MAY RIVER WATERSHED ACTION PLAN

APPENDIX A:

IMPERVIOUS / PERVIOUS STUDY
**IMPERVIOUS COVER WITHIN THE MAY RIVER WATERSHED**

### Table:

<table>
<thead>
<tr>
<th></th>
<th>WITHIN TOWN</th>
<th>WITHIN COUNTY</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>STUDY AREA ACRES WITHIN WATERSHED</td>
<td>13,219</td>
<td>5,077</td>
<td>18,296</td>
</tr>
<tr>
<td>IMPERVIOUS ACRES WITHIN WATERSHED</td>
<td>826</td>
<td>308</td>
<td>1,134</td>
</tr>
<tr>
<td>IMPERVIOUS %</td>
<td>6.1%</td>
<td>6.3%</td>
<td>6.2%</td>
</tr>
</tbody>
</table>

Note: Information and Areas taken from Impervious/Pervious Mapping Project performed by ATM dated April, 2010.
MEMORANDUM

To: John Carmack, Town of Bluffton

From: Chris Ahern

Cc: Carl Norris, Town of Bluffton
Tony Maglione, ATM
Kayle Moore, ATM

Date: 10 June 2010 (Revision 2 of 15 April 2010 original version and 13 May 2010 Revision 1)

Project: Town of Bluffton Impervious Mapping Project

Subject: Technical Memorandum accompanying FINAL Deliverables on 21 April 2010

The purpose of this Memorandum is to describe the methodology and assumptions made to prepare the FINAL deliverables for the Impervious Coverage provided to the Town of Bluffton. The FINAL *.shp files were delivered on a DVD delivered to your office Thursday 15 April 2010. The FINAL 34” by 42” and the 11” by 17” booklets will be delivered to your office Wednesday 21 April 2010.

The calculated impervious area from this project is summarized on page 3 of this Memorandum.

We appreciate the opportunity to work for the Town of Bluffton and look forward to support any future need the Town may have.

Methodology

Impervious features were digitized from 2009 natural color orthographic imagery provided by Beaufort County, using AutoCAD Civil 3d 2009 and ArcView 9.3. The Feature data digitized in CAD was imported into an ArcView GIS feature dataset and cleaned to remove overshoots and “sliver” polygons. All GIS feature datasets created for this project are in the NAD 1983 StatePlane South Carolina FIPS 3900 (Feet) coordinate system.
The digitized features were assigned to be one of 5 attributes.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description of items in Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUILDING</td>
<td>main residential or commercial structure(s) on property</td>
</tr>
<tr>
<td>EXTRA STRUCTURE</td>
<td>ancillary structure apparent on imagery (shed/garage, pool/patio, gazebo, etc.)</td>
</tr>
<tr>
<td>DRIVEWAY</td>
<td>concrete, paved or otherwise improved vehicle driveways on properties</td>
</tr>
<tr>
<td>PARKING LOTS</td>
<td>concrete, paved or otherwise improved parking areas on properties</td>
</tr>
<tr>
<td>DRIVEWAYS/PARKING</td>
<td>combination parking areas with extended access driveways</td>
</tr>
</tbody>
</table>

Heavy tree cover obscured some features on properties and these features could not be confidently digitized. GIS points were created for these features or possible features at the approximate feature locations. The Unclear Features points were reviewed in GIS during the Quality Control process for this project using the imagery and a polygon shapefile of building footprints prepared by the County and provided by the Town. Building footprints at Unclear Feature points, or on the parcel containing the point, were copied to the Impervious Feature layer and attributed with the Source “2007 TOB ftprnt.” Most of these features were assumed to be BUILDINGS, but if cases where it was impossible to discern a feature type, the attribute value “UNKNOWN” was used.

All Unclear Feature points for which County building footprints were copied were attributed with the Comment “Copied shape(s) from County footprint layer.” If no building footprint was present at or near the point, the Unclear Point Feature was attributed with the Comment “No County footprint available.”

In some cases, heavy shadows on the imagery prevented the digitizer from determining if extra impervious features were present, particularly patios in residential subdivisions. In these instances, a typical EXRA STRUCTURE feature was added if it appeared that all or most to the houses in that area or subdivision included such a feature.

The impervious area for roadways was primarily developed by creating buffer polygons at a standard offset of 12 feet from the road centerlines provided in the Town of Bluffton Streets GIS layer. Some roadways were apparent on the imagery but were not included in the Town’s GIS layer. These roadway surfaces were digitized from the imagery and attributed with the Source “2009 Orthos.” Several smaller road in the southern portion of the project area were not included in the Town’s GIS layer but were available from the USGS TIGER GIS data. Polygon buffers were created from these centerlines and added to the Impervious Features layer with the Source “TIGER roads.” Some roadways created from the Bluffton streets layer did not appear on the imagery; these roadways were NOT removed during the QC process in case they represent new existing roads.

