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REQUEST FOR PROPOSALS

RFP 15-14

Identification and Delineation of Intermittent Streams throughout the Jurisdictional Boundaries of Dunwoody, GA

Michael G. Davis Mayor

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Request for Proposal (RFP) 15-14
Identification and Delineation of Intermittent Streams throughout the Jurisdictional Boundaries of Dunwoody, GA

Sealed Proposals for Purchasing RFP 15-14 Stream Identification and Delineation Services will be received by the City of Dunwoody, hereinafter called "City." Service providers whose proposals meet the criteria established in the Request for Proposals, at the sole discretion of the City, may be considered for Contract award. The City may, by direct negotiation, finalize terms with the service provider who is selected for award based on proposals. The City reserves the right to reject any or all responses for any reason. Clarification of information may be requested by the City.

The City, at its sole discretion, may short-list firms that are deemed to best meet the City's requirements, taking into consideration all criteria listed in the RFP. Negotiations will be conducted and may take place in person or via telephone with the most qualified firm as identified by the City or, if short-listing occurs, with all of the short-listed proposers. Proposers that participate in the negotiations may be given an opportunity to submit their best and final offers. The City of Dunwoody requires pricing to remain firm for the duration of the contract. Failure to hold firm pricing for the duration of the contract will be sufficient cause for the City to declare a proposal non-responsive.

A proposal must be submitted in a sealed envelope which shall be clearly marked RFP 15-14 and your company name. One (1) printed and signed unbound original, three (3) bound hard copies, one (1) electronic copy in PDF of the proposal, and one (1) lump sum cost proposal for the requested service in a **separate and sealed envelope**. The proposal shall be submitted **no later than 2:00pm on November 3, 2015.** (Proposals will not be accepted by facsimile or e-mail). At which time noted, all proposals received will be publicly opened and read. Any proposal received after the time and date specified for the opening of the proposals will not be considered, but will be returned unopened.

A **Pre-Proposal Conference will be held at 10:00am on October 13, 2015** at the City of Dunwoody Courtroom, 41 Perimeter Center East, First Floor, Dunwoody GA, 30346. The conference will include a review of the proposal documents, and a question and answer period. Proposers are expected to be familiar with the proposal documents and to provide the City with any questions regarding the proposal documents at the Pre-Proposal conference or by the deadline for questions to be submitted.

Questions regarding proposals should be directed to purchasing@dunwoodyga.gov no later than 2:00pm October 15, 2015. Proposals are legal and binding when submitted.

Proposal must be addressed as follows:

Purchasing Department
The City of Dunwoody
41 Perimeter Center East, Suite 250
Dunwoody, GA 30346

No Proposal may be withdrawn for a period of ninety (90) days after the time and date scheduled (or subsequently rescheduled) for proposal opening.

The City's staff will review all proposals submitted. After reviewing the proposals, staff may, at its discretion, request formal presentations from one or more of the proposers (at proposer's expense at the City's site) whose proposals appear to best meet the City's requirements.

The proposer awarded the Contract must provide proof of liability insurance in the amount of one million dollars ($1,000,000.00), along with any other required insurance coverage and evidence of business or occupational license, as outlined in the Proposal Documents.

The City reserves the right to waive any informalities or irregularities of proposals, to request clarification or information submitted in any proposal, to request additional information from any proposer, or to reject any or all proposals, and to re-advertise for proposals. The City also reserves the right to extend the date or time scheduled for the opening of proposals.

Award, if made, will be to the responsible and responsive proposer submitting the proposal which is deemed by the City, in the sole discretion, to be the most advantageous to the City, price and other factors being considered.

To ensure the proper and fair evaluation of proposals, the City highly discourages any communication initiated by a proposer or its agent to an employee of the City evaluating or considering the proposal during the period of time following the issuance of the RFP, the opening of proposals and prior to the time a decision has been made with respect to the Contract award. An appropriate Purchasing employee of the City may initiate communication with a proposer in order to obtain information or clarification needed to develop a proper and accurate evaluation of the proposal. Any communication initiated by proposer during evaluation should be submitted in writing and delivered to the City of Dunwoody, Purchasing Office, 41 Perimeter Center East, Suite 250, Dunwoody, Georgia 30346, or by e-mail to purchasing@dunwoodyga.gov or facsimile to (678) 382-6750. Unauthorized communication by the proposer may disqualify the proposer from consideration.

Please note that irregularities in proposals may cause them to be rejected by the City. Included in these irregularities are those such as conditions, limitations, or unauthorized alternative proposals which may require the City to reject a proposal.

PART ONE – SCOPE OF WORK

1.1. The purpose of this Request for Proposal (RFP) is to select a qualified contractor to Identify and Delineate **all** Intermittent Streams within the Jurisdictional Boundaries of Dunwoody, GA. This data will be used to implement various permitting requirements and assist with the functions of the Stormwater Utility.

1.2. Streams should be classified based on the Methodology for Identification of Intermittent and Perennial Streams and Their Origins (version 4.11 or newer) produced by the North Carolina Department of Environment and Natural Resources, Division of Water Quality (Appendix A). Data sheets using this methodology shall be completed for every intermittent stream in the Jurisdiction Boundary of Dunwoody, GA.

1.3. The project should be assigned a Project Manager with at least 10 years of stream classification experience including a minimum of 10 projects using the referenced North Carolina Methodology.

1.4. An On-site Classifier with a minimum of 2 years of stream classification experience, including a minimum of 5 projects using the referenced North Carolina Methodology, should be onsite during all stream classifications.

1.5. If sufficient evidence is provided that work could be completed in the given time period, the Project Manager and On-site Classifier may be the same person.

1.6. The streams should be delineated with a minimum accuracy of 1 meter. Upon completion of the project, the selected contractor will provide the City with a geodatabase compatible with ArcGIS. The final format of the data must be approved by Dunwoody Staff. Intermittent streams shall be delineate with GPS in the field for a length of at least 100' starting from the Ephemeral / Intermittent transition point and leading downstream. The successful bidder will also be responsible for merging the newly delineated data with the City's existing stream GIS layer. The City will provide the consultant with stream, topographic, imagery, parcel and stormwater infrastructure data from the GIS Department.

1.7. At least two upstream and two downstream photographs shall be taken at the transition point between ephemeral and intermittent streams. The purpose of these pictures is to provide photographic evidence of base flow or other characteristics of the stream that justify its classification. One photograph in each direction should be a close up showing stream characteristics, the second photo should provide location reference. Photos should also include a directional bearing either in the file name or imprinted on the photograph. If the contractor wishes to provide more than four photographs for each transition between intermittent and ephemeral, the City encourages additional documentation. Photographs shall be delivered electronically and hyperlinked via Excel Spreadsheet. The Excel Spreadsheet will include a GPS Location, unique identifier for the stream segment, and a hyperlink to a folder with the four photos. Photos should be labeled either upstream or downstream.

1.8. Field Data Collection shall occur between January 4, 2016 and March 18, 2016. This shall include completion of all data forms, GPS Delineation, and photograph documentation. It is a project requirement that the successful consultant start data collection the week of January 4, 2016, or the first business day (Monday through Friday) that occurs 48 hours after a precipitation event.

1.9. Wetland Delineation is **not** part of this scope of work.

1.10. Data collection or stream classification shall not occur within 48 hours of any rain event that produces surface runoff.

1.11. If base flow is present and NC DWQ Stream Identification Form Version 4.11 returns a score of less than nineteen (19), the **stream should be classified as intermittent** and delineated. If any of these instances occur, a North Carolina Data Sheet should also be completed and documented.

1.12. The City will provide the successful consultant with an access letter requesting the cooperation of private property owners, describing the purpose and scope of the study, and providing contact information for City Staff that can address additional questions. This letter will be carried by the contractor during all field data collection and presented to any resident that may have property access concerns.

1.13. The successful contractor will develop an excel spreadsheet documenting hourly rainfall in Dunwoody for the period from January 4, 2016 to March 18, 2016.

PART TWO – GENERAL CONDITIONS

2.1. The Contractor shall perform all of its obligations and functions under the Contract in accordance with the Contract specifications, industry standards and any manufacturers' specifications. The Contractor shall adjust and coordinate its activities to the needs and requirements of the City and perform its activities so as not to disturb, endanger, unreasonably interfere with or delay the operations or activities of the City.

2.2. During the performance of this Contract, the Contractor shall keep current and, if requested by the City, provide copies of any and all licenses, registrations or permits required by applicable governing agencies. The Contractor shall keep a copy of any and all licenses, registrations and permits on the job site while performing the Contract work.

2.3. Working hours are limited to Monday through Friday, 7:30 A.M. to 8:30 P.M. Working hours on Saturdays are allowed from 8:30 AM to 5:30 PM. No work is permitted on city-observed holidays. In the event an emergency condition is declared by the City's Manager or his respective designee, the contractor will perform work during such hours as requested by the City.

2.4. The contractor shall give supervision to the work and have a responsible foreman continuously on the job. There shall be at least one person in a position of responsibility on the site at all times who is capable of communicating in English.

2.5. Contractor shall have all vehicles marked with their company name.

2.6. The contractor shall be solely and completely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. The contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to all employees on the work site and other persons including, but not limited to, the general public who may be affected thereby.

2.7. Contractor shall make every effort to ensure private property is not disturbed.

PART THREE – PROPOSAL CONTENTS

Four (4) copies of the proposal (one original and three copies) including a printed copy of the Lump Sum Cost Proposal should be submitted in a sealed envelope. Proposals must be submitted in a sealed envelope which shall be clearly marked Purchasing RFP 15-14. Additionally provide one (1) electronic copy in PDF of the proposal and of the **Lump Sum Cost Proposal in a separate sealed envelope**. Entire length of proposal should be limited to a total of 20 pages. To aid in thorough and consistent review, the proposal shall be submitted on one-sided 8½" x 11" pages in no smaller than 10-point font and shall be organized and numbered to correspond to Section I through Section IV, with particular emphasis given to Section II:

3.1. SECTION I – Each proposal shall include a Title Page and a Table of Contents. The Title Page should identify the project; the name of the firm, name of the firm's primary contact, address, telephone number, and email address. The Table of Contents shall contain the sections and corresponding page number for the items listed below. All pages of the proposal must be clearly identified and consecutively numbered and correspond to the Table of Contents.

3.2. SECTION II – Each proposer shall document its staff, experience and qualifications by describing the contractors experience with similar projects and the manner in which it plans to manage and staff the awarded contract,

including the resumes of key and critical personnel, to successfully complete the project objectives.

3.2.1. Qualifications, including experience in the proposed project methodology and public sector and/or municipal experience;

3.2.2. Resume for the Project Manager that includes 10 years of Stream Classification Experience and at Least 10 Projects using the reference North Carolina Methodology.

3.2.3. Resumes for each On-site Classifier that includes 2 years of Stream Classification Experience and at Least 5 Projects using the reference North Carolina Methodology. If bidders can demonstrate more than one On-site Classifier meeting the minimum criteria, qualifications for multiple On-site Classifiers should be included in the response.

3.2.4. Summary of experience, including the number of years of relevant experience and representative project experience with project name, client and date performed;

3.2.5. Summary of relevant staff certifications and any other applicable certifications that demonstrate additional competence in Stream Classification;

3.2.6. Description of any specialty equipment or capabilities;

3.2.7. Other supporting documentation which demonstrates the ability to successfully perform the work;

3.3. SECTION III – Each proposer is required to include three (3) verifiable references for similar contracts.

3.4. SECTION IV – Required forms (acknowledgement of addenda, etc.)

PART FOUR - EVALUATION OF PROPOSALS

The City's staff will review all proposals submitted. After reviewing the proposals, staff may, at its discretion, invite to interview and demonstrate performance (at proposer's expense at the City's site) one or more of the proposers whose proposals appear to best meet the City's requirements. The purpose of such an interview would be for all proposers to elaborate upon their proposal before a recommendation for ranking of the proposals is made. Interview responses, and demonstration performance, along with the written proposal and samples (if any), will become part of proposer's submission to be evaluated pursuant to the evaluation criteria. The City reserves the right to short-list proposers for further consideration.

4.1. The City, in its discretion, may award the Contract(s) to the responsible and responsive proposer(s) submitting the proposal which is deemed to be the most advantageous to the City, price and other factors being considered. The following are the evaluation criteria the City will consider in determining which proposal is most advantageous to the City:

4.1.1. Copy of business license and proof of being in business at least seven (7) years. Provide copy of State Contractor's License with name and phone of the registered agent.

4.1.2. Name and telephone number of the Contractor's designated contact.

4.1.3. Project Personnel: Provide information on personnel to be assigned to this project. Personnel should have experience from similar projects and in fields necessary to complete this proposed work.

4.1.4. Similar Experience: List and describe your firm's projects worked on in the past five years that best match the scope and intent of the various projects. Identify unique constraints or challenges associated with those projects and how you addressed those in order to deliver a successful project. The City may request samples of comparable work during the proposal review process.

4.1.5. Verifiable references of similar projects.

4.1.6. Lump Sum Cost Proposal (to be submitted in separately sealed envelope).

* * * * * * * END OF SPECIFICATIONS * * * * * * *

CONTRACT REFERENCES

List below customers for whom you have provided similar services in the past or with whom you are presently contracting. Ensure references below have been contacted and agree to provide the City with a reference including answers to questions posed by the City. References should relate to services of a type similar to the obligations presented in this proposal.

1. COMPANY NAME: _____

ADDRESS: _____

_____

CONTACT PERSON: _____

PHONE NO.: _____

E-MAIL: _____

2. COMPANY NAME: _____

ADDRESS: _____

_____

CONTACT PERSON: _____

PHONE NO.: _____

E-MAIL: _____

3. COMPANY NAME: _____

ADDRESS: _____

_____

CONTACT PERSON: _____

PHONE NO.: _____

E-MAIL: _____

Company Name: _____

PROPOSAL FORM

RFP 2015–14 Identification and Delineation of Intermittent Streams

The undersigned, as Proposer, hereby declares that this Proposal is in all respects fair and submitted in good faith without collusion or fraud. Proposer represents and warrants to the City that: (i) except as may be disclosed in writing to the City with its Proposal, no officer, employee or agent of the City has any interest, either directly or indirectly, in the business of the Proposer, and that no such person shall have any such interest at any time during the term of the Contract should it be awarded the Contract; and (ii) no gift, gratuity, promise, favor or anything else of value has been given or will be given to any employee or official of the City in connection with the submission of this Proposal or the City's evaluation or consideration thereof.

The Proposer further represents that it has examined or investigated the site conditions if necessary, and informed itself fully in regard to all conditions pertaining to the place where the work is to be done; that it has examined the Contract Documents (available at http://dunwoodyga.gov/index.php?section=for_businesses_doing_business_with_the_city_procurement_opportunities) and has read all Addendum(s) furnished by the City prior to the opening of the Proposals, as acknowledged below, and that it has otherwise fully informed itself regarding the nature, extent, scope and details of the services to be furnished under the Contract.

The Proposer agrees, if this Proposal is accepted, to enter into the written Contract with the City in the form of Contract attached (properly completed in accordance with said Proposal Documents), and the Contract Documents for RFP 15-14 Identification and Delineation of Intermittent Streams for PW, at the City of Dunwoody, and to furnish the prescribed evidence of a valid business license, insurance, and all other documents required by these Contract Documents. The Proposer further agrees to commence work and to perform the work specified herein within the time limits set forth in the Contract Documents, which time limits Proposer acknowledges are reasonable.

The undersigned further agrees that, in the case of failure or refusal on its part to execute the said contract, provide evidence of specified insurance, a copy of a valid business or occupational license and all other documents required by these Contract Documents within ten (10) business days after being provided with Notice of Intent to Award the contract (or such earlier time as may be stated elsewhere in these Proposal Documents), the Proposal award may be offered by the City to the next ranked Proposer, or the city may re-advertise for Proposals, and in either case the City shall have the right to recover from the Proposer the City's costs and damages including, without limitation, attorney's fees, to the same extent that the City could recover its costs and expenses from the Proposer under section 10 of the Instructions to Proposers if the Proposer withdrew or attempted to withdraw its Proposal.

The Proposer further agrees, if it fails to complete the work according to the Specification within the scheduled time or any authorized extension thereof, that damages may be deducted from the Contract price otherwise payable to the Proposer.

