Atlanta Housing Authority at CAU Flood Management Report

June 21, 2016

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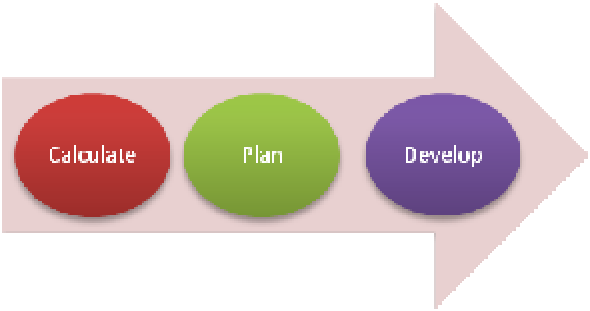
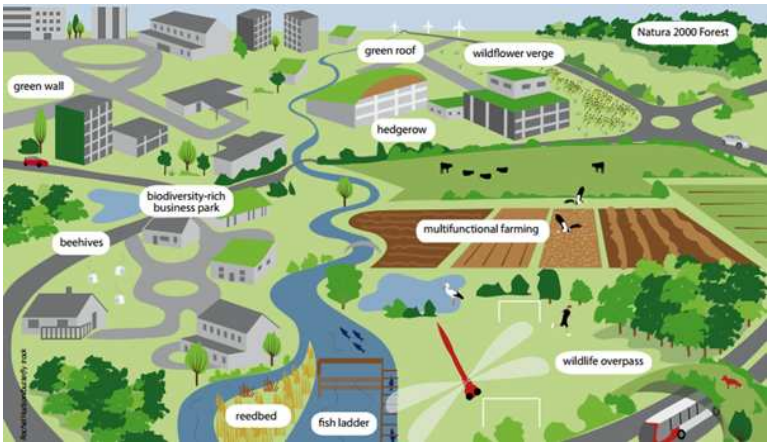




ABSTRACT

During the course of major rain events, storm water from throughout the Atlanta University Center rushes downhill to flood Atlanta Housing Authority property. From here, storm water combined with raw sewage drains down from high elevations to the low elevation residential neighborhoods of Vine City, English Avenue and Washington Park creating documented health risks in flooded homes and streets.

This third world situation has led to a convergence of both Federal and local stakeholders to investigate the causal problems and implement flood control solutions. The Department of Housing and Urban Development, the Army Corps of Engineers and the Environmental Protection Agency, among 16 Federal agencies, have joined forces with the City of Atlanta, corporations, charitable foundations, and non-governmental organizations to fix this problem.

WHAT IS GREEN INFRASTRUCTURE?

