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# North Charleston Stormwater Utility Rate Study Final Report



Date: August 2009

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# STORMWATER UTILITY RATE STUDY FINAL REPORT

## CITY OF NORTH CHARLESTON

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## 1.0 Introduction

Like many other communities, the City of North Charleston is required by law to establish a stormwater management program pursuant to a National Pollutant Discharge Elimination System (NPDES) permit recently issued by the S. C. Department of Health and Environmental Control (DHEC). In order to achieve compliance with the NPDES permit, the City must develop, implement and enforce programs to meet the six (6) minimum measures included in the permit requirements. These minimum measures include public education/outreach, public participation/involvement, illicit discharge detection and elimination, construction site runoff control, post-construction runoff control and pollution prevention/good housekeeping. While the City of North Charleston has had a stormwater utility fee structure in place since June of 2003, the utility fee ordinance adopted only an interim annual rate of \$24.00 and was not based on the actual area of impervious surfaces generating stormwater runoff contained on individual residential and non-residential parcels. In order to develop an accurate and defensible mechanism to establish the basis of the City's stormwater utility fee structure and generate adequate funds to meet their NPDES permit requirements, the City decided to calculate its' stormwater utility fees by comparing the impervious area of each parcel to that of an Equivalent Residential Unit (ERU). Woolpert was asked by the City to determine the amount of impervious area associated with an ERU. The ERU impervious area was then used as the basis for calculation of stormwater utility fees for non-residential and residential properties.

### 1.1 Determination of Sample Size

Ideally, the impervious area for all residential properties in the City would be averaged to calculate the ERU impervious area. Because impervious area data was not available for all properties, Woolpert determined a statistically significant sampling of residential parcels for which the impervious areas would be delineated.

In order to determine the appropriate sample size, a pre-sample of 100 parcels was used. These 100 parcels were randomly selected from the residential parcels in North Charleston. Using GIS software, the amount of impervious area (represented by the 2007 Aerial photos) for each of the 100 parcels was calculated. The average impervious area for the parcels was 2156 ft<sup>2</sup> with a standard deviation of 834. The desired sample size was to be large enough to have 95% confidence that the sample impervious area average would be within 5% of the average impervious area for parcels in the entire City.

$$\mu = 2156 \text{ ft}^2$$

$$\sigma = 834$$

$$1 - \alpha = 0.95$$

$$\alpha = 0.05$$

$$\alpha / 2 = 0.025$$

$$z_{\alpha/2} = z_{0.025} = 1.96$$

$$d = 0.03 \times \mu = 0.03 \times 2156 = 64.7$$

$$n = \left[ \frac{z_{\alpha/2} \times \sigma}{d} \right]^2 = \left[ \frac{1.96 \times 834}{64.7} \right]^2 = 638$$

$$n \approx 638 \text{ parcels}$$

$\mu$ = Mean
$\sigma$ = Standard Deviation
$1 - \alpha$ = Confidence
$d$ = Acceptable Error
$n$ = Required Sample Size

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## 1.2 Sample Parcel Selection and ERU Impervious Area Calculation

Although only 638 parcels were required for the sample size, additional parcels were used in the selection to allow for discarding of erroneous parcels. An example would be an agricultural parcel that is incorrectly categorized as residential. 1250 residential parcels were initially selected using a random number generator meaning that nearly twice the statistically significant necessary sample size ( $n = 638$ ) was analyzed. Of these 1250 parcels, 300 were deemed inappropriate leaving 950 parcels to be used for the impervious area calculations.

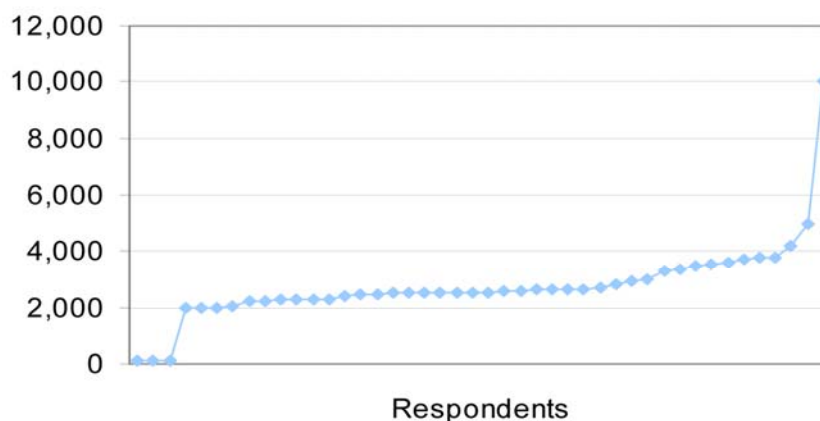
In order to most accurately represent the total impervious area for a typical residential parcel, impervious surfaces were digitized, using GIS software and 2007 Aerial photos, for the 950 previously selected random residential parcels. The total impervious area for a typical residential property in North Charleston was determined to be 2900 ft<sup>2</sup>.