Acknowledgement is hereby made of the following Addendum(s) received since issuance of the Solicitation Documents (identified by number)

Addendum No. Date Addendum No. Date Addendum No. Date

_____ _____ _____ _____ _____ _____

_____ _____ _____ _____ _____ ____

It shall be the responsibility of each Proposer to visit the City Purchasing Department's website to determine if addendum(s) were issued and, if so, to obtain such addendum(s). Failure to acknowledge an addendum above shall not relieve the Proposer from its obligation to comply with the provisions of the addendum(s) not acknowledged above.

Company
Name:_____

Work is to commence on or about December 1, 2015. This contract shall be for one year with a one year City option for extension.

The City of Dunwoody requires pricing to remain firm for the duration of the initial term of the contract. Failure to hold firm pricing for the initial term of the contract will be sufficient cause for the City to declare bid non-responsive.

Termination for Cause: The City may terminate this agreement for cause upon ten days prior written notice to the Consultant of the Consultant's default in the performance of any term of this agreement. Such termination shall be without prejudice to any of the City's rights or remedies by law.

Termination for Convenience: The City may terminate this agreement for its convenience at any time upon 30 days written notice to the Consultant. In the event of the City's termination of this agreement for convenience, the Consultant will be paid for those services actually performed. Partially completed performance of the agreement will be compensated based upon a signed statement of completion to be submitted by the Consultant, which shall itemize each element of performance.

Termination for fund appropriation: The City may unilaterally terminate this Agreement due to a lack of funding at any time by written notice to the Consultant. In the event of the City's termination of this Agreement for fund appropriation, the Consultant will be paid for those services actually performed. Partially completed performance of the Agreement will be compensated based upon a signed statement of completion to be submitted by the Service Provider which shall itemize each element of performance.

The Proposer agrees to provide all work described in this document.

Legal Business Name_____

Federal Tax ID_____

Address_____

_____

Does your company currently have a location within the City of Dunwoody? Yes____ No____

Representative Signature_____

Printed Name _____

Telephone Number _____

Fax Number_____

Email Address _____

North Carolina
Division of Water Quality

Methodology for Identification of Intermittent and Perennial Streams and Their Origins

Version 4.11
Effective Date: September 1, 2010

This document should be cited as:

NC Division of Water Quality. 2010. *Methodology for Identification of Intermittent and Perennial Streams and their Origins, Version 4.11.* North Carolina Department of Environment and Natural Resources, Division of Water Quality. Raleigh, NC.

Further Information can be obtained from:

North Carolina Division of Water Quality
Wetlands and Stormwater Branch
Program Development Unit
1650 Mail Service Center
Raleigh, NC 27699-1650

(919) 733-1786

Copies of this document are available through the internet:
http://portal.ncdenr.org/web/wq/swp/ws/401/waterresources/streamdeterminations

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SECTION 1 – Stream Identification Methodology

Introduction

This stream identification methodology is intended to guide natural resource professionals in the identification of ephemeral, intermittent and perennial streams using geomorphic, hydrologic and biological stream features. This manual and accompanying field form can be used to identify points on the landscape that represent stream origins and to determine whether a stream is ephemeral, intermittent or perennial in reaches that are some distance downstream of an origin. The manual focuses on headwater streams and the characteristic features of low-order streams wherever they occur in a watershed. Section 1 provides the background and scientific justification for the methodology. Section 2 outlines the field method and use of the rating form. Section 3 provides details on additional procedures for determination of a perennial stream.

Version 4.11 of the manual replaces Version 3.1 (February 28, 2005) and reflects five years of regulatory and academic experience gained since the version 3.1. Clarifications and edits were made in several areas throughout the document to provide additional background on the methodology and improve readability of the manual. Changes to the indicators in the methodology were made for clarification purposes only and do not affect the total scores for stream evaluations or the stream determination made by professionals using the methodology. Changes made to indicators and scoring on the stream form from version 3.1 to 4.11 can be found at http://portal.ncdenr.org/web/wq/swp/ws/401/waterresources/streamdeterminations on the DWQ website.

Purpose and Need

The *Methodology for Identification of Intermittent and Perennial Streams and Their Origins* and numerical rating system were developed in response to requests from the North Carolina regulated community for an objective method to identify ephemeral, intermittent and perennial streams. The need for a stream identification methodology resulted from implementation of the Neuse River Basin Riparian Buffer Rules mandating buffers on all intermittent and perennial streams in the basin. The methodology has since been implemented for other river basins in the state that have riparian buffer rules as well as for stream identification related to stream mitigation. The definitions of ephemeral, intermittent and perennial streams are part of the North Carolina Administrative Code (NCAC) and the methods are tailored to these regulatory definitions. Complete language for the rules can be found at: http://reports.oah.state.nc.us/ncac.asp?folderName=\Title%2015A%20-%20Environment%20and%20Natural%20Resources

The regulatory definitions of streams and related terms are below. Citation of the appropriate section of the North Carolina Administrative Code (NCAC) is shown in parentheses following each definition.

> *'Stream' means a body of concentrated flowing water in a natural low area or natural channel on the land surface. [15A NCAC 02B .0233(2)(k)]*

> *'Channel' means a natural water-carrying trough cut vertically into low areas of the land surface by erosive action of concentrated flowing water or a ditch or canal excavated for the flow of water. [15A NCAC 02B .0233(2)(a)]*

'Ditch or canal' means a man-made channel other than a modified natural stream constructed for drainage purposes that is typically dug through inter-stream divide areas. A ditch or canal may have flows that are perennial, intermittent, or ephemeral and may exhibit hydrological and biological characteristics similar to perennial or intermittent streams. [15A NCAC 02B .0233(2)(c)]

'Ephemeral (stormwater) stream' means a feature that carries only stormwater in direct response to precipitation with water flowing only during and shortly after large precipitation events. An ephemeral stream may or may not have a well-defined channel, the aquatic bed is always above the water table, and stormwater runoff is the primary source of water. An ephemeral stream typically lacks the biological, hydrological, and physical characteristics commonly associated with the continuous or intermittent conveyance of water. [15A NCAC 02B .0233(2)(d)]

'Groundwaters' means those waters occurring in the subsurface under saturated conditions. [15A NCAC 02L .0102 (11)]

'Intermittent stream' means a well-defined channel that contains water for only part of the year, typically during winter and spring when the aquatic bed is below the water table. The flow may be heavily supplemented by stormwater runoff. An intermittent stream often lacks the biological and hydrological characteristics commonly associated with the conveyance of water. [15A NCAC 02B .0233(2)(g)]

'Modified natural stream' means an on-site channelization or relocation of a stream and subsequent relocation of the intermittent or perennial flow as evidenced by topographic alterations in the immediate watershed. A modified natural stream must have the typical biological, hydrological, and physical characteristics commonly associated with the continuous conveyance of water. [15A NCAC 02B .0233(2)(h)]

'Perched water table' means a saturated soil horizon or horizon subdivision, with a free water surface periodically observed in a bore hole or shallow monitoring well, but generally above the normal water table, or may be identified by drainage mottles or redoximorphic features, and caused by a less permeable lower horizon. [15A NCAC 18A .1935 (34)]

'Perennial stream' means a well-defined channel that contains water year round during a year of normal rainfall with the aquatic bed located below the water table for most of the year. Groundwater is the primary source of water for a perennial stream, but it also carries stormwater runoff. A perennial stream exhibits the typical biological, hydrological, and physical characteristics commonly associated with the continuous conveyance of water. [15A NCAC 02B .0233(2)(i)]

'Seasonal High Water Table' means the highest level that groundwater, at atmospheric pressure, reaches in the soil in most years. The seasonal high water table is usually detected by the mottling of the soil that results from mineral leaching. [15A NCAC 02H .1002 (15).]

Note that the definition of an intermittent stream refers to a stream only containing water for part of the year (typically winter and spring). Therefore the term "water table" that was used in the intermittent stream definition refers to the seasonal high water table in the riparian zone soil adjacent to the stream.

Development and Implementation Process

A Stream Technical Advisory Committee (TAC) was established by the North Carolina Division of Water Quality (NC DWQ) in December 1998 to provide technical and scientific input related to the definitions of streams and waterbodies in the Neuse River Basin for use in applying the riparian buffer rules. The TAC created the narrative stream definitions above and evaluated and approved a stream identification methodology, developed by NC DWQ, that evaluates geomorphic, hydrologic and biological stream features to determine the origins of intermittent streams

The system of scoring stream features and developing minimum total scores for stream identification were established based on the results from over 300 individual field trials conducted in the piedmont and coastal plain portions of the Neuse River Basin, North Carolina. Field testing conducted during May, June, July and August of 1998 and during December 1998 and January 1999 consistently supported a minimum total score of 19.0 to distinguish ephemeral streams from intermittent streams. Scores less than 19.0 indicate ephemeral streams, whereas scores 19.0 or greater provide sufficient evidence that at least an intermittent stream is present. A score of 30.0 or more points is one method that may be used to determine the presence of a perennial stream. Alternate procedures for perennial stream identification are documented in Section 3 – Guidance for the Determination of Perennial Streams.

Since the adoption of the first version of the stream identification manual in 1999, improvements and clarifications have been made in subsequent versions based on scientific literature and investigation as well as on experience and recommendations from the natural resource community using the methodology. Prior to the implementation of a revised manual, the manual is submitted to a 60-day public review period. All comments and suggestions collected over the review period are considered and incorporated when applicable. Following final revisions, the final manual version is adopted with an effective date and made available for all users.

To date, the NC DWQ Stream Identification Methodology has served as the basis for similar endeavors elsewhere across the country, e.g. Fairfax County, Virginia (http://www.fairfaxcounty.gov/dpwes/watersheds/ps_protocols.pdf); the Athens-Clarke County, Georgia, Department of Transportation and Public Works (http://www.athensclarkecounty.com/documents/pdf/publicworks/stream_id_manual.pdf); State of Oregon US Army Corps of Engineers (USACE); South Carolina Department of Health and Environmental Control, and Tennessee Department of Environment and Conservation.

History of the Stream Identification Manual and Forms

Version 1.0 – Unpublished. The Stream Identification Method was originally developed to correlate scores with the persistence of water. Low scores would indicate streams in the upper portions of watersheds (low order streams), and the highest scores would indicate major rivers (high order streams).

Version 2.0 – Effective January 19, 1999. The method was termed the NC Stream Classification Method and was adopted as a result of HB 1257 (Stream Identification for Buffer Rules), 2001-2002 Session of the NC General Assembly. The Stream Technical Advisory Committee evaluated and revised Version 1.0 of the form and recommended the use of the modified form by the NC DWQ.

Version 3.0 – Added considerable amount of explanatory material and restructured the rating form. Version 3.0 was developed during the summer and fall of 2004, and issued for public comment September 21, 2004. Version 3.0 was used in the development of Version 3.1.

Version 3.1 – Effective February 28, 2005- Minor edits and corrections resulting from a test of the Version 3.0 material during the Surface Water Identification Training and Certification (SWITC) Class; November 15-17, 2004 and December 8-9, 2004. Version 3.1 incorporated the "Guidance for the Determination of the Origin of Perennial Streams."

Version 4.11 – Effective September 1, 2010. Edits, clarifications and corrections resulting from a test of the Version 3.1 material during the Surface Water Identification Training and Certification (SWITC) Classes in 2006, 2007 and 2008. Title change from "*Identification Methods for the Origins of Intermittent and Perennial Streams"* to **"**Methodology for Identification of Intermittent and Perennial Streams and their Origins."

Scientific Justification

A stream can be described as flowing surface water in a channel resulting from five sources of water discharge to the stream from the adjacent landscape (Figure 1). Baseflow or normal low flow in a stream between rainfall events is provided by two of those sources, *groundwater discharge* into the channel and *unsaturated drainage from the soil moisture zone* above the water table to the groundwater zone. During and shortly after rainstorms, the increased flow in the channel known as stormflow is provided by *direct channel precipitation,* surface runoff as *overland flow*, and rapid unsaturated flow through the soil (*interflow*) directly to the stream or to the groundwater zone. Increased groundwater discharge also provides a contribution to stormflow.

Streams may exhibit both stormflow and baseflow characteristics as they flow from their origins to their destinations. However, the seasonal or continual presence of baseflow defines a stream as intermittent or perennial, respectively. The North Carolina stream definitions do not require water to be flowing, but only prescribe that water be present to meet the definition of intermittent or perennial flow for regulatory purposes. Also, within the regulatory framework, an intermittent or perennial stream origin is defined as a specific location in a stream. However, in most cases, stream origins usually occur as transition zones in which the location and length of the zone is subject to fluctuations in groundwater levels and precipitation. Frequently, streams change from ephemeral to intermittent and intermittent to perennial along a gradient or continuum — sometimes with no single distinct point demarcating these transitions (Figure 2).

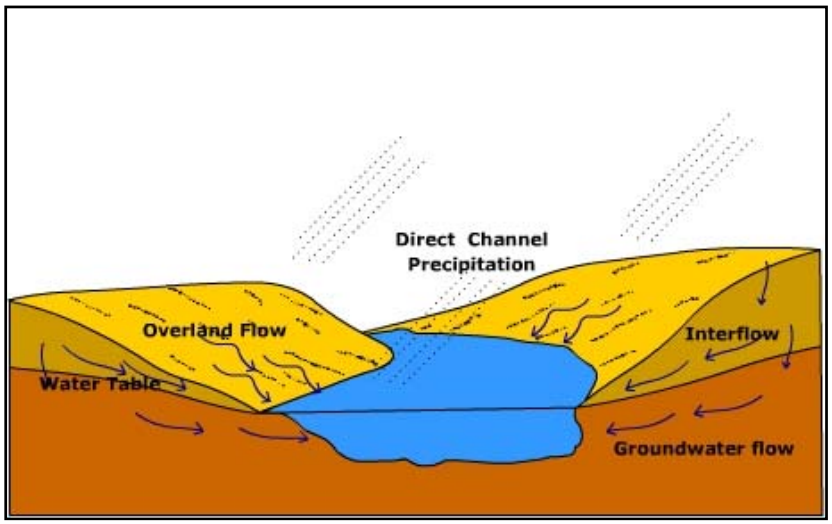

Figure 1: Streamflow sources (Ritter 2008)

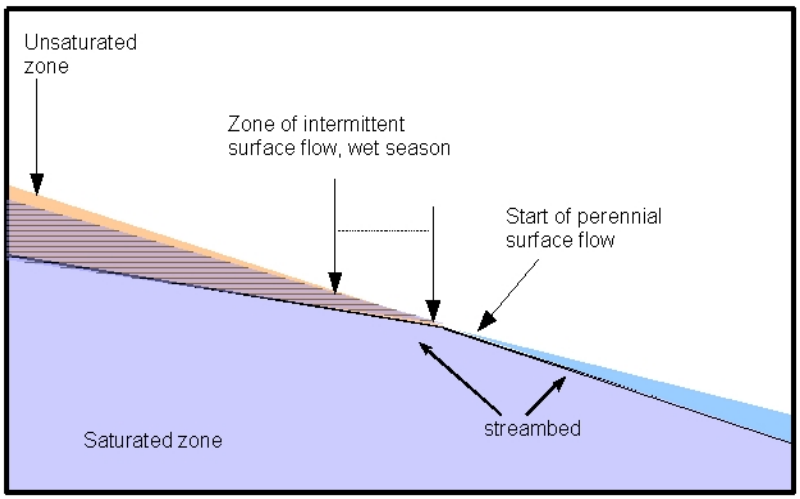

Figure 2: Illustration of perennial and intermittent surface flow intersecting groundwater. Adapted from Winter et al. 1998 **http://pubs.usgs.gov/circ/circ1139**.

In North Carolina, some streams follow that pattern and transition from ephemeral to intermittent to perennial, but in many cases, they do not. The transition in flow duration varies by landscape and general trends can be observed by geologic province, i.e., mountains, piedmont and coastal plain (Russell, unpublished report, 2008a).

The presence or absence of permanent stream flow defines the hydrologic, geomorphic and biological character of streams. Hence, stream systems can be characterized by interactions among hydrologic, geomorphic (physical) and biological processes. Similar to the downstream continuum of ephemeral to intermittent to perennial stream flow, physical and biological characteristics follow the same pattern in response to flow volume and duration. The term “flow duration” used in this manual refers collectively to ephemeral, intermittent and perennial flow as described as one of the five components of flow regime (Poff and Ward 1989; Richter et al. 1996; Walker et al. 1995). Variations in physical and biological characteristics along the length of a stream can help distinguish what source of water predominately contributes to flow. The

fundamental source of water for intermittent and perennial stream baseflow as defined in the North Carolina Administrative Code (NCAC) is groundwater resulting from the intersection of the water table with the streambed. This definition is consistent with those of several other federal and state government agencies as well as many academic organizations (Moore 2003; Jackson et al. 2005; Beaudry et al. 2006; U.S. Army Corps of Engineers 2007,Wilson 2003).