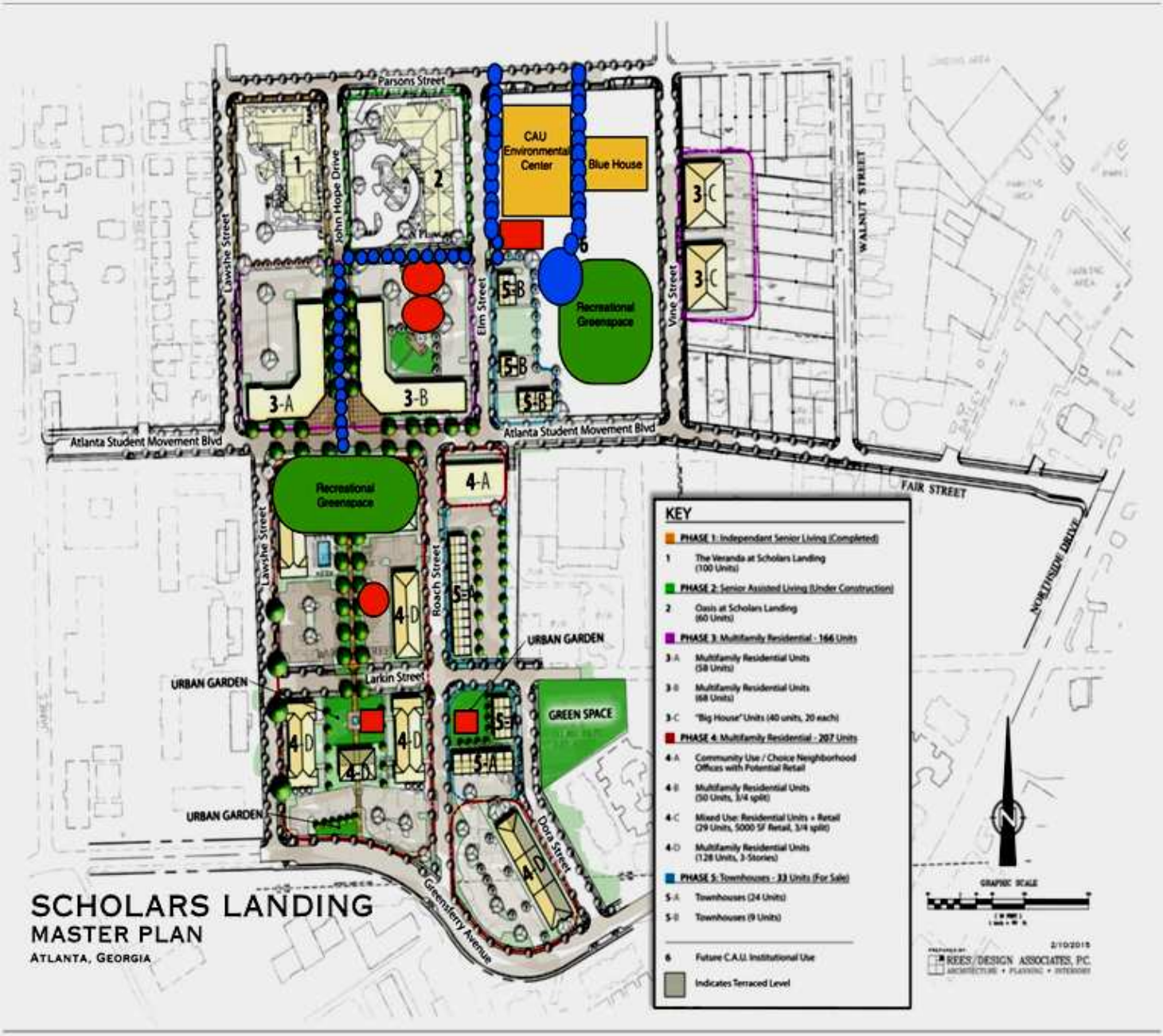
Green infrastructure is a cost-effective, resilient approach to managing wet weather impacts that provides many community benefits. While single-purpose gray stormwater infrastructure -- conventional piped drainage and water treatment systems -- is designed to move urban stormwater downstream quickly, away from the built environment, green infrastructure reduces and treats stormwater at its source while delivering environmental, social, and economic benefits.

HUD AND CHOICE NEIGHBORHOODS PLANNING GRANTS

Building on a commitment to help local communities redevelop distressed public or assisted housing and to transform neighborhoods, U.S. Department of Housing and Urban Development (HUD) Secretary Julián Castro announced new Choice Neighborhoods Planning Grant awards. These awards will help grantees craft comprehensive, locally driven plans to revitalize and transform distressed neighborhoods.

A CONCEPTUAL PLAN FOR FLOOD CONTROL AND GREEN INFRASTRUCTURE FOR ATLANTA HOUSING AUTHORITY PROPERTY IN THE CLARKE ATLANTA UNIVERSITY WATERSHED

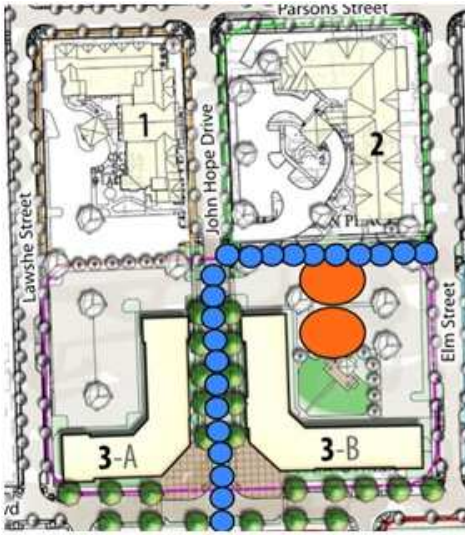
The map below superimposes an overview of our Conceptual Plan over the preliminary Atlanta Housing Authority Plan for Scholars Landing. The following pages break down the overall Conceptual Plan and present analyses and recommendations for cisterns and greenways appropriate to each area. Results are summarized on page 15.



Phase 1: Independent Senior Living, The Veranda at Scholars Landing (100 units) (Completed) and

Phase 2: Senior Assisted Living, The Oasis at Scholars Landing (60 units) (Completed)

Stormwater runoff from impervious surfaces in Phase 1 and Phase 2 currently drains into the recently constructed combined sewer running under Parsons Street. Runoff from this area totals 500,000 gallons for a 25-year rain event. The goal for capturing these long term flood events can be postponed until some future date, after collaboration with Clark Atlanta University makes it possible to construct a large system on the east side of Elm Street north of AHA Phase 5-B.



