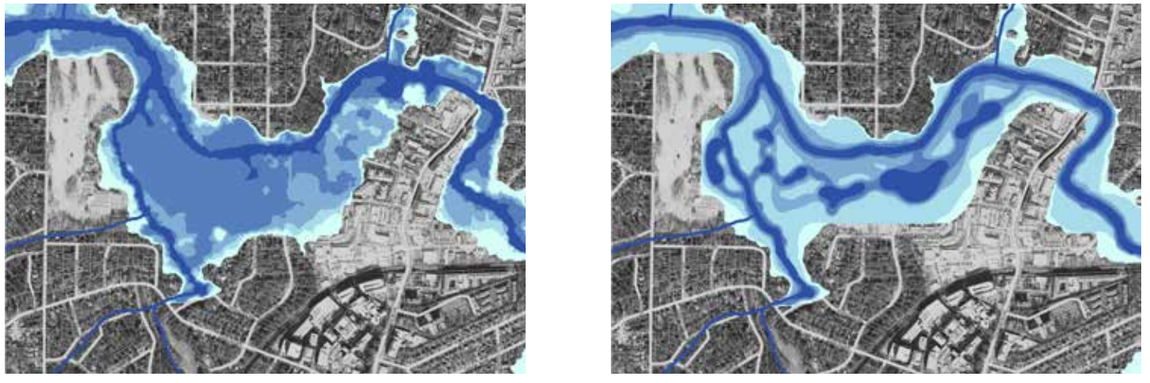
Both the Colonial Homes and the Maddox Park sites are examples of how floodplains can be considered resources for combining stormwater management with urban design. In both cases, land swaps between floodplain land and parcels outside the floodplain became the basis for the urban design proposals. Although both would be very controversial to the surrounding neighbors, the design research points to effective ways to manage complicated stormwater and floodplain issues and create expanded private urban development opportunities.

GREENWAYS ON STREAMBEDS ARE ESSENTIAL FOR STORMWATER AND URBAN DESIGN PERFORMANCE.

This conclusion seems too obvious, given the recent enthusiasm for creating greenways along streambeds in cities across the country. However, combining stormwater management with urban design can create both the public amenities of greenways with private development opportunities on adjacent land. The prospect of the redevelopment of Ansley Mall, with a larger coalition of property owners, could easily create a Clear Creek Greenway from the BeltLine to Peachtree Creek and beyond while expanding opportunities for new urban development on underutilized parcels, like Ansley Mall.

PUBLIC EDUCATION IS CRITICAL FOR ALL PROJECTS.

Each site's urban design proposals would likely produce resistance from neighborhood residents and property owners because the proposals are attempting to resolve complex issues which cross boundaries of neighborhoods, address the perception of public versus private interests;,and highlight different viewpoints of land use and density. This means that public education about the importance of stormwater solutions integrated into neighborhoods, public spaces, and private development needs to be expanded. Better stormwater management, more and better public spaces, and a more livable Georgia will depend on this public education. We hope that this Design + Research Blueprints, as part of the Georgia Conservancy's Sustainable Growth Program, can help to meet that objective.



Existing (left) and Proposed (right) flood plain at Colonial Homes/Bobby Jones Golf Course


Detention pond at University Avenue site