As baseflow becomes more persistent in the downstream direction, stream discharge, both stormflow and baseflow, increases and stream characteristics related to geomorphic, hydrologic and biological processes are more readily observed. For example, stream bedforms, such as gravel bars and pool-riffle sequences, are much more defined in perennial streams than in intermittent streams due to increased sediment supply as well as transport and depositional processes. Furthermore, aquatic organisms respond to the availability of habitat formed and maintained by geomorphic and hydrologic processes and vary depending on the persistence of water and streamflow.

Stream characteristics and commonly observable features resulting from geomorphic, hydrologic and biological processes are used in this stream identification methodology to produce a numeric score. Attributes serve as indicators that can be observed independently of each other, although they are not intended to independently determine stream flow duration. The total score of all indicators provides the means for stream determination. The score is then used to assign a stream type of “ephemeral”, “intermittent”, or “perennial” to the stream reach being evaluated.

SECTION 2 - Stream Identification Field Method and Rating Form

Suggested Field Equipment

Aquatic net and shallow white pan – used to catch and examine benthic macroinvertebrates and aquatic vertebrates. A small aquarium net and plastic container lid may suffice if carrying full-size equipment is not feasible.

Global Positioning System (GPS) – used to determine coordinates of the stream origin or of a stream reach.

Camera – used to photograph and document site features.

Munsell Soil Color Charts (Munsell 2000) – used to determine the soil matrix chroma when looking for soil-based evidence of a seasonal high-water table.

Field Indicators of Hydric Soils of the United States (USDA 2010)– used to help determine the presence of a high water table.

Soil auger – used to extract soils.

National List of Vascular Plant Species that Occur in Wetlands: 1996 National Summary (U.S. FWS 1997) - used to determine the indicator status of plants found in and adjacent to the streambed.

Basic rules for making stream determinations:

Do not evaluate a stream within 48 hours of rainfall that results in surface runoff.

Generally, it takes about 48 hours for increased streamflow resulting from precipitation to attenuate. Delaying a stream determination following rainfall helps to eliminate visual bias associated with observing water in a stream that may not currently have baseflow. Also stormflow may obscure many of the channel features that need to be observed and evaluated.

Review information on stream to be evaluated.

Gather and review available information regarding the area and location of the stream. The use of U.S. Geological Survey (USGS) topographic maps, Natural Resources Conservation Service (NRCS) soil survey maps, geology maps and/or high resolution topographic data (e.g., LiDAR-based) or aerial photography may help provide information when conducting the field investigation. Other important data may include land use/land cover or current construction activity in the area. To assist in evaluating whether flow in the stream is typical, current streamflow at nearby gauges, recent rainfall compared to normal, and drought status information is useful.

Become familiar with the characteristics of headwaters streams in the region of interest.

Beginning users of this manual and form should visit a variety of headwater streams, look for the geomorphic, hydrologic and biological features discussed here, and gain experience observing the magnitude and variability of these features. The field evaluator is strongly encouraged to attend the four-day stream identification methodology class, taught by the NC DWQ and/or NC State University, pass the written and field exams, and to have familiarity with geomorphic, hydrologic and biological characteristics in headwater streams.

Walk to the upstream extent of the feature when feasible.

Evaluating the degree of development of many of the Stream Identification Method indicators involves comparing the stream reach of interest to upstream portions of the stream. Headwater streams are often discontinuous with segments with very poorly developed channels where baseflow flows under the surface. Therefore, an apparent perennial or intermittent stream origin may not be the actual origin. Continue walking upstream towards the ridge top until you are certain that you have observed the entire drainageway to its origin.

Evaluate at least 100 ft of stream to determine average conditions.

Determinations must not be made by observing one location in a stream, but rather should be made by observing a reach of stream. Generally, at least one hundred feet (sometimes more) of channel should be walked to make observations. This initial examination allows the evaluator to examine and study the nature of the channel, noting the presence or absence of bedforms, dominant sediment size, dominant stream processes, and characteristics that indicate the predominant source of water (stormflow, baseflow, tributary discharge, and the presence of benthic macroinvertebrates and/or vegetation). These initial observations also aid in determining the magnitude (absent, weak, moderate or strong) of specific parameters.

Scoring

Identification of stream flow duration is accomplished by evaluating 26 different attributes of the stream and assigning a numeric score to each attribute. A scoring sheet (included on the last page of this manual) is used to record the score for each attribute and determine the total numeric score for the stream under investigation. The sheet specifically requests information for Date, Project, Evaluator, Site, County, Other (Quad Name), and Latitude and Longitude. However any other pertinent observations should also be recorded on this sheet. These may

include the amount and date of the last recent rain, hydrologic unit codes, or evidence of stream modifications. The hardcopy or digital scoring form is an official record, so all pertinent observations should be recorded on the form.

The total score is intended to reflect the persistence of water with higher scores indicating intermittent and perennial streams. A four–tiered, weighted scale used for evaluating and scoring each attribute addresses the variability of streams. The categories (and their accompanying numerical scores), “Absent”, “Weak”, “Moderate”, and “Strong” are applied to sets of geomorphic, hydrologic and biological attributes. The score given to an attribute reflects the evaluator’s judgment of the average degree of development of the attribute along a reach of the stream at least 100 ft long. These categories are intended to allow the evaluator flexibility in assessing variable features or attributes. The small increments in scoring between gradations help reduce the range in scores between different evaluators. The score ranges were developed in order to better assess the often gradual and variable transitions of streams from ephemeral to intermittent.
Definitions of Absent, Weak, Moderate and Strong are provided in Table 1. These definitions are intended as guidelines and the evaluator must select the most appropriate category based upon experience and observations of the stream under review, its watershed, and physiographic region. “Moderate” scores are intended as an approximate qualitative midpoint between the two extremes of “Absent” and “Strong.” The remaining qualitative description of “Weak” represents gradations that will often be observed in the field.

Table 1: Guide to scoring categories

Category	Description
Absent	The character is not observed
Weak	The character is present but you have to search intensely (i.e., ten or more minutes) to find and evaluate it
Moderate	The character is present and observable with brief (i.e., one or two minutes) searching and evaluation
Strong	The character is easily observable and quickly evaluated

Sources of Variability

Sources of spatial variation among stream systems are due primarily to geology, soils, and land cover and their interactions with precipitation and climate. For example, riffles, steps and pools are in-channel structures that vary by woody debris inputs, sediment size and sediment transport rates. Cobble, gravel and boulders are more common in the mountains and roots and woody debris are more common in the coastal plain. Other examples of variability include the magnitude (height) of headcuts, stream gradient and sediment supply.

Temporal variations in flow are related to seasonal changes in precipitation and evapotranspiration, as well as recent precipitation and snowmelt events. Because recent precipitation can have an effect on stream flow, and therefore can influence scoring, it is strongly recommended that field evaluations be conducted at least 48 hours after hydrology-altering events, when conditions would be considered “normal” or representative for the season.

However, please note that the identification method was designed with redundancy among the indicators to allow for reasonably accurate ratings even after a recent precipitation.

Ditches and Modified Natural Streams

In many parts of North Carolina it may be difficult to differentiate between an artificial feature (e.g. ditch or canal) and a natural stream that has been modified (e.g. straightened or relocated). There are a variety of techniques that can be employed to help make this distinction. The topographic lines depicted on a USGS topographic map may indicate a natural valley in which a natural stream could be present. Parallel topographic contour crenulations (V-shaped contour lines) with angles of 90° or less can be indicative of the presence of a stream. Features located outside of a natural crenulation (i.e. moving across a slope rather than perpendicular to it) may not be natural or, alternatively, may be a relocated stream. Additionally, NRCS county soil survey maps often show the presence of linear soil mapping units, which are indicative of alluvial deposits and the presence of a stream. If the feature in question is determined to be artificial, scoring is not necessary for buffer rule applications in North Carolina since those rules do not apply to ditches. The exception is the Randleman Watershed Buffer Rules (see rules).

Field Form Indicators and Descriptions

A. Geomorphic Indicators

1. Continuity of Channel Bed and Bank

Throughout the length of the reach, is the stream clearly defined by having a discernable bank and streambed?

The bed of a stream is the channel bottom and the physical confine of the “normal” baseflow or low water flow. Streambanks are vertical or sloped areas rising from the bed of the channel and are the lateral constraints (channel margins) of flow during all stages but flood stage. Flooding occurs when a stream overflows its banks and partly or completely fills its floodplain. As a general rule, the bed is that part of the channel at or near "normal" flow, and the banks are that part above the water line. However, because discharge varies, this differentiation is subject to local interpretation. Usually the bed is clear of terrestrial vegetation, while the banks are subjected to water flow only during high stages, and therefore can support vegetation much of the time. This indicator will lessen and may diminish or become fragmented upstream as the stream becomes ephemeral.

Strong – The stream has a well developed channel with continuous bed and bank present throughout the length of the reach.

Moderate – The majority of the stream channel has a continuous bed and bank. However, there are obvious interruptions.

Weak – The majority of the stream channel has obvious interruptions in the continuity of bed and bank. However, there is still some representation of the bed and bank sequence.

Absent –The stream has a very poorly developed channel in which little or no bed and bank can be distinguished.

2. Sinuosity of Channel Along Thalweg

What is the extent of stream sinuosity throughout the reach being evaluated?

Sinuosity is a measure of a stream's "curviness." Specifically, hydraulic sinuosity is the sinuosity related to the hydraulic factors of water behavior rather than the influence of topography (Mueller 1968). Sinuosity is measured as the total stream length measured along the stream thalweg (the deepest part of the channel or the low flow channel) divided by the straight line valley length (Figure 3) (Mueller 1968; FISRWG 1998). The higher the result, the greater the sinuosity (Figure 4). The sinuosity of a stream is one way the stream maintains a constant gradient along the channel. Typically, natural, undisturbed streams with steep gradients have low sinuosity, and streams with low gradients have high sinuosity. The size of the stream and its contributing watershed area (a surrogate for discharge) are related to the stream gradient and sinuosity: usually the larger the stream, or stream order, the higher the sinuosity (Stall and Fok 1968). Intermittent streams do not have constant flow year-round, and as a result may have a less sinuous channel than perennial streams. Sinuosity should be visually estimated or measured in the field, rather than from aerial photography.

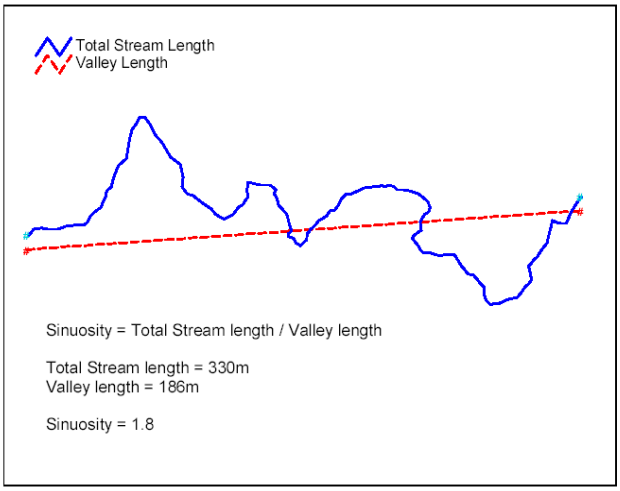

Figure 3: Stream Sinuosity (FISRWIG 1998).

Strong – Ratio > 1.4. Stream has numerous bends, very few straight sections.

Moderate – 1.2 < Ratio < 1.4. Stream has some bends with a few straight sections.

Weak – 1.0 < Ratio < 1.2. Stream has very few bends and numerous straight sections.

Absent – Ratio = 1.0. Stream is completely straight with no bends.

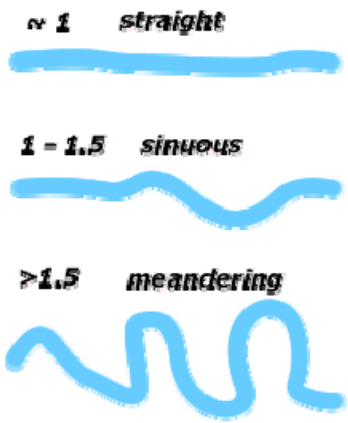

Figure 4: Sinuosity ratio as defined by Allen (1970)

3. In-channel structure: Riffle-Pool, Step-Pool, Ripple-Pool sequence

Is there a regular sequence of riffles and pools or other erosion/deposition structural features in the channel indicative of frequent high flows?

At low flows, a riffle is a zone of turbulent, shallow flow (similar to a rapid in larger streams). The substrate in riffles consists of the coarser sediment sizes in the stream. A pool is a zone of tranquil, deep-water flow. Finer sediments may dominate the bed material in pools if a fine textured sediment supply exists. In steep (slope > 2-4%) mountain and piedmont streams, step-pool sequences are typically formed instead of riffle-pool sequences.

A repeating sequence of riffle-pool (or riffle-run or ripple-pool in sand bed streams, or step-pool in higher gradient streams) is usually observed in perennial streams where the bed material is larger than coarse sand (Leopold 1994). Riffle-run sequences in low gradient streams, such as those in the coastal plain, are often created by in-channel wood such as roots and woody debris. Ripple-run sequences are often found in low gradient, hydraulically smooth streams where the bed consists of fine sand or silt (Gordon et al. 1994). When present, these bedform characteristics can be observed even in a dry stream bed by closely examining the local profile of the channel (Figure 5).

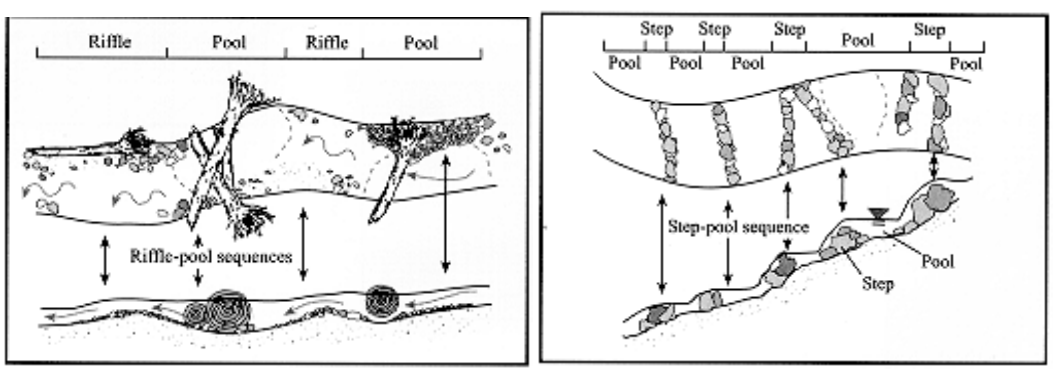

Figure 5: Riffle-pool and step-pool stream morphologies (Church 1992).

Strong – Stream has a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.

Moderate – Stream has less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.

Weak – Stream has some structure but dominated by areas of pools or areas of riffles.

Absent – No sequence is observed.

4. Particle Size of Stream Substrate

Has downcutting penetrated through the soil profile such that the distribution of sediment size in the stream substrate is relatively coarser than the adjacent floodplain or streamside area?

Well developed streams that have eroded through the soil profile often have substrate materials dominated by larger sediment sizes, e.g., coarse sand, gravel and cobble, relative to floodplain sediments and adjacent soils (Table 2). Similar sediment sizes in the stream bed and the adjacent stream side area indicate that stream forming processes have not been consistent enough to cut into the soil profile and form an intermittent or perennial stream (Figure 6a). The bed in ephemeral channels is typically soil, have the same or similar soil texture as areas adjacent to the stream, and often have differentiated soil horizons. The bed of intermittent or perennial streams is often comprised of coarser sediment relative to the adjacent bank area or floodplain due to consistent stream-forming flows that have transported finer particles downstream as the channel has eroded downward (Figure 6b).

The usefulness of this attribute may vary among physiographic provinces. For instance, in the coastal plain or Sand Hills, the differences in particle sizes between the channel substrates and the channel bank/riparian zone soils are often less than in the piedmont and mountains.