Phase 3-A and 3-B: Multifamily Residential - 166 Units and

Phase 3-C: "Big House" Units (40 units, 20 in each of 2 buildings)

We recommend that stormwater runoff from impervious surfaces in Phases 3-A and 3-B be directed to two separate cisterns to be located at the north end of the Phase 3-B parking lot. One would retain 150,000 gallons of runoff from building roofs and the other would retain 200,000 gallons of runoff from the parking lots. **Total cistern capacity: 350,000 gallons.**

Runoff from Phase 3-C "Big House" Units will be accommodated by the Elm Street cistern to be constructed in planning section 6: "Future CAU Institutional Use". Other future buildings in this area will also flow into the Elm Street cistern. This area is bounded by Vine Street, Parsons Street, Walnut Street, and ASM Blvd. An ephemeral stream will cross the block carrying flows during large rain events from Catchment Area #3 to the EJ Simons Park Recreational Greenway/ flood plain.

Major rain events into all three cisterns would overflow into an ephemeral stream running along the lot line north of Phases 3-A and 3-B and south of Phases 1 and 2, over to John Hope Drive and then south along John Hope Drive and under Atlanta Student Movement Boulevard (ASM Blvd) to the major greenway recommended to be constructed in Phase 4 at ASM Blvd. Note that excess runoff from the future cistern serving Phase 5-B in collaboration with CAU on the east side of Elm Street would also flow into the ephemeral stream described above.

Phase 3 also includes renovation of ASM Blvd which we recommend be lined on both sides with trees. It would overlook the major stormwater greenway and to be built in Phase 4.

Several other major greenways are proposed in other conceptual plans that adjoin the AHA property. Together they will create a significant acreage of recreational greenway/floodplain, a

major series of parks that could be connected by a trail, possibly designed by the National Park Service. For further ideas on how to turn ASM Blvd into a greenway, we recommend reviewing the plans proposed for Boone Boulevard greenway which separates the Vine City and English Avenue communities. See one rendering on page 6.

For more information contact City of Atlanta, Department of Watershed Management.
http://procurement.atlantaga.gov/wp-content/uploads/2016/04/FC-8856-Boone-Boulevard-Green-Infrastructure-Capacity-Relief-Project-Final-Solicitation.pdf

Phase 4: Multifamily Residential - 207 Units and

Phase 5-A: Townhouses - 24 Units (For Sale)

We recommend the construction of an additional three cisterns for this area, as described below. Overflow from these cisterns will flow via the ephemeral streams indicated on the map into the large recreational greenspace/floodplain located at ASM Blvd across from John Hope Drive.

We engaged the professional services of Tennell, Spangler, and Walsh (TSW), Planners, Architects, Landscape Architects, to envision a suitable land use plan to accommodate the number of multifamily residential units, retail spaces and townhouses required by the Atlanta Housing Authority plan and to accomplish our flood control goals. See the TSW plan on the following page. The TSW plan includes more potential retail space (17,000 ft^2) than the preliminary AHA plan and is served by a large parking lot on the east side of Roach St. The 24 townhouses are integrated into the TSW plan.

The plans call for a major green space bordering on ASM Blvd. It is conceptual; in the future it can be detailed to reflect the aesthetic as well as environmental objectives of the Atlanta Housing Authority. There is a second smaller recreational area floodplain at the intersection of Roach St. and Larkin St. A third would be located on the eastside of Roach St. halfway between ASM Blvd. and Larkin St. **Greenway capacity: 1,420,000 gallons.**

Stormwater runoff from Blocks A and B in the TSW plan would be captured in a cistern located at the northwestern corner of Larkin St. and Roach St. Overflow from rain events in excess of the 25-year rain event would be captured in the recreational greenway located at the same intersection, on top of the cistern, and rarely flow via an ephemeral stream across Blocks D and C to the major greenway at ASM Boulevard. **Cistern capacity: 200,000 gallons.**

Stormwater runoff from Block C would be captured in a cistern located under the parking lot in Block C, which is intended to capture the 25-year rain event from this area. Larger rain events would flow via an ephemeral stream to the major greenway at ASM Boulevard. **Cistern capacity: 230,000 gallons.**

