STATE OF NORTH CAROLINA CONTRACT NUMBER

COUNTY OF WAKE CONTRACTOR'S FEDERAL I.D. 56-6000-756

THIS AGREEMENT, made by and between North Carolina State University for the Urban Water Consortium Stormwater Group of the Water Resources Research Institute of The University of North Carolina, hereinafter referred to as "CONTRACTOR", and **Durham, NC** a municipal corporation of the State of North Carolina and a member of the UWC Stormwater Group, hereinafter referred to as the "CITY";

W I T N E S S E T H :

THAT WHEREAS, the CONTRACTOR has submitted to the CITY a proposal for the performance of certain technical or professional services; and

WHEREAS, the CITY desires to enter into a contract with the CONTRACTOR to perform the services set out in the proposal;

NOW, THEREFORE, for and in consideration of the mutual promises to each other, as hereinafter set forth, the parties hereto do mutually agree as follows:

1. The CONTRACTOR hereby agrees to perform research titled "**Downspout Disconnection & Rain Catchers Assistance**" as described in **ATTACHMENT A** which is incorporated as part of this contract.

2. The services of the CONTRACTOR are to commence on and shall not extend beyond the estimated completion date of **April 30, 2014** unless the period is further extended through mutual agreement in writing.

3. The CITY hereby agrees to pay the CONTRACTOR a sum of money not to exceed **Eighty Three Thousand Five Hundred Fifty Four Dollars ($83,554)**, said sum to be full and complete compensation for services to be rendered under this agreement. The payment set forth will be made as a cost reimbursement pursuant to receipt of expenditure reports and invoices to be submitted not less than quarterly.

4. It is specifically agreed as part of the consideration of the signing of this contract that the parties hereto, their agents, officials, employees or servants will not discriminate in any manner on the basis of age, handicap, sex, race, color, creed, sexual orientation or national origin with reference to the subject matter of this contract. no matter how remote.

This provision shall be binding on the successors and assigns of the parties hereto with reference to the subject matter of this contract.

IN WITNESS WHEREOF, the CONTRACTOR and the CITY have executed this agreement in duplicate originals, one of which is retained by each of the parties, the day and year first above written.

| NORTH CAROLINA STATE UNIVERSITY | CITY OF Durham, NC |
|---|---|
| By_____ | By_____ |
| Title:_____ | Title _____ |
| WITNESS: | WITNESS: |
| _____ | _____ |
| Signature | Signature |

Attachment A

## Proposal to City of Durham – Downspout Disconnection & Rain Catchers Assistance

**Submitted to Laura Webb Smith, Public Education Coordinator, City of Durham**

Prepared by William F. Hunt, Associate Professor & Extension Specialist, N C. State University
NCSU Box 7625, Raleigh, NC 27695-7625

### Problem Statement

Low Impact Development suggests that post-development hydrology should mimic that of pre-developed or target conditions. In short, on an annual basis long term hydrology should reflect the same runoff, infiltration, and evapotranspiration balance in any developed condition.

One of the most commonly suggested Low Impact Development (LID) techniques is the disconnection of downspouts. While many of the practices associated with LID have been relatively well-tested (in NC and across the nation), such as bioretention and permeable pavement, the true benefits of downspout disconnection are relatively unknown. Moreover, another practice – amending soils with compost – could be examined as well.

There are 2 main benefits of studying downspout disconnection. (1) The benefits of disconnecting downspouts need to be quantified as it can become a potential retrofit practice (in watersheds such as those associated with Falls Lake and Jordan Lake), as identified in Durham's Rain Catchers Program. (2) Downspouts that are currently disconnected can be appropriately accounted for when calculating loads from current and new developments.

### Proposed Framework

To evaluate the benefits of disconnecting downspouts and to properly credit them for runoff reduction, four properties in Durham are proposed to be used as study locations. At each property, 2 to 3 downspouts will be disconnected, the surrounding soil investigated for compaction and infiltration rate, and 2 to 3 lengths of disconnection will be tested. The distances expected to be examined will be approximately 5 ft, 15 ft, and/or 25 ft, and are meant to reflect potential retrofit lengths available. After nine months of evaluation, the soil associated with one-half of the examined disconnections will be amended with compost to improve their infiltration rate. Expected amendment depth is 4 inches. A summary of what is to be evaluated is found in Table 1. The properties do not need to be contiguous, but are best if located in the same neighborhood. The City of Durham would work with NC State and local watershed/homeowner associations to select the properties to be used.