Strong – The channel is well-developed through the soil profile with relatively coarse streambed sediments compared to riparian zone soils: coarse sand, gravel, or cobbles in the piedmont; gravel, cobbles, or boulders in the mountains, and medium or coarse sand in the coastal plain. Particle size differs greatly between the stream substrate and adjacent land.

Moderate – There is a well-developed channel but it is not deeply incised through the soil profile. Some coarse sediment is present in the streambed in a continuous layer. Particle size differs somewhat between the stream substrate and adjacent land.

Weak – The channel is poorly developed through the soil profile. Some coarse sediment is present in the streambed but is discontinuous. Particle size differs little between the stream substrate and adjacent land.

Absent – The channel is poorly developed, very little to no coarse sediment is present. There is no difference between particle size in the stream substrate and adjacent land.

Figure 6a. Ephemeral Stream Bed (NC DWQ)

Figure 6b. Perennial Stream Bed (NC DWQ)

Figure 6: Examples of Sediment Sizes in the Substrate

5. Active/Relict Floodplain

Is there an active floodplain at the bankfull elevation or is there evidence of recent stream incision with a relict floodplain (terrace) above the current bankfull elevation?

Floodplains are relatively flat, depositional areas adjacent to streams composed of alluvial material. In undisturbed streams, the elevation of the floodplain is roughly equivalent to bankfull elevation. An active floodplain abuts and parallels the stream and is a continuum of the stream bank (Figure 7). Floodplains accumulate organic matter and mineral alluvium deposited during receding flood waters. An active floodplain shows characteristics such as surface scour, drift lines, sediment deposited on the banks or surrounding plants and plants flattened by flowing water. In many cases there should be evidence of a floodplain if the stream has perennial flow and the floodplain becomes more continuous and developed as the stormflow volume and sediment transport increase downstream.

Occasionally, small, shallow ephemeral or intermittent channels in relatively broad, flat valley bottoms that are predominantly erosion/transport systems may have a floodplain formed of residual soil over which stormwater often flows. Such floodplains usually are not accumulating alluvium like floodplains farther downstream and should not receive the same score that one might apply to a floodplain formed by depositional processes.

Strong – The area displays all of the aforementioned characteristics. The floodplain consists of coarse- to fine-textured alluvium (check with soil auger) and is relatively wide and continuous on either or both sides of the stream.

Moderate – Most of the characteristics are apparent. The floodplain is not continuous on either or both sides of the stream.

Weak – The floodplain is not obvious, however some of the indicators are present. Small, infrequent segments of floodplain are present.

Absent – The characteristics are not present.

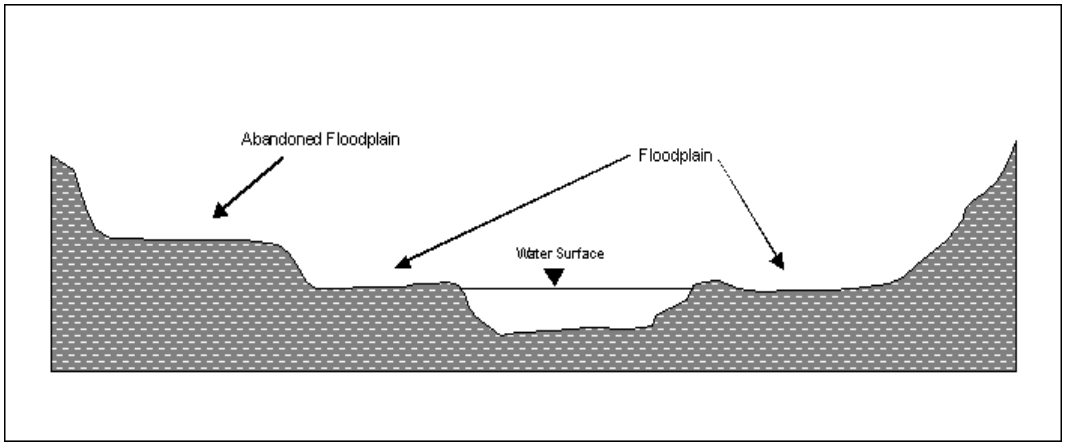

Figure 7: Illustration of abandoned floodplain relative to stream and active floodplain (Source unknown).

6. Depositional Bars or Benches

Are depositional (alluvial) bars and/or benches present in the stream?

When a stream conveys perennial flow, channel processes create distinct erosional and depositional features which can be readily observed. Bars are sediment storage areas in streams located along the margins or the middle of the stream (Figure 8). Point bars are located on the inside of bends in meandering streams, alternate bars are located along the sides of streams and are typical of streams with low sinuosity. Medial or midpoint bars are typical of streams that lack the capacity to transport their sediment load. The presence of depositional bars implies that the channel experiences relatively continuous sediment transport and deposition. The more obvious and continuous these depositional features are throughout the reach, the higher the score should be. Depositional features are often absent or subtle in very small, low order channels due to low sediment supply and/or steeper stream gradients.

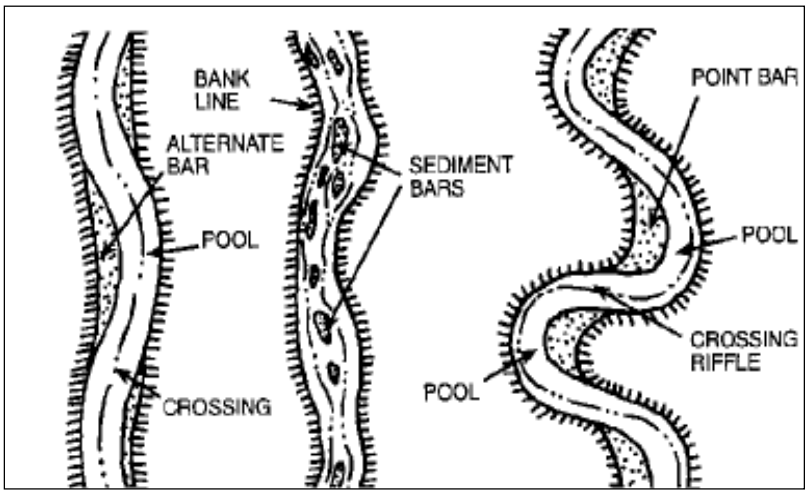

Figure 8: Plan view of depositional bars in streams (Ohio Stream Management Guide).

Bankfull benches (Figure 9) are located along the margins of the stream and are usually associated with deposition and scour resulting from bankfull flows in deeply incised streams. In stable streams, bankfull flow is the flow within the stream banks just before it spills over into the floodplain. In incised streams, the traditional, i.e., return interval of 1.5-2 years, bankfull flow does not spill over onto the floodplain, and sediment transport related to bankfull flow is not deposited on the floodplain, but rather in the stream along the margins. Over time, the scour of the bankfull flow and/or the deposition of sediment from receding bankfull flows accumulate, resulting in a bench on one or both of the stream margins. The presence of a bankfull bench is an indicator that the stream experiences bankfull flows and subsequent sediment transport and deposition usually associated with perennial streams.

Figure 9: Bankfull bench and related stream features (USACE 2005).

Strong – Depositional bars or benches are obvious throughout the sample reach.

Moderate – Indicators are present throughout most of the reach.

Weak – Indicators are infrequent along sampling reach.

Absent – Indicators are completely lacking.

7. Recent Alluvial Deposits

Are there fresh deposits of alluvial materials that have been transported and deposited on surfaces in the stream or on the floodplain by recent high flows?

Alluvial material in streams with intermittent and perennial flow is constantly being transported and deposited, or reworked, over time. Fresh alluvial deposits absent of vegetation and leaves or debris are observable following recent high flows in the stream and on the floodplain and are indicative of streams that have a sediment supply and flow needed to transport and deposit that sediment. Alluvium may consist of silt, sand, gravel, and/or various sized cobble. However, smaller sediment sizes are typically deposited last during receding flows so they may be more visible. Observe if there is any recent deposition of alluvium in the stream (Figure 10), on point bars or medial bars, or on the floodplain. Recent alluvial deposits may also be observed overlying floodplain vegetation, or at the crest or downstream end of a point bar.

Strong – Large amounts of fresh alluvium present in the channel and/or on the floodplain.

Moderate – Large to moderate amount of fresh alluvium present in the stream.

Weak – Small amounts of fresh alluvium present within the channel.

Absent – There are no recent alluvial deposits present within the stream or on the floodplain.

Figure 10: Recent alluvial deposits. Striped stick is 1.0 m long, painted in decimeters and lying on the streambed.

8. Headcuts

Is there a headcut at the upstream end of the reach being evaluated? Are there one or more headcuts within the reach being evaluated?

A headcut is an abrupt vertical drop in the bed of a stream that is an active erosional feature. It often resembles a small intermittent waterfall (or a miniature cliff) and may have a deep pool at the base resulting from scour. Intermittent or perennial streams sometimes begin at a head cut in the piedmont and mountains. Headcuts are transient structures of the stream and often exhibit relatively rapid upstream movement during periods of high flow. Groundwater seepage may also be present from the face or base of a head cut (Figures 11, 12).

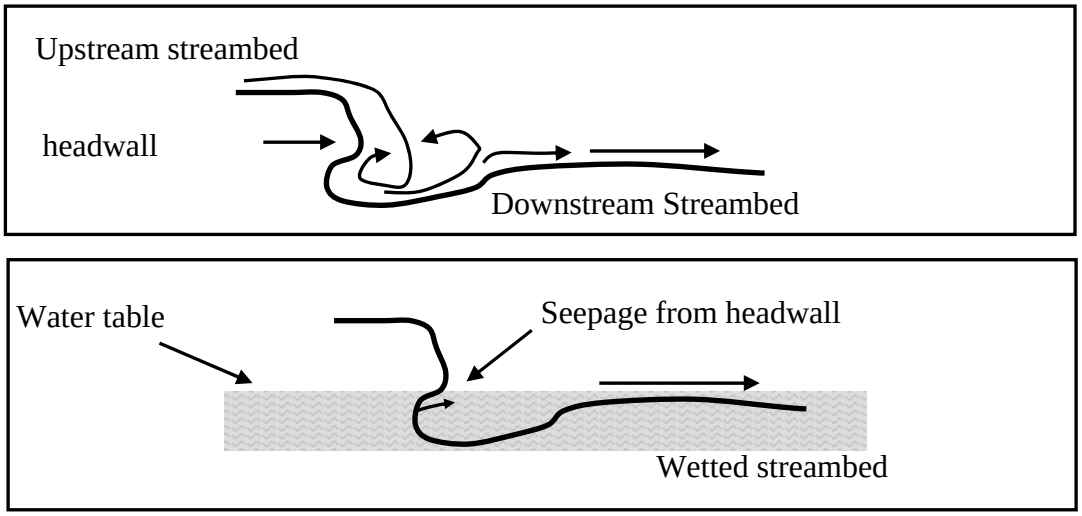

Figure 11: Headcut formation (Modified from Ken Fritz, EPA)

Strong –One or more obvious headcuts are present in the stream. Groundwater seepage may be present at the base of the headcut.

Moderate – One or more small headcuts are obvious and present in the stream.

Weak – One small headcut is present in the stream.

Absent – No headcuts are present.

Figure 12: Examples of Headcuts (NC DWQ, 2004)

9. Grade Control

Is there grade control within the reach being evaluated?

A grade control point is a structural feature in the channel that separates an abrupt change in grade of the stream bed, or a point where a headcut has been stopped by an obstruction (Figure 13). Grade controls may consist of bedrock outcrops, large boulder and cobble clusters, large roots that extend across the channel, or accumulations of large woody debris. Pipes can also be considered grade control, i.e. perched culverts, piped channels, or sewer lines crossing the channel. Grade controls may decrease the rate of headcut migration by providing an obstruction that is more resistant than the surrounding stream material. Grade control is dependent on the forming material and its residence time in the location. Bedrock will typically be more resistant to erosion (and therefore be in that location longer) relative to keyed in (stable) large wood. It may be difficult to decide what to call a headcut that is temporarily stopped by roots or debris. Is it a headcut or a grade control? Rate such features as either headcut or grade control, not both.

Strong –Exposed bedrock, boulder and cobble clusters and/or large wood jams are present in the channel and appear to be acting as relatively permanent grade control.

Moderate –Some exposed bedrock, boulder and cobble clusters, and/or large wood and roots are present in the channel and appear to be acting as grade control, but only with moderate longevity.

Weak – No bedrock, few to no boulder clusters, and/or few to no roots or wood are present but some may be acting as short-term grade control.

Absent – No grade control structures are in the stream.

Figure 13: Example of grade control in Umstead State Park, Wake County NC (Susan Howard 2007).

10. Natural Valley

Is there a well-developed valley at the location of the reach being evaluated?

A valley is an extended depression in the Earth's surface that is usually bounded by uplands, hills or mountains and is commonly occupied by a river or stream. Valley formation results from erosion or gradual wearing down of the land by wind and water. In river valleys for example, the river acts as an erosional agent by grinding down the rock or soil and creating a valley. Valley shapes vary but are typically steep-sided canyons or broad plains and their form is dependent on the erosional agent, the slope of the land, local and regional rock or soil material and time (Briney 2009).

In North Carolina, current valley formation and maintenance results from water erosion. The frequency and magnitude of water flowing over the land surface over time, in conjunction with the erodibility of underlying rock and soil material, determine the degree of valley formation. This indicator addresses the degree of valley development due to water as an erosional agent. In the continuum of a single valley, the degree of development of that valley usually increases in the downstream direction. Variation in the signature of a well-developed valley occurs across geologic provinces.

When looking at the local topography in the field, does the land slope towards the channel thereby indicating a “draw” or valley? In other words, does the land have slopes that seem to drain to or indicate a natural valley?

Strong – Well defined valley indicated by all surrounding land sloping downward to the valley bottom or stream.

Moderate – Defined valley indicated by most of the surrounding land sloping downward to the valley bottom or stream.

Weak –Subtle valley indicated by some of the surrounding land sloping downward to the valley bottom or stream.

Absent – No indication of surrounding land sloping to the valley bottom or stream. Channel located on side slope indicative of an artificial channel or stream relocation.

11. Second (or Greater) Order Channel

Is the channel reach being evaluated second order or greater, considering all intermittent and perennial channels that discharge to it?

The higher the channel order, the more likely a stream is to be perennial. Determine the order of the reach being evaluated in accordance with the Strahler Stream Order method (Strahler 1952), considering all intermittent and perennial stream segments that discharge to the evaluation reach. Due to inaccurate depiction of headwaters streams on maps, ground reconnaissance of the stream upstream of the reach being evaluated is preferred, when feasible. Use evidence of intermittent or perennial stream segments upstream of the evaluation reach on a USGS 1:24,000 topographic map or NRCS county soil survey map (printed version) when ground reconnaissance is not feasible. It is often difficult to evaluate stream order on channels that have been altered by upstream development. This indicator should be based on the natural condition of the stream network, when possible. Review of historic data such as a topographic or soils map that predates the development may be helpful. If such information is not available, then base the stream order determination on the current situation.

YES – The reach being evaluated is second (or greater) order based on intermittent or perennial stream segments discharging to it.

NO – The reach being evaluated is part of a first order stream or stream order cannot be determined.

B. Hydrologic Indicators

12. Presence of Baseflow

Does the presence of flow more than 48 hours after rainfall that produces runoff and evidence of groundwater discharge into the evaluation reach indicate a significant period of baseflow in the stream?

Water flowing in the channel more than 48 hours after rainfall that produces runoff is clear evidence of baseflow supplied by groundwater discharge from saturated soils below the water table adjacent to the stream. Even when there is no visible flow above the channel

bottom, there may be slow groundwater discharge into, and downstream flow through, the hyporheic zone (Figure 14). The hyporheic zone is the accumulation of coarse-textured sediments in the bed and sides of the channel that may be up to 2-3 ft deep in small streams. A functioning part of the stream, the hyporheic zone is the site where much of the groundwater discharge to the stream occurs, the source of downstream flow, and the location of biological and chemical processes associated with aquatic functions of the stream.