As agreed in the 22 March 2010 Meeting to discuss the pilot study results, several major intersections were digitized to account for collector and merge lanes and islands. Circular areas or “donuts” were also added at all cul-de-sacs with these features shown in the imagery. Although beyond the scope of this project, many (but not all) smaller intersections and cul-de-sacs within subdivisions were “cleaned” to better match the imagery during the data QA/QC process.
Summary of Results

<table>
<thead>
<tr>
<th>Feature</th>
<th>Feature Count (Quantity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings</td>
<td>7,683</td>
</tr>
<tr>
<td>Driveways</td>
<td>6,517</td>
</tr>
<tr>
<td>Extra Structures</td>
<td>4,057</td>
</tr>
<tr>
<td>Parking Lots</td>
<td>240</td>
</tr>
<tr>
<td>Driveway/Parking</td>
<td>20</td>
</tr>
<tr>
<td>Unknown</td>
<td>96</td>
</tr>
<tr>
<td>Roadways</td>
<td>955</td>
</tr>
<tr>
<td></td>
<td>≈ 41 features digitized from 2009 ortho imagery</td>
</tr>
<tr>
<td></td>
<td>≈ 19 features using offset from TIGER road shapefile</td>
</tr>
<tr>
<td></td>
<td>≈ 895 features using offset from Bluffton street shapefile and adjusted at major intersections and within some subdivisions</td>
</tr>
</tbody>
</table>

Town of Bluffton Only:

<table>
<thead>
<tr>
<th></th>
<th>Impervious 1,531 ac 4.4 %</th>
<th>Pervious 32,926 ac 95.6 %</th>
<th>Total 34,457 ac 100.00 %</th>
</tr>
</thead>
</table>

Unincorporated Areas Only:

<table>
<thead>
<tr>
<th></th>
<th>Impervious 444 ac 8.1 %</th>
<th>Pervious 5,059 ac 91.9 %</th>
<th>Total 5,503 ac 100.00 %</th>
</tr>
</thead>
</table>

Project Study Area (Town of Bluffton and Unincorporated Areas):

<table>
<thead>
<tr>
<th></th>
<th>Impervious 1,975 ac 4.9 %</th>
<th>Pervious 37,985 ac 96.1 %</th>
<th>Total 39,960 ac 100.00 %</th>
</tr>
</thead>
</table>

Notes regarding uses and updates of the GIS Deliverables (Notes 2 through 8 are provided on page 4 of 4)

1. Sidewalks are not included in this impervious calculation as agreed during the 22 March 2010 Meeting regarding the pilot study results. The Town of Bluffton can add to the Impervious Features dataset by digitizing, buffered offsets form road centerlines, GPS data collection or some combination of suitable methods. ATM has provided the Town of Bluffton a proposal to include this additional area in the impervious database.
2. Heavy tree cover obscured some features on properties and these features could not be 
confidently digitized. GIS points were created for these features or possible features at the 
approximate feature locations. The Unclear Features points were reviewed in GIS during the 
Quality Control process for this project using the imagery and a polygon shapefile of building 
footprints prepared by the County and provided by the Town. Building footprints at Unclear 
Feature points, or on the parcel containing the point, were copied to the Impervious Feature 
layer and attributed with the Source “2007 TOB fprtnt.” Most of these features were assumed 
to be BUILDINGS, but if cases where it was impossible to discern a feature type, the attribute 
value “UNKNOWN” was used. ATM recommends the Town consider researching building 
permits or obtain measurement from field visits in order to confirm the assumptions made to 
preserve the deliverables for this project.

3. In some cases, Heavy shadows on the imagery prevented the digitizer from determining if extra 
impervious features were attached to structures but obscured by the shadows, particularly 
patios in residential subdivisions. In these instances, a typical EXRA STRUCTURE feature was 
added if it appeared that all or most to the houses in that area or subdivision included such a 
feature. ATM recommends the Town consider researching building permits or obtain 
measurement from field visits in order to confirm the assumptions made to prepare the 
deliverables for this project.

4. Roadways in the Town of Bluffton layer occasionally noted a roadway that was not shown in the 
corresponding 2009 imagery. Where the Town streets layer noted a street however no street 
could be observed in aerals, these areas WERE NOT removed from the existing roadway layer 
and thus the impervious area calculation. The digitizer assumes the roadway layer provided by 
the Town is more current than the 2009 aerials and the roadway may now exist. No separate 
layer was used to denote where the roadway layer was different from the 2009 aerials.

5. Roadway Features which are either considerably narrower or wider than the standard offset 
using for this project should be revised either using measured offsets or digitizing the edge of 
pavement from the imagery.

6. ATM corrected most of the errors resulting from a standard offset being applied however 
recommends the Town review smaller intersections (e.g, intersections of two lane roads) which 
may not have been adjusted for this deliverable project. Specifically, the Town should review 
standard offsets and adjust the polygon coverage to the actual aprons and turn radii.

7. Roadway, driveway and parking lot features developed in this project are all assumed to be 
impervious. The Town may wish to expand on the information for these features by 
determining and differentiating surface types (i.e. paved, shell, dirt).

8. It should be noted that some spatial inconsistencies among the imagery were observed using 
the street layer and parcel base data used for this project. The data created for this project 
should be used to determine impervious/pervious characteristics for larger spatial areas within 
the town such as subdivision or land use regions. Site specific use of this dataset should include 
a review by Town staff to verify acceptable accuracy for the intended use.