## 1.3 ERU Comparison

The North Charleston ERU impervious area determination of 2900 square feet compares well with other communities that use ERU impervious area as the basis for their stormwater utility fees. This is illustrated below in the data taken from the 2009 Stormwater Utility Survey conducted by the Southeast Stormwater Association (SESWA) that reported an average impervious area utilized for ERU calculations to be 2,766 square feet.

**If impervious area is the fee basis, what is the square footage of your average billing unit (ERU or similar designation) ?**

Average is 2,766 square feet. Average in 2007 was 3,253.



**2009 Southeast Stormwater Association (SESWA) Utility Survey**

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## 2.0 Non-Residential Impervious Areas

In order to create the most accurate utility fee structure possible, it was determined that all non-residential properties, such as commercial and industrial properties, needed to have impervious area determinations performed for each individual parcel. Therefore, the City asked that Woolpert delineate the impervious areas for 3700 non-residential properties in incorporated areas of the City utilizing 2007 and 2009 aerial photography. GIS data sets of the impervious areas have been provided to the City. As other communities are added to the City's stormwater utility, their non-residential properties will also need to be delineated so that their fees can be properly calculated in future billings.

### 2.1 Residential Impervious Areas

Because residential properties are to be charged a flat rate of one ERU, the fee calculation is simple and the amount of impervious area for each property need not be calculated. However, a statistically significant sample size of residential parcels was analyzed to determine the appropriate average ERU for residential properties as described in Section 1.2

## 3.0 Fee Projection

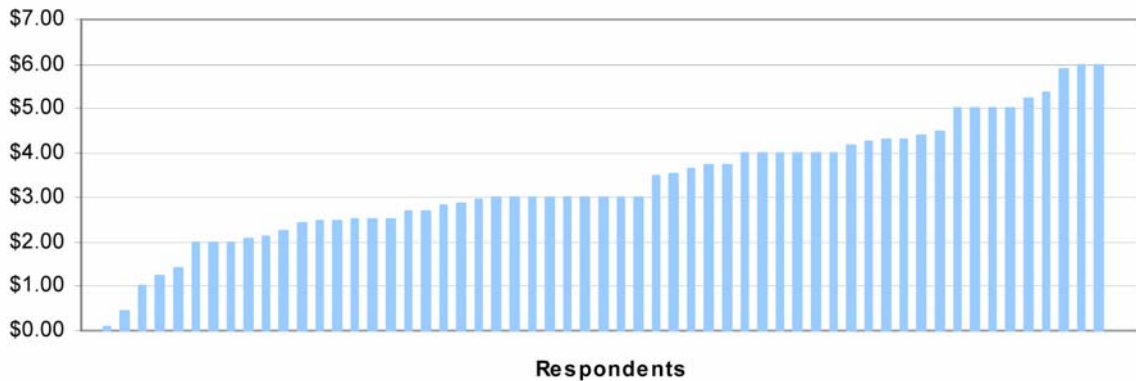
After the ERU impervious area was determined (See Section 1.0) and the impervious area for each non-residential parcel was calculated, the yearly fee to be charged for each ERU needed to be established. The Ordinance adopted by the City of North Charleston in June of 2003 establishing an interim stormwater utility fee had a base rate of \$24.00 per year. The City asked that Woolpert provide an estimate of the total revenue to be expected from a range of different ERU fees and compare that with the anticipated budget needs for stormwater program implementation and NPDES Phase II Permit requirements. Detailed cost projections for yearly ERU fees of \$30.00, \$36.00, and \$42.00 were tabulated and compared to the predicted stormwater costs for the City and it was determined that utilization of a \$36.00 per year base rate (\$3.00/month) would be most appropriate for current budget needs. Detailed revenue projections using the \$36.00 base rate can be found in the Summary section (Section 5.0) of this report.

### 3.1 ERU Rate Comparison

As seen in the chart below, the aforementioned SESWA 2009 Stormwater Utility Survey indicates that the proposed ERU fee of \$3.00/month (\$36.00/year) is appropriate and equitable compared to other stormwater fees being charged in other areas of the Southeast. The proposed fee of \$3.00/month is less than the average rate (\$3.22/month) being charged in 2009 for Southeastern communities responding to the SEWSA Study survey.

## What is your current stormwater utility rate per month?

Average rate is \$3.22, which is slightly higher than the \$3.18 reported in 2007.