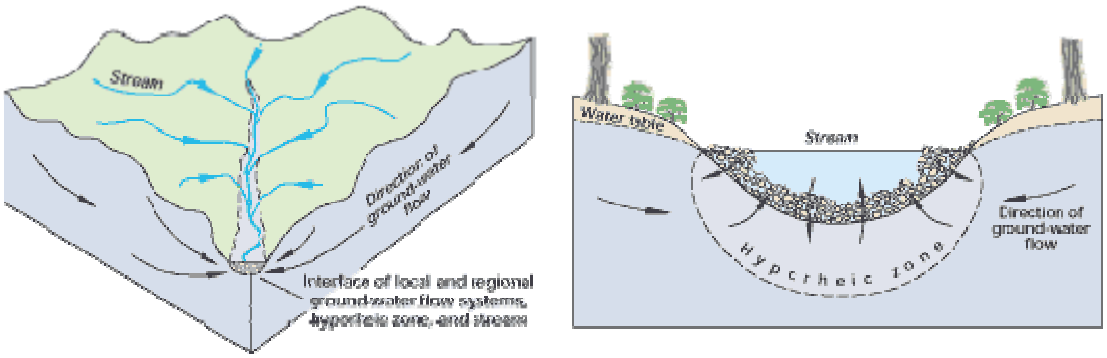

Figure 14: Illustration of groundwater flow and hyporheic zone (Winter et al.,1998).

The presence of a seasonal high water table or groundwater discharge (e.g., seeps or springs) from the bank above the elevation of the channel bottom indicates a relatively reliable source of baseflow to a stream.

Strong – Water is present and flowing in the thalweg region of the channel throughout the evaluation reach and there is significant baseflow through the riffles or other shallow zones. Evidence of groundwater discharge into the channel or a groundwater table above the thalweg is readily observable throughout the reach.

Moderate – Water is present in the thalweg region of the channel throughout the evaluation reach and there is a small amount of baseflow through the riffles or other shallow zones. Evidence of groundwater discharge into the channel or a groundwater table slightly above the thalweg is observable in the reach but not abundant throughout the reach.

Weak – Water is standing in pools and the hyporheic zone is saturated, but there is not visible flow through the riffles or other shallow zones of the thalweg. Evidence of groundwater discharge is present, but requires considerable time to locate. The groundwater table is at or slightly above the level of water in the pools.

Absent – There is little to no visible water in the thalweg region of the channel. There is no evidence of groundwater discharge into the channel and the groundwater table is at or below the deepest parts of the channel.

13. Iron Oxidizing Bacteria

In slow moving (or stagnant) areas of the stream, are there clumps of "fluffy" rust-red material in the water, on the sides of the bank or in the streambed? Are there red or rust-

colored stains on the soil surface and/or an "oily sheen" or "oily scum" on the water surface?

Iron oxidizing bacteria derive energy by converting iron in the ferrous form (Fe^{2+}) to the ferric form (Fe^{3+}), which then combines with oxygen to produce iron oxide, essentially rust. Since the reaction is dependent on oxygen presence it is more likely to be found in areas of the wetted channel where oxygen-poor groundwater is just reaching the surface. Iron oxidizing bacteria can be detected in these areas by looking for the iron oxide waste product, often appearing as a rusty red or orange material in "fluffy" clumps or as a stain within the wetted channel where groundwater enters (Figure 15). Staining can be visible in channels without water present as well. The bacteria can also produce an oily sheen on the water surface that breaks apart when disturbed, though other bacteria can produce a similar sheen. However, a sudden or unusual occurrence may indicate a petroleum product release from an underground fuel storage tank. One way to differentiate iron-oxidizing bacteria from oil releases is to trail a small stick or leaf through the film. If the film breaks up into small islands or clusters, it is most likely bacterial in origin. However, if the film swirls together, it is most likely a petroleum discharge.

Strong – Abundant iron oxidizing bacteria is observed.

Moderate – Some iron oxidizing bacteria is observed.

Weak – Very little iron oxidizing bacteria is observed.

Absent – No iron oxidizing bacteria is observed.

Figure 15: Iron oxidizing bacteria. Figure on right depicts iron bacteria on a twig.

14. Leaf litter

Is leaf litter accumulating in the streambed?

Perennial streams with riparian vegetation should continuously transport plant material through the channel. Leaves and lighter debris are typically present throughout the length of non-perennial streams, whereas little to no leaves are present in streams with constant or

near-constant flow. This indicator may be more difficult to discern during autumn, especially between rain events in areas with deciduous riparian vegetation. Accumulations of organic debris, including leaves, on the upstream side of obstructions are another indicator and are not considered to be leaf litter.

Strong – Abundant amount of leaf litter is present throughout the length of the stream. Greater than 80% of the active channel is covered with leaves and the thalweg substrate is not visible.

Moderate – Leaf litter is present throughout most of the stream's reach with some accumulation beginning on the upstream side of obstructions and in pools. Between 25% and 80% of the active channel bottom is covered with leaves and portions of the thalweg is visible.

Weak – Leaf litter is present and is mostly accumulated in pools.. Between 5% and 25% of the streambed is covered with leaves and most of the thalweg is visible.

Absent – Leaf litter is not present in the fast moving areas of the reach but there may be some present in the pools. Less than 5% of the active channel bottom is covered with leaves. The thalweg is swept clear of leaf litter and the substrate is continuously visible throughout the assessment reach.

15. Sediment on Plants or Debris

Is fine sediment deposited on plants or debris in the channel or on the active floodplain, indicative of recent high flows and suspended sediment transport?

The transportation and processing of sediment is a main function of streams. Therefore, evidence of fine sediment on plants or other debris in the stream may be an important indicator of the persistence of flow and the transport of suspended sediment. Note that sediment production and delivery to streams in stable, vegetated watersheds is usually less than in disturbed watersheds. Look for silt and clay accumulation in thin layers on debris or rooted aquatic vegetation, and on plants and debris on the bank and floodplain immediately adjacent to the stream. Note any upstream land-disturbing activities that may contribute greater amounts of sediment to the stream.

Strong – Fine sediment found readily on plants and debris within the stream, on the streambank, and within the floodplain throughout the length of the stream.

Moderate – Fine sediment found on plants or debris within the stream although not prevalent along the stream.

Weak – Fine sediment is isolated in small amounts along the stream.

Absent – No sediment is present on plants or debris.

16. Organic Drift Lines

Are there accumulations of organic debris in piles or lines in the channel or on the active floodplain indicative of recent high flows?

Organic drift lines are defined as twigs, sticks, logs, leaves, and any other floating materials piled up on the upstream side of obstructions in the stream, on the streambank, in overhanging branches, and/or in the floodplain that indicate high stream flows. Ephemeral streams usually exhibit fewer or no drift lines within their channels unless downstream of a storm drain or areas with high runoff potential. The magnitude of the accumulation of drift may be influenced by watershed characteristics and sources of debris. For example, streams in watersheds dominated by herbaceous vegetation may not exhibit drift lines.

Strong – Large drift lines are prevalent along the upstream side of obstructions within the channel and the floodplain.

Moderate – Large drift lines are dispersed mostly within the channel.

Weak – Small drift lines are present within the channel.

Absent – No drift lines are present.

17. Soil-based Evidence of a Seasonal High Water Table

Is there evidence of a seasonal high water table in the soil at the toe of the stream bank, or the base of a head cut above the elevation of the thalweg of the evaluation reach?

The presence of a seasonal water table in the soil above the thalweg elevation is evidence of groundwater discharge into the channel that sustains an annual extended period of baseflow. In soils with fluctuating water tables near the surface, the level of the seasonal high water table is routinely estimated from soil color variation in soils with silts and clays that have iron and manganese oxides. When the soil is unsaturated and aerobic, chemically oxidizing conditions in the soil water produce oxidized forms of iron and manganese that are precipitates that coat soil particles and produce brown, yellow, and red colors. When the soil is saturated and anaerobic, chemically reducing conditions in the soil water produce reduced forms of iron and manganese that are colorless ions in solution. Gray or neutral low chroma soil colors result because the colors of the soil particles are visible. In sandy soils with very low clay content, long periods of saturation result in accumulation of organic matter that coats the sand grains and produces dark low chroma colors.

In soils with frequent, long periods of saturation the oxidation/reduction reactions of iron and manganese produce color variations called redoximorphic features (formerly called mottles). The degree of development of redoximorphic features is indicative of the frequency and duration of periods of soil saturation. Weakly developed redoximorphic features in the soil at the toe of the bank above the channel bed are common in intermittent streams and indicate the level of the seasonal high water table. Strongly developed redoximorphic features are common in the soils at the toe of banks and in the streambed sediments of perennial streams. Ephemeral streams have oxidized soils in the bed and bank. Types of redoximorphic features are: (1) depleted matrix – matrix color has chroma ≤ 2; (2) depletions – zones of low chroma (≤ 2) within a matrix of higher chroma; (3) concentrations - soft masses or pore linings; zones of accumulation of oxidized iron and manganese, bright yellow, orange, or red colors (Figure 16).

Soil colors are identified with Munsell soil color charts. The matrix color of a soil ped is the color of more than 50% of the face of a broken ped. Use a soil auger to obtain at least three 6-8 inch cores in the toe of the bank above the thalweg elevation in a riffle or shallow zone of the channel. Look for redoximorphic features below by breaking open chunks of soil (peds). Note that non-soil such as relatively young alluvial accumulations of coarse sand, gravel, and cobble in the stream bank or hyporheic zone will not have redoximorphic features or other hydric soil indicators.

YES – In the soil of the stream bank or base of a headcut within at least six inches above the average elevation of riffles or other shallow zones in the thalweg is found a soil layer at least two inches thick that has at least one indicator of a seasonal high water table.

NO – In the soil of the stream bank or base of a headcut within at least six inches above the average elevation of riffles or other shallow zones in the thalweg is found no indicator a seasonal high water table.

Common indicators of a seasonal high water table include <u>but are not limited</u> to:

- More than 60% of the ped face is gleyed, i.e. color is on a gley page of the Munsell
- More than 60% of the ped face is chroma ≤ 2 with or without concentrations
- In streams with floodplains, more than 60% of the ped face is chroma ≤ 4 with 10% or more redox concentrations
- More than 60% of the ped face is chroma ≤ 2 with 10% or more of redox depletions
- In a sandy soil, more than 70% of the sand grains are coated with organic matter
- In a sandy soil, there is streaking or splotches of organic matter
- The soil has mucky mineral texture

16a. Upland Soil (chroma >3) (NC DWQ)

16b. Hydric soil depicting gleying (chroma<2) (NC DWQ)

16c. Low chroma soil with redox concentrations (NC DWQ)

16d. Redox concentrations in sandy soil. (NC DWQ)

Figure 16: Example of Soil Features

C. Biological Indicators

18. Fibrous Roots in Streambed

Are fibrous roots present near the surface of the hyporheic zone in and around the thalweg of the stream?

Fibrous roots are non-woody, small diameter (< 0.10 in), shallow, wide-spreading roots that often form dense masses in the top few inches of the soil. Roots in the root mass can be numerous and are generally of equal diameters. Fibrous roots of plants are those which function in water and nutrient uptake. The persistent presence of water would not allow for oxygen exchange in the roots of water-intolerant plants, limiting the growth of fibrous roots. Frequent high-energy flows that disturb the substrate will also limit their growth. Therefore, a higher score is given for the absence of fibrous roots.

Observe the streambed in or near the thalweg of the stream and determine if very small (fibrous) roots are present. Note that during an extended growing season or dry periods, fast growing fibrous roots may grow across the bottom of a stream that would not be present during normal flow conditions.

Strong – A strong network of fibrous roots is persistent in the stream thalweg and surrounding area.

Moderate – A discontinuous network of fibrous roots is present in the stream thalweg and surrounding area.

Weak – Very few fibrous roots are present anywhere in the streambed.

Absent – No fibrous roots are present.

19. Rooted Upland Plants in Streambed

Are rooted upland plants growing in or near the thalweg area of the stream?

This attribute relates flow to the absence of rooted plants, since flow will often act as a deterrent to plant establishment by removing seeds or preventing aeration to roots. A higher score is given for the absence of rooted plants. Focus should be on the presence of upland (i.e. FAC or drier as listed in the *National List of Vascular Plant Species that Occur in Wetlands: 1996 National Summary* (U.S. FWS, 1997) plants in or near the thalweg of the stream. Plants growing on any part of the bank of the stream should not be considered. Note, however, there will be exceptions to this attribute. For example, rooted plants can be found in shaded perennial streams with moderate flow but in most cases these plants will be water tolerant (FACW or wetter), in which case they should be considered under indicator 26, Wetland Plants in Streambed. Cases where rooted upland plants are present in the streambed may indicate ephemeral or intermittent flow.

Strong –Rooted plants are observed and cover over 75% of the streambed.

Moderate – Rooted plants are observed and cover approximately 20-75% of the streambed.

Weak – Rooted plants are observed and cover less that 20% of the streambed and most are in the thalweg.

Absent – No rooted plants are observed.

20. Benthic Macroinvertebrates

"Benthic macroinvertebrates" is a broad term applied to many different types of invertebrates that live on or within the stream substrate. In a broad sense, this term can be applied to a wide range of animals that live in this zone. *Crayfish and mollusks are assessed separately in this method, so this indicator is meant to assess primarily aquatic insects (i.e., mayflies, stoneflies, caddisflies, hellgrammites, midges), amphipods, isopods, and annelids (worms and leeches).*

The larval stages of many aquatic insects (Figure 17) are well-established indicators of flow duration since a continuous aquatic habitat is required for these species to mature. Though insects are defined in part by having three pairs of legs, this characteristic can be difficult to see or non-existent in some larvae. There is great variability in appearance, from legless, soft, "wormlike" or "maggotlike" forms (e.g., true flies [Order Diptera]); grub-like forms with variably hardened body sections and obvious legs (e.g., caddisflies [Order Trichoptera] and some beetle larvae [Order Coleoptera]); to more complex and distinctive body forms (e.g., mayflies [Order Ephemeroptera], stoneflies [Order Plecoptera], hellgrammites [Order Megaloptera], and dragonflies and damselflies [Order Odonata]). In general, caddisflies, mayflies, stoneflies, and damselflies are very good indicators of at least intermittent (and in many cases, perennial) flow. These are discussed more fully in Section 3 – Guidance for the Determination of Perennial Streams.

Examine rocks and sticks in the stream and use a small net to sample a variety of habitats including riffles, pools, roots, undercut banks, leaf packs and the substrate. Note both the

quantity as well as the diversity of the macroinvertebrate sample on the field form when scoring.

Strong – Abundance and/or a large diversity of macroinvertebrates are present and readily found.

Moderate – Several macroinvertebrates (abundance and/or diversity) are present and found relatively quickly.

Weak – One or two macroinvertebrates are present OR several tolerant macroinvertebrates (e.g., amphipods) are present.

Absent – No macroinvertebrates are present.

Caddisfly: *Diplectrona sp*

Stonefly*: Eccoptera sp*.

Figure 17: Benthic Macroinvertebrates

21. Aquatic Mollusks

Aquatic mollusks are invertebrate animals with a soft body enclosed at least partially by a hardened shell, such as clams, mussels, snails, and limpets. Bivalves (mollusks with two shells, Class Bivalvia) include clams or mussels, and are often highly dependent on water presence for survival. Snails (mollusks with a coiled shell, Class Gastropoda) can have either gills (and therefore more dependent on the presence of well-oxygenated water) or primitive lungs (and therefore are “air breathers” that are more tolerant of drier conditions). Gilled snails can be identified by the presence of an operculum (somewhat hardened plate) that closes off the opening of the snail’s shell, and generally the shells are “right-handed”, i.e., the opening is on the right when held facing you and the point of the shell is up. Lunged snails will never have an operculum and they are generally “left-handed”. Limpets (Class Gastropoda, Family Ancylidae) are a type of lunged snail with a cone-like shell (not coiled as in other snails) though they are thought to obtain oxygen mainly through diffusion over their entire body surface (Voshell 2002). To find mollusks, one should examine various habitats: hard substrates, such as sticks and rocks for clams and snails, silty areas of the stream bed for clams, leaves for limpets and aquatic plants for snails. Fingernail clams (Figure 18) are often smaller than pea-sized, so careful examination may be required to find them in the silty substrates they prefer. A small net may be useful and the mollusk search may be part of the larger search for macroinvertebrates. Scoring of the indicator includes abundance and/or diversity.

Strong – Abundance and/or a large diversity of mollusks are present and readily found.

Moderate – Several mollusks are present and found relatively quickly.

Weak – One or two mollusks are present.

Absent – No mollusks are present.