**Table 1.** Downspout Disconnection Evaluation Summary

| Location of Homes | Disconnection Distances | Compost Amendment | Roof Surface Areas |
|---|---|---|---|
| City of Durham | 5 ft | ½ of soils amended ½ through study | Vary to allow for Impermeable surface area to flow distance ratio to be calculated |
| Same Neighborhood | 15 ft | ½ of soils will not be amended | |
| Homes need not be contiguous | 25 ft | | |

NCSU will also assist the city of Durham to fabricate and install monitoring systems for watersheds targeted by the Durham Rain Catchers project. This includes in-shop fabrication by a research technician and field installation by the research technician and extension associate (engineer).

**Deliverables:**

1. Four homes (8-12 downspouts) will be disconnected.
2. Three different parameters will be studied for 1.75 years (length, soil amendment, and ratio of impermeable area to overflow length.
3. A downspout disconnection design guidance will be presented to the City of Durham and NC DENR. Included in this will be an estimating tool to assist officials with how to credit disconnected downspouts from an annual pollutant load released perspective.
4. Up to 20 additional downspouts will be disconnected by NCSU staff and student. These will not be included in the monitoring portion of the grant
5. Support for installation of other Rain Catchers projects (rain gardens, cisterns, trees, and native plantings) will be provided by the NCSU graduate student. Work may include design guidance, site analysis, and inspections.
6. NCSU will assist the City of Durham to fabricate and install monitoring equipment and framework for the Rain Catchers watershed project. The budget for this portion of the grant is highlighted as part of the budget description below.

**Milestones**

April 15, 2012. Project Start. Begin site selection process.
May 15, 2012. Select project locations. Begin to disconnect downspouts.
June 15, 2012. Begin monitoring
March 15, 2013. Amend soils on ½ of properties. Pause monitoring to await stabilization.
June 15, 2013. Resume monitoring.
March 15, 2014. Complete monitoring. Analyze data.
April 1, 2014. Complete data analysis. Submit final invoice.
April 30, 2014. Submit Design Guidance. End project.

**Budget Justification**

<u>Personnel</u>

Graduate Student (M.S. Candidate) – Two years of one graduate student will be dedicated 100% to this project. ($19,000 per year for 2 years = $38,000)
NCSU Research Technician (Shawn Kennedy) – 2 months + 2 weeks total (1 month + 2 weeks year 1 and 1 month year 2) of Shawn Kennedy. $7,520total
Extension Associate (Andrew Anderson) – 0.05 FTE per year (0.10 FTE total). $4,800 total.
Fringe – 16% of salary for Graduate Student and 30% of dedicated for Research Technician and Extension Associate. Total = $9,776.

<u>Other Costs</u>

Tuition – most of 2 years for MS Candidate. $11,947 total.
Mileage to/from NCSU Campus to Durham – 59 trips. 65 miles RT. $0.50 per mile. $1,915 total.

Material includes fabricating metal and wooden collection troughs for study and plastic components needed for downspout disconnection. Also, fabricating weirs for Rain Catchers Watershed portion. Lump sum = $2,000.

Total Direct Cost = $75,958

Overhead 10.0% reduced rate is applicable to WRRI Enhancement projects funded by UWC-SWG members in accordance with NCSU policy for Centers and Institutes. F&A cost totals $7,595.80

Total Cost = $83,554

*Subdivision of Costs for City of Durham*

*$80,304 is directed toward the downspout disconnection and rain garden design portion of the project*

*$3,250 is directed for the weir and monitoring assembly fabrication and installation for the larger catchment.*

***Note #1:*** *The following NCSU campus and field faculty time will be dedicated to the City without compensation: Dr. William Hunt (0.01 FTE), Mr. William Lord (0.02 FTE), and Mr. Mitchell Woodward (0.02 FTE). Additionally, monitoring equipment will be supplied at no cost to the City.*

***Note #2 (for NCSU):*** *The balance of tuition will be covered under the following account: 3-76876-02249.*

Attachment A

| SALARIES | FTE | | Salary | Cost |
|---|---|---|---|---|
| Shawn Kennedy | 0.21 | | $36,100 | $7,520 |
| Andrew Anderson | 0.10 | | $48,000 | $4,800 |
| Graduate Student | 2 | | $19,000 | $38,000 |
| *TOTAL* | | | | $50,320 |
| | | | | |
| **FRINGE** | **Rate** | | | **Cost** |
| Grad | 16% | | | $6,080.00 |
| Kennedy/Anderson | 30% | | | $3,696 |
| *TOTAL* | | | | $9,776.00 |
| | | | | |
| **Other Costs** | | | | |
| Tuition | | | | $11,947 |
| Mileage | 59 trips | 65 mi ($.5 per mile) | | $1,915 |
| Materials | | | | $2,000 |
| *TOTAL* | | | | $15,862 |
| | | | | |
| **Total Direct** | | | | $75,958 |
| **F&A** | 10.0% | | | $7,595.80 |
| **Total Costs** | | | | $83,553.80 |