Runoff from Block D would be captured in a cistern located under the parking lot in Block D. It is intended to capture the 25-year rain event from this Block. Larger rain events would occasionally flow via an ephemeral stream to the major greenway at ASM Boulevard. **Cistern capacity: 350,000 gallons.**

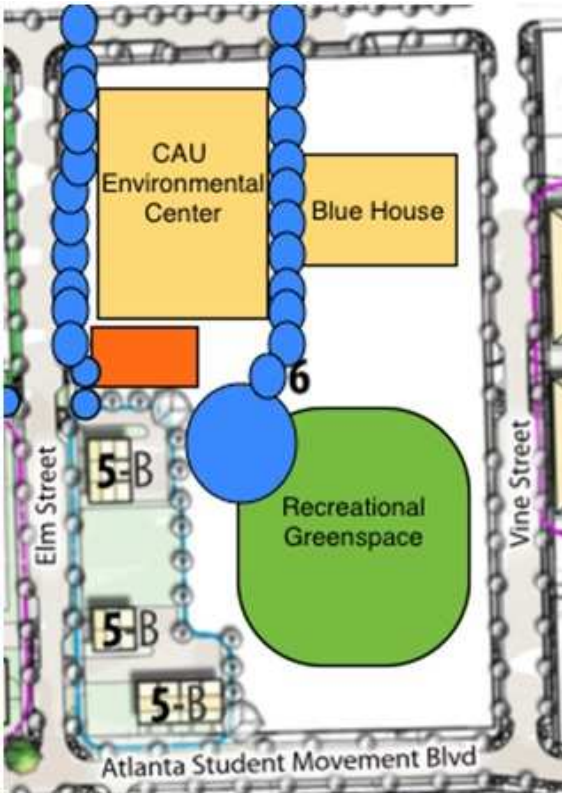

Atlanta Student Movement Boulevard
A
B
C
D
Underground Cistern
Underground Cistern
Underground Cistern
London St
Lowrie St
Greenfairy Ave
Greenfairy Ave
Block A:
Commercial: 5,100 sf
Townhouse: 8 units
99 parking spaces
Block B:
3-4 stories multifamily: 70 units
Townhouse: 4 units
107 parking spaces
Block C:
3 stories multifamily over commercial:
17,000 sf commercial, 29 units
Townhouse: 12 units
90 parking spaces (additional parking provided at Block A)
Block D:
3 stories multifamily: 99 MF units
148 parking spaces
Concept Plan for:
AUC
prepared by:TSW
TOTAL:
Multifamily: 208 units
Townhouse: 24 units
Commercial: 26,100 sf
Parking: 454 spaces
TSW

Phase 5-B: Townhouses - 9 Units (For Sale) and the Major CAU/AHA Planning Block Bounded by Elm St. Parsons St., Vine St., and ASM Blvd

Many more than 9 townhouses can be sold in this area because it borders on an large and attractive recreational greenspace.

The north end of this block is being considered for CAU's "Blue house" water reclamation center and a proposed CAU environmental center/experiment station. In addition, it will include a cistern on the east side of Elm Street that will capture runoff from the adjoining Catchment Area #2. Implementing construction of this cistern will require stakeholder input, collaboration and cooperation. Stormwater runoff from 5-B townhouses will flow into the Elm Street cistern.