Figure 18: Fingernail claims (NC DWQ 1998)

22. Fish

Fluctuating water levels of intermittent streams provide unstable and stressful habitat conditions for fish communities. When looking for fish, all available habitats should be observed, including pools, riffles, root clumps, and other obstructions. In small streams, the majority of species usually inhabit pools and runs. Fish should be easily observed within a minute or two. Fish will seek cover once alerted to your presence, so be sure to look for them slightly ahead of where you are walking along the stream. Check several areas along the stream sampling reach, especially underneath undercut banks. In most cases, fish are indicators of perennial streams, since fish will rarely inhabit an intermittent stream. *Gambusia* (mosquitofish) should not be considered as a perennial indicator due to their extremely short life cycle and tolerance for stressful conditions, such as low oxygen levels, but may be considered as present for this indicator.

Strong – Many fish (>3) are readily observed.

Moderate – Several fish (2-3) are observed.

Weak – One fish is observed.

Absent – No fish are observed.

23. Crayfish

Most species of crayfish are associated with aquatic or wet environments such as streams and wetlands. A small net can be used to examine small pools, under rocks, under logs,

sticks or within leaf packs in the stream for crayfish. Crayfish associated with small holes or "chimneys" in the muddy streambank or floodplain may be indicators of wet soils (wetlands) rather than streams. The presence of chimneys should not be considered for this metric.

Strong – Several (3 +) or very large crayfish are present and were found quickly.

Moderate – A few (1-2) crayfish are present.

Weak – One crayfish is present.

Absent – No crayfish are present.

24. Amphibians

Amphibians such as salamanders, frogs, and toads require water, or at least moist conditions, for egg laying and larval development. Many salamander species' immature, gilled larvae require aquatic environments until they transform to adults. All frogs and toads lay their eggs in fresh water and tadpoles (the larval form of toads and frogs) require water for development.

Older (>1 year old) salamander larvae can be a very good indicator of relatively permanent waters. Abundance of one species (Southern Two-Lined Salamanders, *Eurycea cirrigera*) has been found to be positively correlated with watershed area in headwater streams, and the presence of >1 year-old larvae was found to be an indicator of perennial water (Johnson et al. 2009). This same study did not find any larval salamanders in any ephemeral streams, suggesting that their presence, regardless of age, suggests at least intermittent flow.

The tadpoles of many species of frogs and toads require 2-3 months before final metamorphosis to adult occurs. However, the very large tadpoles of the American Bullfrog (*Rana catesbeiana*), River Frog (*Rana heckscheri*), and Carpenter Frog (*Rana virgatipes*) require a year or more before metamorphosis to adults. When large specimens of these species are found, it is a strong indicator of the presence of water over several seasons.

Seasonality may have to be considered when assessing this indicator. Many species of salamanders in the piedmont and coastal plain areas of NC have a relatively short larval stage and develop from egg to adult over a single fall-to-spring period, so their presence may not be as strong of an indicator of perennial flow during this time of the year in this area of the state unless species can be definitively identified. In the mountain ecoregion of NC, salamander diversity is much higher with more varied life histories, including many more species with longer larval stages, so this rule of thumb may not apply in these areas of the state. Many tadpoles develop from egg to adult over the summer, suggesting that their presence during this time of year is a strong indicator of perennial flow, as this is usually the driest portion of the year.

Salamanders (Figure 19) and tadpoles can be found under rocks, on stream banks and on the bottom of the stream. They may also appear in the benthic sample. Frogs and tadpoles typically inhabit the shallow, slower moving waters of the pools and near the sides of the bank. Amphibian eggs, also included as an indicator, can be located on the bottom of rocks and in or on other submerged debris. They are usually observed in gelatinous clumps or strings of eggs.

Figure 19: Salamander

Strong – Abundance and/or a large diversity of amphibians are present and readily found.

Moderate – A few (2-3) amphibians are present and found relatively quickly.

Weak – One amphibian is present.

Absent – No amphibians are present.

25. Algae

Benthic algae are photosynthetic organisms that live on substrates in the stream, such as on rocks, sticks, leaves, or plants. These algae can take the form of long, hair-like filaments, a crust-like coating, or as an invisible (but palpable) slimy biofilm growing on appropriate substrates. The most commonly seen in streams include blue-green algae (actually more accurately classified in the bacterial phylum Cyanobacteria), green algae (algal division Chlorophyta), and diatoms (algal division Bacillariophyta) (Stevenson, 1996). Benthic algal abundance is strongly influenced by the amount of sunlight reaching the stream, relative rate of stream discharge, availability of appropriate substrates, and level of nutrient enrichment. Look for green or blue-green filaments or mats, or golden brown "crusts" on appropriate substrates within the wetted channel. Also feel submerged rocks, plants, leaves, sticks, or other available substrates; a "slimy" coating can indicate a biofilm consisting of a mix of diatoms, other algae, bacteria, and fungus that is collectively referred to as periphyton, and should also be considered when rating this indicator.

Strong – Abundant algae is observed throughout the reach.

Moderate – Some algae is observed in a few locations in the reach.

Weak – Very little algae is observed through the reach.

Absent – No algae is observed through the reach.

20a. Filamentous algae, Source: www.duluthstreams.org

20b. Filamentous algae Source: www.aquafiber.com

Figure 20: Algae

26. Wetland Plants in Streambed (FACW and wetter)

The U.S. Army Corp of Engineers wetland delineation procedure utilizes a plant species classification system upon which soil moisture regimes can be inferred. This same system can be used to infer the duration of soil saturation in streams. Small, low gradient, low velocity intermittent and perennial streams with adequate sunlight will often have OBL (obligate wetland) and FACW (facultative wetland) plants, aquatic bryophytes such as *Fontanalis*, or submerged aquatic vegetation growing in the stream bed. All wetland designations are defined by *National List of Vascular Plant Species that Occur in Wetlands: 1996 National Summary* (U.S. FWS 1997).

OBL: Obligate Wetland, occurs almost always (estimated probability 99%) under natural conditions in wetlands.

FACW: Facultative Wetland, usually occurs in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.

FAC: Facultative, Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).

FACU: Facultative Upland, Usually occurs in non-wetlands (estimated probability 67%-99%), but occasionally found on wetlands (estimated probability 1%-33%).

UPL: Obligate Upland, Occurs in wetlands in another region, but occurs almost always (estimated probability 99%) under natural conditions in non-wetlands in the regions specified. If a species does not occur in wetlands in any region, it is not on the National List.

SECTION 3 – Guidance for the Determination of Perennial Streams

Background

The NC DWQ utilizes a numerical cutoff of 19 points with this evaluation form as an appropriate value to classify a stream as at least "intermittent". As part of an investigation for the City of Greensboro, personnel with Law Engineering and Environmental Services (now MacTec Environmental Services), with the support of NC DWQ personnel, used a modification of the NC DWQ stream classification method and recommended a numerical cutoff for a perennial stream origin in the piedmont of 30 points (Lawson, et al. 2002).

Recent and on-going Investigations

NC DWQ biologists have been looking for the presence of long-lived aquatic species as reliable determinants for perennial channels. These investigations suggest that the presence of a select group of benthic macroinvertebrates that require water for their entire life cycles (aquatic taxa) is a reliable method to determine the origins of perennial channels. A proposed list of these organisms is included with this policy revision (Tables 2 and 3). The NC DWQ is currently completing an investigation of the ecological functions of intermittent streams. Results from this federally funded investigation also have corroborated the technique of using a suite of aquatic insect taxa to determine perennial stream origins. Additionally, research related to headwater stream mapping is defining physical and hydrologic characteristics of intermittent and perennial origins.

NC DWQ Policy for the Definition of Perennial Stream Origins

A perennial stream is defined as a well-defined channel that contains water year round during a year of normal rainfall[1] with the aquatic bed located below the water table for most of the year (15A NCAC 2B.). This definition also notes that perennial streams exhibit the typical biological, hydrologic, and physical characteristics commonly associated with the continuous conveyance of water.

A stream is perennial when any of the following criteria are met:

1. Biological indicators such as fish (except *Gambusia)*, crayfish (in channel), amphibians (larval salamanders and large, multi-year tadpoles), or clams are present. If only crayfish or fingernail clams are present, a numerical value of at least 18 on the geomorphology section of the most current version of the NC DWQ stream classification form is required.

   OR

2. A numerical value of at least 30 points is determined from the most recent version of the NC DWQ stream identification form[2].

   OR

[1] Normal Rainfall is defined as the 30 year average, provided by NOAA National Climatic Data Center, computed at the end of each decade. These data are available as annual and monthly means.

[2] Use of this form requires Division-based (NC DWQ) or approved training (or appropriate certification in accordance with GS 143-214.25)

3. More than one benthic macroinvertebrate that requires water for their entire life cycles are present as later instar larvae[3]. A list of the benthic organisms commonly collected by NC DWQ biologists during perennial stream determinations are shown in Tables 2 and 3.

NC DWQ staff suggest that a stream be examined using these three criteria in the sequence above – namely, a field examination should first look for criterion 1 and then criterion 2. If the channel does not meet either of these two criteria and the field biologist believes the channel to be perennial, then the third criterion should be utilized, however identification by a well-trained aquatic entomologist is required for the proper use of this criterion. In most instances, the use of either of the first two criteria should be sufficient to make a stream determination.

Table 2: Ephemeroptera, Plecoptera and Trichoptera (EPT) perennial stream indicators

Order:	**Ephemeroptera (Mayflies)**	**Plecoptera (Stoneflies)**	**Trichoptera (Caddisflies)**
Family:	Baetidae	Peltoperlidae	Hydropsychidae
	Caenidae	Perlidae	Lepidostomatidae
	Ephemerellidae	Perlodidae	Limnephilidae
	Ephemeridae		Molannidae
	Heptageniidae		Odontoceridae
	Leptophlebiidae		Philopotamidae
	Siphlonuridae		Polycentropidae
			Psychomyiidae
			Rhyacophilidae

Table 3: Additional indicators of perennial streams

	Megaloptera	**Odonata**	**Diptera**	**Coleoptera**	**Mollusca**
Family:	Corydalidae	Aeshnidae	Ptychopteridae	Elmidae	Unionidae
	Sialidae	Calopterygidae		Psephenidae	Ancylidae
		Cordulegastridae			Planorbidae
		Gomphidae			Pleuroceridae
		Libellulidae			
Family & ***Genus:***			Tipulidae *Tipula* sp.	Dryopidae *Helichus* (adult)	

[3] Recognition and/or identification of these organisms will require Division-based (NC DWQ) or approved training.

Special Provision for Coastal Plain Perennial Streams

Reduced topography, which causes fewer channel-forming features, can make the geomorphology section of the stream form problematic in the Middle Atlantic Coastal Plain and Southeastern Plains ecoregions (Griffith et. al. 2002) – approximately east of I-95. In this area, biology should take precedence over geomorphology for determining a stream. Therefore the criteria should be utilized in the following sequence: 1, 3, and then 2.

History of the Guidance for the Determination of the Origin of Perennial Streams

Version 1.0 – Developed in 1997/1998. Fish, salamanders, turtles, crayfish and multiyear (large) tadpoles were used as indicators.

Version 2.1 – Added stoneflies, mayflies and caddisflies

Version 2.2 – Added section about the coastal plain

Version 2.3 – Added taxa lists (Tables 5 and 6)

Version 2.4 – Effective February 28, 2005. Added tables of macroinvertebrate taxa found in perennial streams. Issued for public comment October 13, 2004.

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NC DWQ Stream Identification Form Version 4.11

Date:	**Project/Site**:	**Latitude:**
Evaluator:	**County:**	**Longitude:**
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30**	**Stream Determination (circle one)** **Ephemeral Intermittent Perennial**	**Other** *e.g. Quad Name*:

A. Geomorphology (Subtotal =_____)	Absent	Weak	Moderate	Strong
1[a.] Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = _____)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = _____)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

GENERAL CONDITIONS

These Instructions will apply unless a particular item is specifically addressed in the solicitation document or not relevant to the particular type of good or service.

1. SCOPE OF WORK

The Contract will be to provide to the City in accordance with the Contract Documents. All work shall be performed in accordance with the Specifications attached hereto.

2. REGULATIONS

2.1 The Contractor shall comply with all applicable federal, state and local laws, ordinances, rules and regulations pertaining to the performance of the work specified herein.

2.2 The Contractor shall obtain all permits, licenses and certificates, or any such approvals of plans or specifications as may be required by Federal, State and local laws, ordinances, rules and regulations, for the proper execution of the work specified herein.

2.3 During the performance of this Contract, the Contractor shall keep current and, if requested by the City, provide copies of any and all licenses, registrations or permits required by applicable governing agencies. The Contractor shall keep a copy of any and all licenses, registrations and permits on the job site while performing the Contract work.

3. WORK HOURS

3.1 The Contractor shall normally perform on-site work during Standard Work Hours which are between 8:00 a.m. and 5:00 p.m., Monday through Friday, excluding City's observed holidays. The City may require the Contractor to perform work on the city's premises during Non-standard Work Hours which are outside the Standard Work Hours. Non-standard Work Hours may be arranged with prior written approval of the City. The Contractor shall advise the City no less than 48 hours in advance of its projected work schedule. The Contractor shall perform no work during City observed holidays without the prior written permission of the City.

3.2 In the event an emergency condition is declared by the City's Manager or his respective designee, the Contractor will perform work during such hours as requested by the City.

3.3 Work can be performed away from the City's premises, but in all cases, such work must be maintained and documented on the City's servers (shared drives accessed via a VPN, etc.)

4. CONTRACTOR'S PERSONNEL

4.1 The Contractor will abide by all State and Federal regulations on wages and hours of an employee dealing with the employment relationship between the Contractor and its subsidiaries or related parties and its employees, including but not limited to the Federal National Labor Relations Act, the Federal Fair Labor Standards Act, the Federal Civil Rights Act of 1964, as amended, and the Americans with Disabilities Act.

4.2 The Contractor shall require all prospective employees to show proof of citizenship, or proof from the United States Immigration and Naturalization Service of valid entry permits and/or work permits for legal aliens and proof that such legal aliens are eligible to be employed in the United States. This includes any requirement for participation in the DHS e-Verify or SAVE program.

4.3 Should the Contractor engage employees who are illiterate in English, it will be the Contractor's responsibility and obligation to train such employees to be able to identify and understand all signs and notices in and/or around the areas that relate to them or the services being performed by them pursuant to this Contract. In addition, the Contractor will have someone in attendance at all times who can communicate instructions to said employee.

4.4 The Contractor shall maintain a drug-free workplace within the meaning of the Georgia Drug-free Workplace Act. No employee shall be hired by a Contractor for work on the City's premises prior to such employee having tested negative for drugs. In addition, existing employees of the Contractor must be subject to drug testing by the Contractor upon reasonable suspicion of drug use. Results of all such drug tests are to be retained by the Contractor. Copies shall be provided to the City, if requested.

4.5 The Contractor shall transfer promptly from the City any employee or employees that the City advises are not satisfactory, and replace such personnel with employees satisfactory to the City; but in no event shall the City be responsible for monitoring or assessing the suitability of any employee or agent of the Contractor.

4.6 The Contractor's employees shall be instructed that no gratuities shall be solicited or accepted for any reason whatsoever from the tenants, customers or other persons at the City. The Contractor shall be responsible for ensuring that all articles found by its employees on the City's premises are turned over to the City or the City's designated agent in charge of such articles.

4.7 A valid driver license (Commercial Driver License, if applicable) will be required of all personnel operating motor vehicles or motorized equipment on roadways in or around the City.

4.8 While working on city property all Contractors' employees shall wear (when appropriate) neat-appearing business casual attire or uniforms with the company name and/or logo and footwear of a style that complies with all legal and safety requirements, including and without limitation, the requirements of OSHA.

4.9 Designation of Project Manager - The Contractor shall designate a Project Manager acceptable to the City for all purposes related to this Specification.

4.9.1 The Project Manager shall be fully responsible for the Contractor meeting all of its obligations under this Contract. The Project Manager shall provide the City with an appropriate status report on the progress of the project every week, as well as conduct weekly team status review calls or meeting with the City during the Contract term, the day to be mutually determined as part of the Project Plan. This report may be delivered by facsimile, e-mail, U.S. postal service, or private carrier, provided it is delivered in a timely manner.

4.9.2 The Project Manager shall be available, as reasonably required, to be on-site during necessary times. Such times shall be discussed between the Project Manager and the City, but the final required times will be at the City's discretion.