## 2009 Southeast Stormwater Association (SESWA) Utility Survey

### Current Stormwater Utility Rates per Month

Utility Rate Range

Low = \$.09 High = \$6.00

Jurisdiction	Billing Rate	Unit Size	Jurisdiction	Billing Rate	Unit Size
Charleston County	\$3.00	TBD	City of Oxford	\$2.00	2,300
City of Archdale	\$5.00	3,612	City of Radcliff	\$4.50	2,800
City of Athens/Clarke County	\$3.51	2,628	City of Raleigh	\$4.00	2,260
City of Belmont	\$3.00	2,500	City of Rocky Mount	\$3.75	2,519
City of Bessemer City	\$2.07	N/A	City of Valdosta	\$2.50	3,704
City of Burlington	\$2.00	N/A	City of Wilmington	\$5.00	2,500
City of Charleston	\$6.00	2,200	City of Winston-Salem	\$4.25	2,000
City of Charlotte	\$5.90	2,613	Clayton County Water Authority	\$3.75	2,950
City of Chattanooga	\$2.50	10,000	Columbia County	\$0.09	100
City of Conway	\$5.25	2,700	Cumberland County/Fayetteville	\$3.00	2,266
City of Covington	\$3.00	2,600	Dorchester County	\$2.43	N/A
City of Douglasville/Douglas Cnty	\$4.00	2,543	Georgetown County	\$4.30	3,770
City of Easley	\$2.00	5,000	Greenville County	\$2.25	2,477
City of Fairburn	\$4.00	3,300	Gwinnett County	\$0.21	100
City of Fayetteville	\$2.95	3,800	Henry County	\$2.83	4,200
City of Florence	\$2.50	2,460	Horry County	\$2.45	2,500
City of Folly Beach	\$3.00	TBD	Mecklenburg County	\$2.12	2,613
City of Franklin	\$3.65	3,350	Richland County	NR	N/A
City of Greensboro	\$2.70	2,543	Sanitation District #1	\$4.30	2,600
City of Greenville	\$2.85	2,000	Spartanburg County	1 mil	N/A
City of Griffin	\$4.39	2,200	Storm Water Management Auth	\$0.42	parcel
City of Isle of Palms	\$3.00	TBD	Town of Hope Mills	\$3.00	2,266
City of Lawrenceville	\$4.20	N/A	Town of Indian Trail	\$2.70	2,060
City of Loganville	\$5.00	3,000	Town of Landis	\$5.00	NR
City of Louisville/Jefferson Cnty Metro	\$5.35	2,500	Town of Lincolnville	\$3.00	TBD
City of Monroe	\$4.00	2,618	Town of Matthews	\$1.42	2,000
City of Morristown	\$1.00	2,400	Town of Smyrna	\$3.47	3,543
City of Norcross	\$1.25	100	Town of Sullivan's Island	\$3.00	TBD
City of North Augusta	\$4.00	N/A	Town of Wrightsville Beach	\$0.00	N/A
City of North Myrtle Beach	\$6.00	3,500	Warren County	\$4.00	NR

Note: Please refer to the Appendix for detailed Jurisdiction information sorted by city/county & state.

## 2009 Southeast Stormwater Association (SESWA) Utility Survey

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## 4.0 Stormwater Utility Credit Considerations

One area not yet addressed in the North Charleston Stormwater Utility Ordinance is the possibility of credits that would offer some customers an opportunity to reduce their stormwater fee. A common example would be a commercial property with a properly operating and maintained detention pond that reduces the water quantity impact from the site to the City's stormwater system. The utility fee for this property could be reduced by a percentage designated by the City.

Stormwater utility credits which are typically applied to non-residential properties, can be offered for a variety of reasons, and can enhance the fairness and equity of the fees. However, the specific customer and property data that must be collected and maintained in order to administer the credit can range from simple to complex depending on the type of credits to be offered. As the complexity increases, so does the time and expense needed by the City in order to implement the credit policy.

### 4.1 Stormwater Utility Credit Structure

The City should consider developing a Stormwater Utility Credit structure and include this structure in any Stormwater Management Ordinance amendments. Included in any Stormwater Ordinance amendments should be a list of credit types, a percent discount for each credit type, and a maximum credit. The maximum credit and percent discounts should be determined from an analysis of the expected user fees and the revenue that needs to be generated to support the City's stormwater management program. Potential language to be included in a Stormwater Utility Credit structure is as follows:

1. All agencies that are a permitted MS4 shall be entitled to an 80% credit.
2. Facilities that have documented biannual maintenance shall be entitled to a 20% credit.
3. A 20% credit shall be offered to all higher education facilities that offer stormwater education classes.
4. If a facility can provide documentation that the stormwater from their site is self-contained (self contained is defined as stormwater that does not use the city system for conveyance) with accurate documentation shall be entitled to a 25% to 50% credit, evaluated on a case by case basis. The City may allow adjustments of stormwater charges for self-contained stormwater facilities that reduce the amount of impact on City maintained stormwater facilities upon inspection and approval of facilities by the Public Works director or his or her Designee. The amount of adjustment and requirements for receiving and maintaining those adjustments are as follows:
  - A. The rate of the adjustment for self-contained stormwater facilities is based on the amount of reduced impact that the privately maintained stormwater facilities achieve. The City may allow exemption from stormwater charges for any portion of the parcel that can be demonstrated to directly discharge into any drainage conveyance facility not maintained by the City and does not ultimately flow into a City owned or maintained facility. The adjustment will be 50% for the portion of the parcel that meets this requirement.
  - B. A non-residential property with private stormwater facilities shall be eligible for an adjustment of fees for self-contained stormwater facilities when the following conditions are met:
    1. Private Stormwater facilities exist;
    2. The utility customer has provided to the City, information demonstrating it's facilities qualify as self-contained facilities, including hydraulic/hydrologic calculations, topographic maps and other necessary information signed and sealed by a professional engineer registered in the state of South Carolina.

3. The utility customer has provided a copy of a valid NPDES stormwater permit or a statement that no permits is required for the activity on the parcel
4. the utility customer has entered into an agreement with the City in which the property owner agrees to provide continued maintenance of the private stormwater facilities;
5. The proof of reduced impact upon City-owned or maintained stormwater facilities has been approved by the Public Works Director or his/her designee and;
6. The owners of the parcel of property receiving such adjustments of the City stormwater charges agrees that, prior to receiving such adjustments, it will provide maintenance on all private drainage structures, consistent with the requirements of the City and consistent with the City's maintenance practices for public drainage structures.

In order to continue receiving the credit for these options each year, evidence of proper maintenance of the structures must be collected. The City must decide whether it will conduct inspections of the structures or if the utility customer will be responsible for certifying that maintenance has been completed.

## Section 5.0 Summary

In a stormwater program assessment performed by Woolpert and the City staff, it was determined that the estimated budget needs to deliver the appropriate services and meet the new NPDES requirements would be in the range of 3.2 to 3.6 million dollars. Several different proposed utility rates were analyzed and revenue resources determined in order to establish a proposed revised rate structure. The \$36.00 rate was determined to be the most appropriate and equitable fee to meet the City's stormwater budget needs. It should be noted that Dorchester County recently adopted a new stormwater utility fee structure which incorporates a \$44.76/ERU rate for non-residential/commercial properties based on actual impervious areas and a tiered structure for residential properties with an average rate of \$44.76 per residential parcel.

The proposed rate structures and projected revenues for both the Charleston County and Dorchester County portions of the City of North Charleston are represented in the following table.

**Table 1. Projected City of North Charleston Stormwater Utility Fee Structure**

<b>Dorchester County</b>			
<b>FEE</b>	<b>Area (ft<sup>2</sup>)</b>	<b>ERU Units</b>	<b>\$44.76/ERU</b>
NON-EXEMPT NON-RESIDENTIAL	19,120,870	5,119	\$229,126
MULTIFAMILY HOMES	1,338,916	358	\$16,024
SINGLE FAMILY HOMES		5,789	\$259,116
<b>TOTAL</b>		<b>11,266</b>	<b>\$504,266</b>
TEN PERCENT (10%) NON PAYMENT			\$50,427
70% PAID TO N. CHARLESTON			<b>\$317,687</b>



<b>Charleston County</b>			
<b>FEE</b>	<b>Area (ft<sup>2</sup>)</b>	<b>ERU Units</b>	<b>\$36/ERU</b>
MS4 PERMITTED PROPERTY (USING MAXIMUM 80% CREDIT)	36,003,393	12,415	\$89,388
SELF CONTAINED CREDIT ( USING MAXIMUM 50% CREDIT)	42,901,531	14,794	\$266,292
NON-EXEMPT NON-RESIDENTIAL	183,543,662	63,291	\$2,278,476
MULTIFAMILY HOMES	25,178,939	10,550	\$379,800
SINGLE FAMILY HOMES		17,557	\$632,052
SUBTOTAL		<b>118,607</b>	<b>\$3,646,008</b>
TEN PERCENT NON PAYMENT			\$364,601
TOTAL			<b>\$3,281,407</b>

<b>GRAND TOTAL (W/ 10% NON PAYMENT)</b>			<b>\$3,599,094</b>
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<b>GRAND TOTAL (W/ 20% NON PAYMENT)</b>			<b>\$3,191,685</b>
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