Cistern capacity: Perhaps 700,000 gallons, to be determined



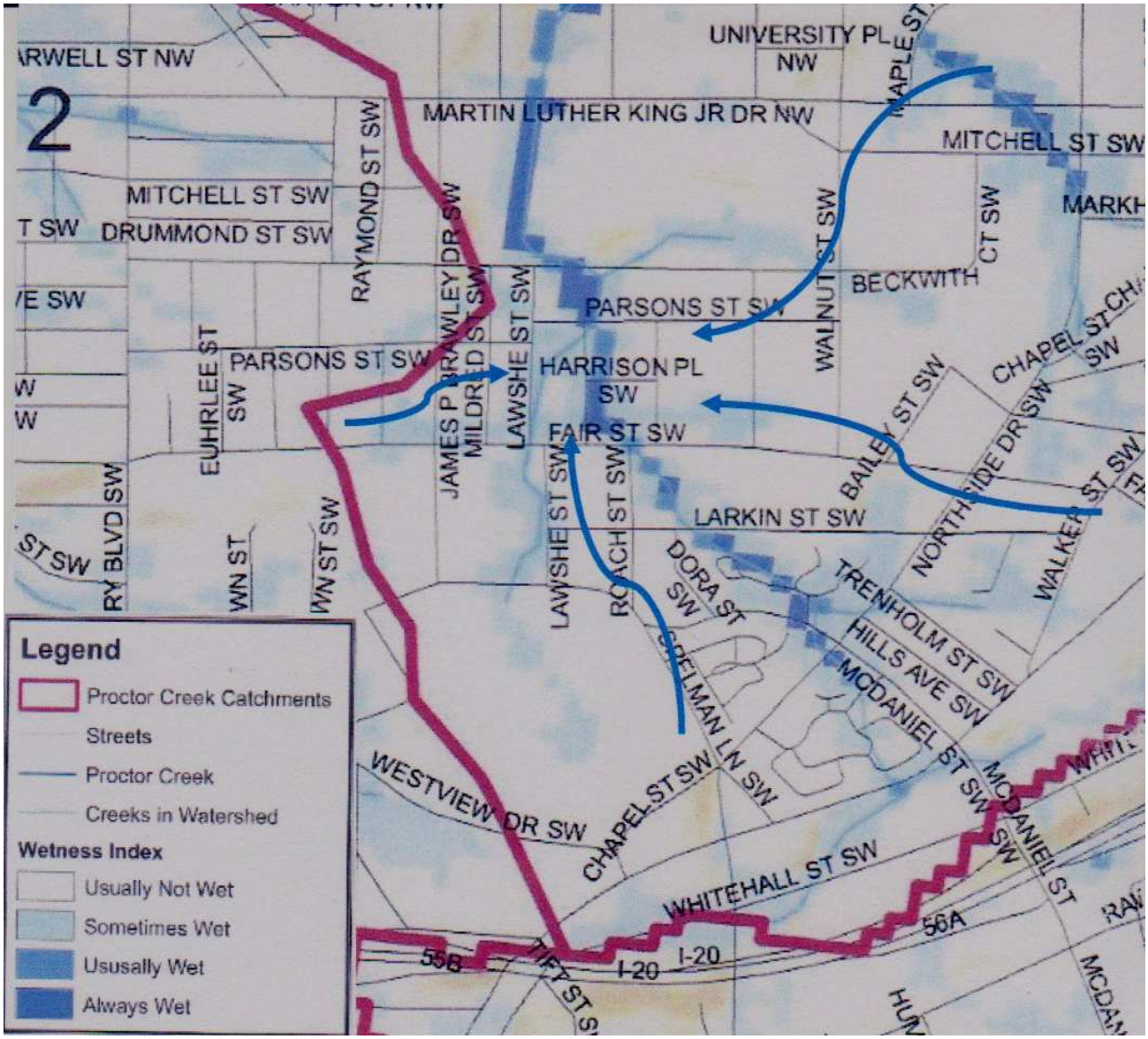
One strong recommendation for this area is to construct the EJ Simon Park Recreational Greenspace. This major recreation/floodplain greenway would extend north from the current floodplain called EJ Simon Park into the southern portion of what was formerly the Bird Cage site. Bounded by Atlanta Student Movement Blvd. and Vine St. it would accept ephemeral stream flows from Catchment Area #3 east of Walnut Street, and Catchment Area #2 north of Parsons Street and the eastern half of AHA/CAU Planning Area 6.

Greenway capacity: 950,000 gallons.

FLOODING ON AHA PROPERTY

Atlanta Housing Authority (AHA) property is located at a low elevation in Subwatershed A in the Proctor Creek/North Avenue (PNA) watershed. Flood waters from throughout the Atlanta University Center run downhill to the low point of the AHA Property at John Hope Drive.

According to the EPA Wetness Index for the area, the AHA property experiences "usually wet" conditions. See EPA Wetness Index map below.



John Hope Drive is at the lowest elevation in the watershed. As indicated, stormwater from throughout the watershed moves downhill to the AHA property. Existing City combined sewer pipes will not keep major rainfall events from flooding AHA property. Our proposed cisterns and greenways will solve the problem.

HEALTH CONCERNS

During heavy rain events, storm water combined with raw sewage rushes down from the high elevations of the AUC campuses and the AHA property to flood homes and streets in the lower elevation residential neighborhoods with the region's polluted runoff, especially in Vine City, English Avenue, and Washington Park.