4.9.3 In the event that the designated Project Manager terminates employment with the Contractor, or is requested by the City to be removed from the role of Project Manager (as provided in Section 4.5), the position shall be assumed by an individual with equivalent qualifications, experience, and knowledge. Such replacement shall require the City's prior approval.

4.9.4 The Contractor shall not replace the approved Project Manager without written approval of the City, which approval will not be unreasonably withheld.

4.10 The process by which the implementation partner requests the removal of a team member from the project. If a Contractor replaces a proposed team member, the Contractor shall replace that team member with a new team member of similar experience. The City reserves the right to accept or reject any proposed or replacement team member, with or without cause, at any time during the duration of the project.

5. ITEMS PROVIDED BY THE CITY

5.1 Work Location. It shall be the sole responsibility of the Contractor to provide for project team work locations.

5.2 Uninterruptible Power Supply (UPS). It shall be the sole responsibility of the Contractor to provide for project team all necessary UPS.

5.3 Printers. It shall be the sole responsibility of the Contractor to provide for project team all necessary printers.

5.4 Office Space. It shall be the sole responsibility of the Contractor to provide for project team all necessary office space.

5.5 Utility Services. It shall be the sole responsibility of the Contractor to provide for project team all necessary utility services.

5.6 Employee Parking. It shall be the sole responsibility of the Contractor to provide for project team all necessary parking.

6. TOOLS AND EQUIPMENT

It shall be the sole responsibility of the Contractor to provide for project team all tools, parts and equipment necessary to perform work under this Contract.

7. PERFORMANCE REQUIREMENTS

7.1 The Contractor shall perform all of its obligations and functions under the Contract in accordance with the Contract specifications, industry standards and any manufacturers' specifications. The Contractor shall adjust and coordinate its activities to the needs and requirements of the City and perform its activities so as not to annoy, disturb, endanger, unreasonably interfere with or delay the operations or activities of the City.

7.2 The Contractor's personnel shall perform work in a neat and professional manner, and in compliance with all Federal, State, and City of Dunwoody regulations and OSHA rules and regulations shall be followed at all times.

7.3 Dates for commencement and completion of work shall be coordinated with the City's Authorized Representative.

7.4 Any work required beyond that which is specified herein shall be reported in advance to the City. At no time shall work beyond the scope be performed without prior written authorization from the City.

7.5 The Contractor shall utilize maximum safety precautions. Tools and equipment will be in a good state of repair, safe to use, and be used in the manner in which they were intended. The Contractor is required to inform all workers and concerned persons of the Material Safety Data on all products being utilized on this project. No materials or equipment will be left unattended or stored on the project site at any time.

7.6 The Contractor will make a reasonable effort to reply to e-mails and phone calls from City personnel within 1 business day. When a response is anticipated to take more than 1 business day to prepare, the Contractor will acknowledge the request immediately and provide an estimated time to deliver the complete response. In addition, the contractor shall make every reasonable effort to respond to formal written communication from the City within 3 business days of receipt.

8. CONFIDENTIAL INFORMATION

8.1 In the course of performing the Contract work, the Contractor may gain access to security-sensitive and other sensitive information of the City.

8.2 The Contractor agrees to hold all City data and information in confidence and to make such information known only to its employees and subcontractors who have a legitimate need to know such information and only after advising such persons of the Contractor's non-disclosure obligations.

8.3 The Contractor shall seek the City's prior written consent before using for any purpose other than the fulfillment of the Contractor's obligations hereunder, or before releasing, disclosing, or otherwise making such information available to any other person.

8.4 The Contractor shall employ such practices and take such actions to protect the City's information from unauthorized use or disclosure as the Contractor employs and takes to protect its own information, but in no event shall the Contractor use less than reasonable efforts to protect the City's information.

8.5 The provisions of this Section shall survive the expiration or earlier termination of the Contract.

9. USE OF PREMISES

During the progress of the work specified herein, the Contractor shall keep the premises free from accumulation of waste materials, and other debris resulting from the work. At the completion of each work day, the Contractor shall remove daily all waste materials and debris from, and about the premises as well as tools, equipment, machinery and surplus material, and leave the site clean and ready for occupancy by the City.

10. SAFETY AND PROTECTION

The Contractor shall be solely and completely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to all employees on the work site and other persons including, but not limited to, the general public who may be affected thereby.

11. COMPENSATION - INVOICE AND PAYMENT FOR SERVICES

11.1 The City shall pay the Contractor, subject to any authorized deductions, the applicable prices set forth for each service authorized by the City, and actually delivered or performed, as the case may be, by the Contractor to the satisfaction and acceptance, as appropriate, of the City. The timing of such payments shall be as set forth below in this Section.

11.2 The City shall pay the Contractor the price as set forth within 30 days after completion of the services, or 30 days after the City's receipt of the invoice, whichever is later. The Contractor shall invoice the City for the implementation services that were completed and accepted under the Contract, accompanied by such supporting documentation and other backup material as the City may reasonably require.

11.3 The Contractor shall invoice with such supporting documentation and other backup material as the City may reasonably require.

11.4 The Contractor shall deliver to the City for approval and acceptance, and before eligible for final payment of any amounts due, all documents and material prepared by the Contractor for the City under this Contract.

11.5 The City shall pay the undisputed amount of the Contractor's invoice, as it may be reduced to reflect unsubstantiated or unsatisfactory services. Items in dispute shall be paid upon the resolution of the dispute. No verification or payment of any amounts invoiced shall preclude the City from recovering any money paid in excess of that due under the terms of this Contract.

11.6 The Contractor shall be obligated to pay promptly all proper charges and costs incurred by the Contractor for labor and materials used for the work performed hereunder. The City shall have the right, but not the obligation, to pay directly to third parties (including subcontractors) all past due

amounts owed by the Contractor to third parties for labor and materials used for the work hereunder, based on invoices submitted by such third party, and all such amounts paid by the City shall be applied toward, and shall reduce, amounts owed to Contractor hereunder.

11.7 The Contractor shall submit all invoices to: City of Dunwoody, GA, Accounts Payable, 41 Perimeter Center East, Suite 250, Dunwoody, GA 30346.

12. COMPLIANCE WITH LAWS AND REGULATIONS

12.1 The Contractor shall perform its obligations and functions hereunder in compliance with the applicable laws of the United States, the State of Georgia, DeKalb County, the City of Dunwoody, any applicable rules, regulations or directives of any agency thereof, and the applicable regulations of the City. OSHA rules and regulations shall be followed at all times. The City shall have the right (but not the obligation) to contest or challenge by any means whatsoever any law, regulation, rule or directive which in any way affects or otherwise impacts upon the Contractor's performance of its obligations and functions hereunder; the Contractor shall cooperate to the fullest extent and take whatever action (including becoming a party in any litigation) the City should reasonably request in connection with any such challenge or contest by the City.

12.2 The Contractor shall obtain and keep current all licenses, permits and authorizations, whether municipal, county, state or federal, required for the performance of its obligations and functions hereunder and shall pay promptly when due all fees therefore.

12.3 The Contractor shall abide by all applicable state and federal regulations pertaining to wages and hours of an employee; including but not limited to the Contractor’s compliance with requirements of the Official Code of Georgia Annotated and relevant State Rules and Regulations.

13. CONTRACTOR'S LIABILITY

The Contractor shall be responsible for the prompt payment of any fines imposed on the City or the Contractor by any other federal, state or local governmental agency as a result of the Contractor's, or its subcontractor's (or the officers’, directors’, employees’ or agents’ of either), failure to comply with the requirements of any law or any governmental agency rule, regulation, order or permit. The liability of the Contractor under this Section 13 is in addition to and in no way a limitation upon any other liabilities and responsibilities which may be imposed by applicable law or by the indemnification provisions of Section 14 hereof, and such liability shall survive the expiration or earlier termination of this Contract.

14. INDEMNIFICATION AND INSURANCE

14.1 The Contractor shall indemnify, defend and hold completely harmless the City, and the members (including, without limitation, members of the City's Council, and members of the citizens’ advisory committees of each), officers, employees and agents of each, from and against any and all liabilities (including statutory liability and liability under Workers' Compensation Laws), losses, suits, claims, demands, judgments, fines, damages, costs and expenses (including all costs for investigation and defense thereof, including, but not limited to, court costs, paralegal and expert fees and reasonable attorneys' fees) which may be incurred by, charged to or recovered from any of the foregoing by (i) reason or on account of damage to or destruction or loss of any property of the City, or any property of, injury to or death of any person resulting from or arising out of or in connection with the performance of this Contract, or the acts or omissions of the Contractor's directors, officers, agents, employees, subcontractors, licensees or invitees, regardless of where the damage, destruction, injury or death occurred, unless such liability, loss, suit, claim, demand, judgment, fine, damage, cost or expense was proximately caused solely by the City's negligence or by the joint negligence of the City and any person other than the Contractor or the Contractor's directors, officers, agents, employees, subcontractors, licensees, or invitees, or (ii) arising out of or in connection with the failure of the Contractor to keep, observe or perform any of the covenants or agreements in this Contract which are required to be kept, observed or performed by the Contractor, or (iii) arising out of or in connection with any claim, suit, assessment or judgment prohibited by Section 14.4 below by or in favor of any person described in Section 14.5 below, or (iv) arising out of or in connection with any action by Contractor or its directors, officers, agents, employees, subcontractors, licensees or invitees. The City

agrees to give the Contractor reasonable notice of any suit or claim for which indemnification will be sought hereunder, to allow the Contractor or its insurer to compromise and defend the same to the extent of its interests, and to reasonably cooperate with the defense of any such suit or claim. In carrying out its obligations under this section, the Contractor shall engage counsel reasonably acceptable to the City. In any suit, action, proceeding, claim or demand brought in respect of which the City may pursue indemnity, the City shall have the right to retain its own counsel, but the fees and expenses of such counsel shall be at the expense of the City unless (1) the Contractor and the City shall have mutually agreed to the contrary, (2) the Contractor has failed within a reasonable time to retain counsel reasonably satisfactory to the City, or (3) the City and the Contractor are both named parties in any such proceeding and, in the sole judgment of the City, representation of both the City and the Contractor by the same counsel would be inappropriate due to actual or potential differing interests between them. The indemnification provisions of this Section 14 shall survive the expiration or earlier termination of this Contract with respect to any acts or omissions occurring during the term of the Contract.

14.2 In addition to indemnification provisions stated above, if the City's use of any service, software, firmware, programming, or other item provided by or on behalf of the Contractor is enjoined due to infringement of another person or entity's intellectual property rights, the Contractor shall promptly, at its sole cost and expense, modify the infringing item so that it no longer infringes, procure for the City the legal right to continue using the infringing item, or procure for the City a non-infringing item, or procure for the City a non-infringing replacement item having equal or greater functional capabilities as the infringing item.

14.3 The Contractor shall assume all responsibility for loss caused by neglect or violation of any state, federal, municipal or agency law, rule, regulation or order. The Contractor shall give to the proper authorities all required notices relating to its performance, obtain all official permits and licenses, and pay all proper fees and taxes. It shall promptly undertake proper monetary restitution with respect to any injury that may occur to any building, structure or utility in consequence of its work. The Contractor will notify the City in writing of any claim made or suit instituted against the Contractor because of its activities in performance of the Contract.

14.4 No recourse under or upon any obligation, covenant or agreement contained in this Contract, or any other agreement or document pertaining to the work or services of the Contractor hereunder, as such may from time to time be altered or amended in accordance with the provisions hereof, or any judgment obtained against the City, or by the enforcement of any assessment or by any legal or equitable proceeding by virtue of any statute or otherwise, under or independent of this Contract, shall be had against any member (including, without limitation, members of the City's Council, or members of the citizens advisory committees of each), any officer, employee or agent, as such, past, present, or future of the City, either directly or through the City or otherwise for any claim arising out of or in connection with this Contract or the work or services conducted pursuant to it, or for any sum that may be due and unpaid by the City. Any and all personal liability of every nature, whether at common law or in equity, or by statute or by constitution or otherwise, of any such member, officer, employee, or agent, as such, to respond by reason of any act or omission on his or her part or otherwise for any claim arising out of or in connection with this Contract or the work or services conducted pursuant to it, or for the payment for or to the City, or any receiver therefore or otherwise, of any sum that may remain due and unpaid by the City, is expressly waived and released as a condition of and in consideration of the execution of this Contract and the promises made to the Contractor pursuant to this Contract.

14.5 In any and all claims against the City, or any of their officers, members, agents, servants or employees, by any employee of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation of the Contractor under this Section 14 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefit payable by or for the Contractor or any subcontractor under Workers' Compensation Acts, disability benefit acts or other employee benefit acts.

14.6 No provisions of Section 14 herein shall be construed to negate, abridge, or otherwise reduce any other right of indemnity that the City may have as to any party or person described therein.

14.7 Insurance

14.7.1 General Liability and Automobile Liability. The Contractor shall purchase and maintain in force during the term of the Contract, at its own cost and expense, to protect the Contractor, the City, and the members (including, without limitation, all members of the governing City's Council and the citizens' advisory committees of each), officers, agents, and employees of each, from and against any and all liabilities arising out of or in connection with the Contractor's performance of the Contract work:

(1) Commercial general liability insurance with coverage of not less than ONE MILLION DOLLARS ($1,000,000.00) combined single limit per occurrence, and with contractual liability coverage for Contractor's covenants to and indemnification of the City under the Contract, and

(2) Automobile liability insurance with policy limits of not less than ONE MILLION DOLLARS ($1,000,000.00) combined single limit per accident or occurrence covering each motor vehicle operated on City property.

14.7.1.1 Self-Insured Retention. Contractor's commercial general liability insurance policies shall not be subject to a self-insured retention exceeding $10,000, if the value of the Contract is less than $1,000,000, and not be subject to a self-insured retention exceeding $100,000, if the Contract is $1,000,000 or more, unless approved by the City Manager. Contractor's automobile liability insurance policies shall not be subject to a self-insured retention exceeding $10,000, unless approved by the City Manager.

14.7.1.2 Additional Insured Endorsement. Contractor agrees and shall cause the City their members (including, without limitation, members of the City's Council and members of the citizens' advisory committees of each), officers, employees, and agents to be named as additional insured's under such policy or policies of commercial general and automobile liability insurance.

14.7.2 Workers' Compensation and Employer's Liability. If Contractor has any employee working on City property, Contractor shall procure and maintain in force during the term of the Contract (i) workers' compensation insurance, and (ii) employer's liability insurance. The policy limits of the Contractor's employer's liability insurance shall not be less than $100,000 for "each accident," $500,000 for "disease policy limit," and $100,000 for "disease each employee." If the Contractor is self insured, the Contractor shall provide proof of self-insurance and authorization to self-insure as required by applicable state laws and regulations.

14.7.3 Professional Liability Insurance. The Contractor shall purchase and maintain in force during the term of the Contract, Professional Liability insurance which will pay for damages arising out of errors or omissions in the rendering, or failure to render professional services under the Contract in the amount of at least ONE MILLION DOLLARS ($1,000,000.00) per claim. Such insurance must contain nose and tail coverage to include work performed by the Contractor from the project's inception date and until such time as the Statue of Limitations has run for the work done on the project.

14.7.4 Deductibles. The Contractor's policies of insurance required by this Section 14.7 may require the Contractor's payment of a deductible, provided the Contractor's insurer is required to pay claims from the first dollar at 100% of the claim value without any requirement that the Contractor pay the deductible prior to its insurer's payment of the claim.

14.7.5 Other Insurance Requirements. All insurance policies required by this Section 14.7 shall provide that they are primary insurance with respect to any other valid insurance the City may possess, and that any other insurance the City does possess shall be considered excess insurance only. All such insurance shall be carried with a company or companies which meet the requirements of Section 15.2 of these General Conditions, and said policies shall be in a form satisfactory to the City. A properly completed and executed Certificate of Insurance on a form provided or approved by the City (such as a current ACORD certificate of insurance) evidencing the insurance coverage required by this Section shall be furnished to the City upon the Contractor's execution of the Contract. The Contractor shall provide the City with at least thirty (30) days' prior written notice of any adverse material change in the Contractor's required insurance coverage except that ten (10) days notice of cancellation for non-payment is required. For purposes of this Section, an "adverse material change" shall mean any reduction in the limits of the insurer's liability, any reduction, non-renewal or cancellation of any insurance coverage, or any increase in the Contractor's self-insured retention. Prior to the expiration of any such policy, the Contractor shall file with the City a certificate of insurance showing that such insurance coverage has been renewed. If the insurance coverage is canceled or reduced, the Contractor shall, within five (5) days after such cancellation or reduction in coverage, file with the City a certificate showing that the required insurance has been reinstated or provided through another insurance company or companies approved by the City. If the Contractor fails to obtain or have such insurance reinstated, the City may, if it so elects, and without waiving any other remedy it may have against the Contractor, immediately terminate this Contract upon written notice to the Contractor. The City Manager shall have the right to alter the monetary limits or coverage herein specified from time to time during the term of this Contract, and the Contractor shall comply with all reasonable requests of the City Manager with respect thereto.