Residents living within Vine City, English Avenue, and Washington Park neighborhoods experience high risk levels of developing illnesses caused by untreated sewage. Raw sewage carries pathogens which are the source of disease development. Pathogens include bacteria, parasites, and viruses such as E. coli 0157:H7, Yersinia, and Vibrio cholera which can lead to acute, chronic, or ultimate effects including, but not limited to diarrhea, ulcers, stomach cancer, and even death. Stormwater combined with raw sewage is not just responsible for diseases, but also flooding of homes leading to the displacement of local neighborhood residents. Flooding causes irreplaceable damage to homes leaving them uninhabitable and as a result, residents are forced to move. Abandoned homes lead to the decline of property value, become a threat to public health, and attract squatters, all leading to issues for community members who still occupy the area.

SOLVNG PROBLEMS

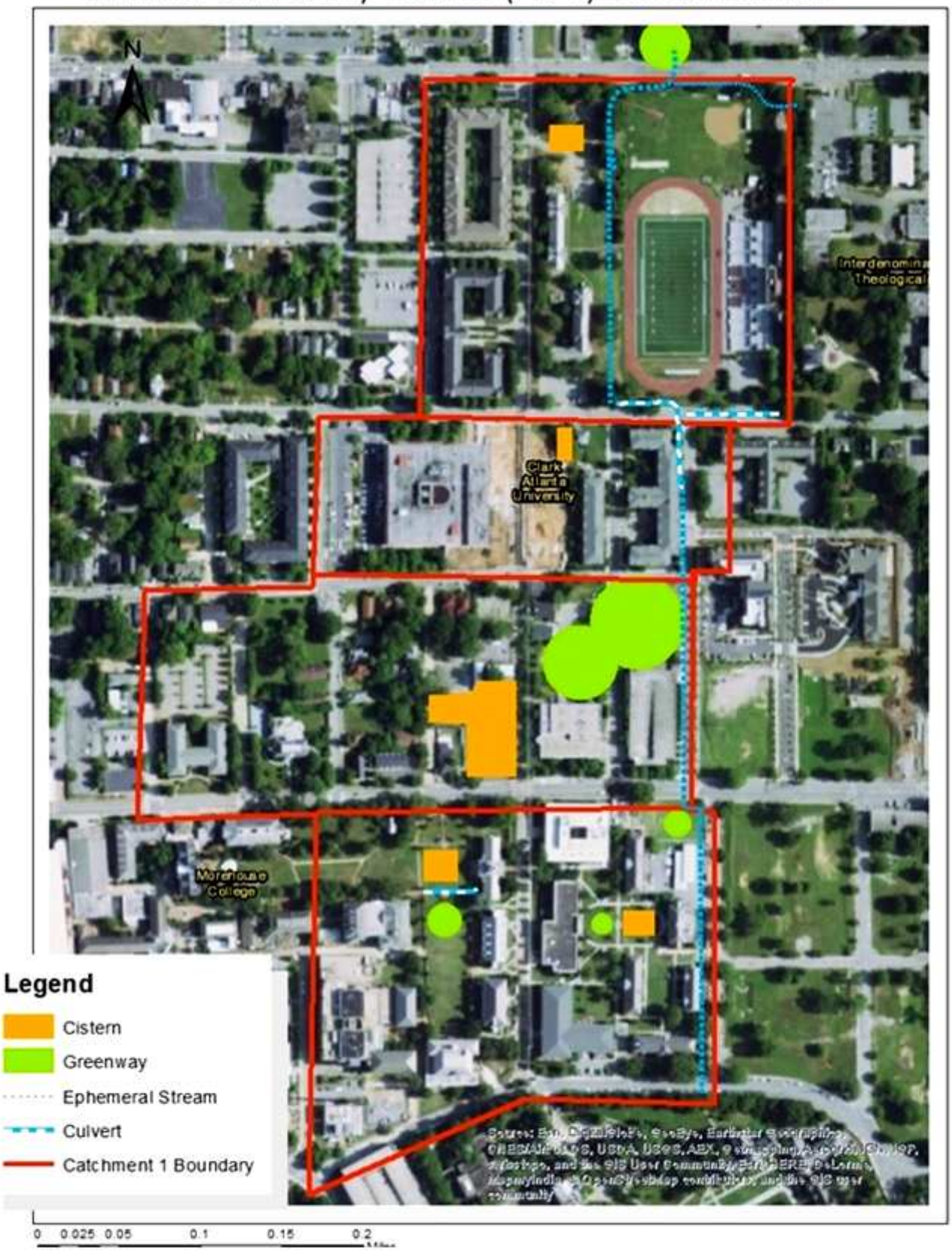
Students, faculty and staff at the colleges and universities are working together to stop this third world arrangement by capturing the 22.4 million gallons of stormwater generated by a typical 100-year rain event in cisterns and manmade floodplains that will serve double duty as public parks and recreation areas for most of time.

To do its part, we believe that the AHA must capture its own runoff, some 4.2 million gallons of rainwater during a 100 year rain event. This includes retaining for reuse some 1.8 million gallons of stormwater, and detaining (for 3-36 hours) some 2.4 million gallons of stormwater on recreational green spaces that do double duty as flood plains.

Note that Conceptual Plans are currently being developed to keep all four watershed areas that surround AHA from flooding AHA property. For example, see the preliminary plans for Catchment Area #1 on the Clark Atlanta University Campus which will keep 8.0 million gallons of stormwater from flooding AHA property during the 100 year rain event. See next page. Similar conceptual plans are being developed for Catchment Areas #3 (9.2 million gallons) and #4 (5.0 million gallons) on the east side of AHA property.

It seems reasonable to expect AHA to join and support this watershed wide effort. Helping to reduce the adverse health impacts of our downhill flooding would seem reason enough. But AHA is itself an especially flood prone area within the study area.

Atlanta University Center (AUC) Catchment #1



COST SAVINGS

And Other Benefits of Flood Control and
Reasons to Offset the Effects of AHA High Density Development

Flood reduction can also provide improved water quality, air quality, reduced heat island effect, additional jobs, higher property values and energy savings. According to the Chicago's Center for Neighborhood Technology:

- The AHA can reduce costs by paying for less City water. The Grand Hyatt Atlanta in Buckhead captures 100% of its roof runoff, which saves them over $26,000 per year on their water bill according to the Department of Watershed Management.

  One reason that the Georgia Institute of Technology is investing heavily in stormwater cisterns and floodplains is to save money on City of Atlanta water bills for irrigation, cooling tower makeup water and other uses. The Institute maintains that water rates will be increasing in the future.

- Lower building operating costs from reduced energy use according to The Center for Neighborhood Technology (CNT).

- Urban heat island: Research is not extensive enough at this time to quantify for the AHA Site, but one estimate of integrating Green Stormwater Infrastructure across Philadelphia estimated $1.45 billion in value over 40 years from reductions in premature fatalities.

- There will be an increase in the value of homes that are at a reduced risk of flooding.

- Reduced Crime and Violence: Green space offers the possibility of increasing social activity, improving community cohesion and lowering crime levels, particularly in disadvantaged communities. Research by the Baltimore Ecosystem Study found a 10% increase in tree cover was associated with an 11.8% decrease in crime. Considering that the U.S. Department of Transportation values a statistical life saved at over $9 million per person, this could be a large benefit.

- Recreation: the city of Philadelphia found that the recreational value of green infrastructure being integrated across the city over 40 years was estimated at $520 million, which is primarily based on the number of outings and the associated health benefits from additional exercise.

SOURCES OF IMPLEMENTATION FUNDING

Urban Waters Federal Partnership: Partners for Progress in Proctor Creek

HUD, DOT and EPA were the lead partners in pulling together the Urban Waters Federal Partnership (UWFP) for Proctor Creek. The Proctor Creek watershed is one of nineteen U.S. locations selected for the UWFP. UWFP reconnects urban communities (particularly those that are overburdened or economically distressed) with their waterways by improving coordination among federal agencies and collaborating with community-led revitalization efforts to improve our nation's water systems and promote their economic, environmental and social benefits. Specifically, this partnership:

- Breaks down federal program silos to promote more efficient and effective use of federal resources through better coordination and targeting of federal investments.

- Recognizes and builds on local efforts and leadership, by engaging and serving community partners.

- Works with local officials and effective community-based organizations to leverage area resources and stimulate local economies to create local jobs.

- Learns from early and visible victories to fuel long-term action.

- Aligns with President Obama's America's Great Outdoors initiative, which calls on agencies to support innovative community efforts to provide safe, healthy, and accessible outdoor spaces.

Sixteen federal agencies, are participating in the Proctor Creek Urban Waters Federal Partnership. They are:

- US Army Corps of Engineers, Department of the Army (USACE-DA)
- Centers for Disease Control and Prevention
- Department of Health and Human Services (CDC-HHS)
- Corporation for National and Community Service (CNCS)
- Department of Agriculture (USDA)
- Department of Education (ED)
- Department of Energy: Office of Energy Efficiency and Renewable Energy (DOE)
- Department of Housing and Urban Development (HUD)
- Department of the Interior (DOI)
- Department of Transportation (DOT)
- Economic Development Administration, Department of Commerce (EDA-DOC)
- Environmental Protection Agency (EPA)
- Federal Emergency Management Agency, Department of Homeland Security (FEMA-DHS)

- National Institute of Environmental Health Sciences, Department of Health and Human Services (NIEHS-HHS)
- National Oceanic and Atmospheric Administration, US Department of Commerce (NOAA-DOC)

Led by federal agencies and coordinated by the White House Council on Environmental Quality and Domestic Policy Council, the Urban Waters Federal Partnership closely aligns with and advances the work of the White House's place-based efforts, including the Partnership for Sustainable Communities and the Strong Cities, Strong Communities (SC2) Initiative, to revitalize communities, create jobs and improve the quality of life in cities and towns across the nation.

City of Atlanta

The City of Atlanta Department of Watershed Management has the following reasons to invest in urban stormwater green infrastructure in the Proctor Creek/North Avenue (PNA) combined sewer watershed:

- The City has made plans to spend $55 million on a combined sewage storage tunnel in the PNA combined sewer area. Stormwater management greenways can eliminate this expense.

- Stormwater management greenways can do double duty as parks and recreation areas thus providing much needed public amenities and marketing goodwill for the Department.

According to the Chicago Center for Neighborhood Technology (CNT) other benefits of green infrastructure include:

- Costs for operating existing gray infrastructure will be reduced. The initial reduced costs will be approximately $340 per acre.

Reduced water treatment costs: CNT estimates that Chicago's costs will be reduced by $.0000919/gal.

CALCULATIONS & METHODOLOGY

North of Atlanta Student Movement Boulevard

Area Number	*Acres*	*Percent Pervious*	*Percent Impervious*	*Pervious areas*	*Impervious areas*
1	1.8 acres	15%	85%	.3 acres	1.5 acres
2	2.5 acres	25%	75%	.6 acres	1.9 acres
3a	1.8 acres	15%	85%	.3 acres	1.5 acres
3b	1.9 acres	30%	70%	.6 acres	1.3 acres
Roads	2.4 acres	--	--	--	2.4 acres
6	6.5 acres	50%	50%	3.3 acres	3.2 acres
E	6.0 acres	50%	50%	3.0 acres	3.0 acres
TOTAL	22.9 acres			8.1 acres	14.8 acres

Total north area runoff from all surfaces (pervious and impervious) for a 100-year rain event:

22.9 acres x 6.87 inches of rain falling during a 100-year rain event

÷ 12 inches per foot = 13.153 acre feet

13.153 acre feet x 325,000 gallons per acre foot = 4,242,225 gallons

South of Atlanta Student Movement Boulevard

Block	*Acres*	*Percent Pervious*	*Percent Impervious*	*Pervious areas*	*Impervious areas*
A	1.62 acres	35%	65%	.57 acres	1.05 acres
B	2.38 acres	45%	55%	1.07 acres	1.31 acres
C	3.78 acres	60%	40%	2.27 acres	1.5 acres
D	3.27 acres	30%	70%	.98 acres	2.29 acres
TOTAL	11.05 acres			4.89 acres	6.16 acres

Total south area runoff from all surfaces (pervious and impervious) for a 100-year rain event:

11.05 acres x 6.87 inches of rain falling during a 100-year rain event

÷ 12 inches per foot = 6.33 acre feet

6.33 acre feet x 325,000 gallons per acre foot = 2,055,990 gallons

SUMMARY OF RESULTS

Type of Green Infrastructure	Gallons of Stormwater Captured (Cisterns based on 25-year rain event, greenways based on 100-year rain event)
Area 3-B Cisterns	350,000 gallons
Area 6 Cisterns	700,000 gallons or to be determined
E.J. Simons Park Recreational Greenway North of Atlanta Student Movement Blvd.	950,000 gallons
South of Atlanta Student Movement Blvd. Greenway	1,420,000 gallons
Area B Cistern	200,000 gallons
Area C Cistern	230,000 gallons
Area D Cistern	350,000 gallons
TOTAL	**4.2 million gallons**

ACKNOWLEDGEMENTS

~ Dr. Abayomi Noibi- Environmental Community Action (ECO-Action)

~ Bill Eisenhauer- Metropolitan Atlanta Urban Watershed Institute (MAUWI)

~ Lindsay Yonker- The Integral Group LLC

~ Thomas Walsh, TSW Planners, Architects, Landscape Architects