15. SURETY BONDS/LETTERS OF CREDIT/LIABILITY INSURANCE

15.1 A surety Bond/Letter of Credit is not required for this Contract.

15.2 Liability Insurance Companies furnishing insurance coverage required by these General Conditions shall (a) be approved to issue insurance policies in the State of Georgia, and (b) must have no less than a "B+" Financial Rating and a Financial Size Category of "Class VI" or higher according to the most current edition of A.M. Best's Insurance Reports. If the liability insurer is rated by A.M. Best's Insurance Reports at an "A-" Financial Rating and a Financial Size Category of "Class VIII" or higher than the City Manager may waive the requirement for the insurer to be approved by the State of Georgia.

16. CONTRACT ADJUSTMENTS

16.1 Notwithstanding any provision herein to the contrary, the City reserves the right to modify at any time the nature, method, scope, frequency, or timing of the Contractor's obligations under this Contract (Contract Adjustments) in whatever manner it determines to be reasonably necessary for the proper completion of the Contractor's work hereunder. Both parties agree that, should any Contract Adjustments be made, the Contractor's compensation and the amount of the Performance Bond or Letter of Credit required, will be adjusted accordingly, in such amount or amounts as will be mutually agreed to by means of good faith negotiation by the City and the Contractor and, to the extent possible, by reference to any unit costs already established in the Proposal. Without exception, all deletions or additions to the scope of work will be set forth in a written Amendment to this Contract.

16.2 Notwithstanding the foregoing, the City shall have the right to terminate this Contract pursuant to the provisions of Section 18.2 herein should the Contractor and the City fail to reach agreement on the adjusted compensation, or the amount of the Performance Bond or Letter of Credit, within thirty (30) days after the date of the Contract Adjustment.

16.3 Notwithstanding the foregoing, there shall be no upward adjustment of the compensation on account of any Contract Adjustment made necessary or appropriate as a result of the mismanagement, improper act, or other failure of the Contractor, its employees, agents, or its subcontractors to properly perform its obligations and functions under this Contract.

17. SUBCONTRACTORS

17.1 The Contractor shall perform all of its obligations and functions under this Contract by means of its own employees, or by a duly qualified subcontractor which is approved in advance by the City. Such subcontractor which is an affiliate, parent, or subsidiary company; or had principal owners, relatives, management, or employees common to the Contractor; or any other party that has the ability to significantly influence the management or daily business operations of the subcontractor must be disclosed in writing to the City Manager. Goods and services provided by subcontractors which are reimbursed by the City must be bona fide arm's-lengths transactions. In the event a subcontractor is employed, the Contractor shall continuously monitor the subcontractor's performance, shall remain fully responsible to ensure that the subcontractor performs as required and itself perform or remedy any obligations or functions which the subcontractor fails to perform properly. Nothing contained herein shall be construed to prevent the Contractor from using the services of a common carrier for delivering goods to the City.

17.2 This Contract shall be referred to and incorporated within any contractual arrangement between the Contractor and a subcontractor and, in such contractual arrangement; the subcontractor shall give its express written consent to the provisions of this Section 17. To the extent feasible, the provisions of this Contract shall apply to any such subcontractor in the same manner as they apply to the Contractor. However, such application shall neither make any subcontractor a party to this Contract, nor make such subcontractor a third party beneficiary hereof.

17.3 In the event that the Contractor employs a subcontractor, then the City may require that copies of invoices for all work (including invoices submitted to the Contractor for work performed by a subcontractor) shall be submitted to the City by the Contractor and the City shall pay all compensation to the Contractor. It shall be the sole responsibility of the Contractor to deal with a subcontractor with respect to the collecting and submission of invoices and the payment of compensation. In no event shall the City have any obligation or liability hereunder to any subcontractor, including, in particular, any obligations of payment.

18. DEFAULT AND TERMINATION

18.1 In the event that:

18.1.1 the Contractor shall repeatedly fail (defined for this purpose as at least three (3) failures within any consecutive twelve (12) month period) to keep, perform or observe any of the promises, covenants or agreements set forth in this Contract (provided that notice of the first two (2) failures shall have been given to the Contractor, but whether or not the Contractor shall have remedied any such failure); or

18.1.2 the Contractor shall fail to keep, perform or observe any promise, covenant, or agreement set forth in this Contract, and such failure shall continue for a period of more than five (5) days after delivery to the Contractor of a written notice of such breach or default; or

18.1.3 the Contractor's occupational or business license shall terminate or the Contractor shall fail to provide the City with any bond, letter of credit, or evidence of insurance as required by the Contract Documents, for any reason; or

18.1.4 the Contractor fails for any reason to provide the City with an acceptable renewal or replacement bond or letter of credit within the time period specified by a provision of this Contract; or

18.1.5 the Contractor shall become insolvent, or shall take the benefit of any present or future insolvency statute, or shall make a general assignment for the benefit of creditors, or file a voluntary petition in bankruptcy or a petition or answer seeking an arrangement for its reorganization, or the readjustment of its indebtedness under the Federal Bankruptcy laws, or under any other law or statute of the United States or any State thereof, or shall consent to the appointment of a receiver, trustee or liquidator of all or substantially all of its property; or

18.1.6 the Contractor shall have a petition under any part of the Federal Bankruptcy laws, or an action under any present or future insolvency laws or statute filed against it, which petition is not dismissed within thirty (30) days after the filing thereof; or

18.1.7 There is any assignment by the Contractor of this Contract or any of the Contractor's rights and obligations hereunder for which the City has not consented in writing; or

18.1.8 The Contractor shall default on any other agreement entered into by and between Contractor and the City, then, in its discretion, the City shall have the right to terminate this Contract for default, which termination shall be effective upon delivery of written notice of such termination to the Contractor. In the event that the City terminates this Contract for default, or the Contractor abandons or wrongfully terminates the Contract, the Contractor shall be paid for compensation earned to the date of termination or abandonment (but the City shall have the right to reduce by off-set any amounts owed to the Contractor hereunder or under any other Contract or obligation by the amount of the City's damages and any amounts owed by the Contractor to the City), but the Contractor shall not be compensated for any profits earned or claimed after the receipt of the City's notice of termination by default or after abandonment or wrongful termination. The City's election to terminate or not to terminate this Contract in part or whole for the Contractor's default shall in no way be construed to limit the City's right to pursue and exercise any other right or remedy available to it pursuant to the terms of the Contract or otherwise provided by law or equity.

18.2 Notwithstanding anything else herein contained, the City may terminate this Contract in whole or in part at any time for its convenience by giving the Contractor thirty (30) days written notice. In that event, the Contractor shall proceed to complete any part of the work, as directed by the City, and shall settle all its claims and obligations under the Contract, as directed by the City. The Contractor shall be compensated by the City in accordance with the provisions hereof, including in particular Section 2 of these General Conditions, provided, however, that in no event shall Contractor be entitled to compensation for work not performed or for anticipatory profits. Contractor shall justify its claims, as requested by the City, with accurate records and data.

18.3 Bankruptcy and Liquidation - In the event the Contractor (1) makes an assignment for the benefit of creditors, or petition or apply to any tribunal for the appointment of a custodian, receiver, or trustee for all or a substantial part of its assets; (2) commences any proceeding under any bankruptcy, reorganization, arrangement, readjustment of debt, dissolution, or liquidation law or statute of any jurisdiction whether now or hereafter in effect; (3) has had any such petition or application filed or any such proceeding commenced against it in which an order for relief is entered or an adjudication or appointment is made, and which remains undismissed for a period of sixty (60) days or more; (4) takes any corporate action indicating its consent to, approval of, or acquiescence in any such petition, application, proceeding, or order for relief or the appointment of a custodian, receiver, or trustee for all or substantial part of its assets; or (5) permits any such custodianship, receivership, or trusteeship to continue undischarged for a period of sixty (60) days or more causing the Contractor or any third party, including, without limitation, a trustee in bankruptcy, to be empowered under state or federal law to reject this Contract or any agreement supplementary hereto, the City shall have the following rights:

(i) In the event of a rejection of this Contract or any agreement supplementary hereto, the City shall be permitted to retain and use any back-up or archival copies of the software licensed

hereunder under this Agreement for the purpose of enabling it to mitigate damages caused to the City because of the rejection of this Contract. The City shall exert reasonable efforts to mitigate such damages by use of such back-up or archival copies.

(ii) In the event of rejection of this Contract or any agreement supplementary hereto, the City may elect to retain its rights under this Contract or any agreement supplementary hereto as provided in Section 365(n) of the Bankruptcy Code. Upon written request of the City to, as applicable, the Contractor or the bankruptcy trustee or receiver. The Contractor or such bankruptcy trustee or receiver shall not interfere with the rights of the City as licensee as provided in this Contract or in any agreement supplementary hereto to obtain the Source Material(s) from the bankruptcy trustee and shall, if requested, cause a copy of such Source Material(s) to be available to the City.

(iii) In the vent of rejection of this Contract or any agreement supplementary hereto, the City may elect to retain its rights under this Contract or any agreement supplementary hereto as provided in section 365(n) of the Bankruptcy Code without prejudice to any of its rights of setoff with respect to this Contract under the Bankruptcy Code or applicable non-bankruptcy law; or In the event of a rejection of this Contract or any agreement supplementary hereto, the City may retain its rights under this Contract or any agreement supplementary hereto as provided in section 365(n) of the Bankruptcy Code without prejudice to any of its rights under section 503(b) of the Bankruptcy Code.

19. CITY'S AUTHORIZED REPRESENTATIVE

During the term of this Contract, the City Manager or designee may from time to time designate an individual to serve as the City's Authorized Representative and an Assistant Representative designated to serve in that capacity in the absence of the CITY’S AUTHORIZED REPRESENTATIVE, who shall have such authority to act on the City's behalf as the City Manager may from time to time actually delegate to such person, but in no event shall the CITY’S AUTHORIZED REPRESENTATIVE have authority to modify or terminate this Contract, or make final decisions with respect to amendments, time extensions, assignments, cost or payment adjustments or payment disputes.

20. ASSIGNMENT

Neither this Contract nor any of the Contractor's rights or obligations hereunder may be assigned by the Contractor without the City's prior written consent, which consent may be granted or withheld at the City's sole discretion. Any transfer of this Contract by merger, consolidation or liquidation (unless the stock of the Contractor is traded on a national stock exchange or in a generally recognized over the counter securities market) any change in ownership of or power to vote a majority of the outstanding voting stock or ownership interests of the Contractor shall constitute an assignment of this Contract for purposes of this Section. In the event the Contractor assigns or subcontracts or attempts to assign or subcontract any right or obligation arising under this Contract without the City's prior written consent, the City shall be entitled to terminate this Contract pursuant to the provisions of Section 17 hereof.

21. NOTICES

21.1 Unless otherwise stated herein, all notices or other writings which the City is required or permitted to give to the Contractor may be hand delivered, mailed via U.S. Certified Mail or sent next-day delivery by a nationally-recognized overnight delivery service to the Contractor's address set forth in the Proposal. Any such notice shall be deemed to have been delivered upon actual delivery, or one (1) day following submission to a nationally-recognized overnight delivery service for next day delivery to the Contractor, or three (3) days following submission to the Contractor by U.S. Certified Mail.

21.2 Unless otherwise stated herein, all notices or other writings which the Contractor is required or permitted to give to the City may be hand delivered to the City Manager, mailed via U.S. Certified Mail, or sent next-day delivery by a nationally-recognized overnight delivery service. Any such notice shall be deemed to have been delivered upon actual delivery, or one (1) day following submission to a nationally-recognized overnight delivery service for next day delivery to City, or three (3) days following submission to the City by U.S. Certified Mail. Any such notice shall be sent to:

City of Dunwoody, GA
ATTN: City Manager
41 Perimeter Center East, Suite 250
Dunwoody, GA 30346

21.3 Either party may change its notice address by written notice to the other given as provided in this section.

22. NONDISCRIMINATION

22.1 During the performance of this Contract, the Contractor, for itself, its assignees and successors in interest agrees as follows:

22.1.1 Compliance with Regulations. The Contractor shall comply with the Laws and Regulations as they may be amended from time to time (hereafter referred to as the "Regulations"), which are herein incorporated by reference and made a part of this Contract.

22.1.2 Nondiscrimination. The Contractor, with regard to the work performed by it during the Contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of any subcontractor, including procurement of materials and leases of equipment. The Contractor shall not participate either directly or indirectly in the discrimination prohibited by the Regulations.

22.1.3 Solicitations for Subcontracts, Including Procurement of Materials and Equipment. In all solicitations either by competitive proposing or negotiation made by the Contractor for work to be performed under a subcontract, including procurement of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the Contractor of the Contractor's obligations under this Contract and the Regulations relative to nondiscrimination on the grounds of race, color or national origin.

22.1.4 Information and Reports. The Contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources or information, and its facilities as may be determined by the City to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of the Contractor is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the City, as appropriate, and shall set forth what efforts it has made to obtain the information.

22.1.5 Sanctions for Noncompliance. In the event of the Contractor's noncompliance with the nondiscrimination provisions of this Contract, the City shall impose such Contract Sanctions as it may determine to be appropriate, including but not limited to:

22.1.5.1 Withholding of payments to the Contractor under the Contract until the Contractor complies, and/or

22.1.5.2 Cancellation, termination or suspension of the Contract, in whole or in part.

22.1.6 Incorporation of Provisions. The Contractor shall include the provisions of subsections 22.1.1 through 22.1.5 in every subcontract, including procurement of materials and leases of equipment, unless exempt by the Regulations or directives issued pursuant thereto. The Contractor shall take such action with respect to any subcontract or procurement as the City may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the Contractor may request the City to enter into such litigation to protect the interest of the City and, in

addition, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

22.2 The Contractor assures the City that it will comply with the pertinent statutes, Executive Orders and such rules as are promulgated to assure that no person shall, on the grounds of race, creed, color, national origin, sex, age, marital status, or handicap be excluded from participating in any activity conducted with or benefiting from Federal assistance. This provision shall bind the Contractor from the period beginning with the initial solicitation through the completion of the Contract.

23. COPYING DOCUMENTS

The Contractor hereby grants the City and its agent's permission to copy and distribute any and all materials and documents contained in, comprising, or which are otherwise submitted to the City with or in connection with the Contractor's Proposal or which are contained in the Contract Documents (the "Submittals"). The permission granted by the Contractor shall be on behalf of the Contractor and any and all other parties who claim any rights to any of the materials or documents comprising the Submittals. Such permission specifically authorizes the City and its agents to make and distribute such copies of the Submittals or portions thereof as may be deemed necessary or appropriate by the City for its own internal purposes or for responding to requests for copies from any member of the public regardless of whether the request is specifically characterized as a public records request pursuant to Georgia Code. This provision shall survive the expiration or termination of the Contract.

24. GENERAL PROVISIONS

24.1 The Contract Documents consist of the Contract, the Proposal Forms, the Instructions to Proposers, Request for Proposals, all Addendum(s) issued prior to execution of this Contract, these General Conditions and the Specifications. Together, these documents comprise the Contract and all the documents are fully a part of the Contract as if attached to the Contract or repeated therein. Precedence of the Contract Documents shall be as follows: (i) addendum(s) to the Contract Documents, (ii) the Contract, (iii) the General Conditions (iv) the Proposal Forms, (v) the Instructions to Proposers, (vi) the Specifications, and (vii) the Request.

24.2 This Contract represents the entire agreement between the parties in relation to the subject matter hereof and supersedes all prior agreements and understandings between such parties relating to such subject matter, and there are no contemporaneous written or oral agreements, terms or representations made by any party other than those contained herein. No verbal or written representations shall be relied upon outside the Contract terms and amendments. Without exception, all deletions or additions to the scope of work will be set forth in a written amendment to this Contract. No amendment, modification, or waiver of this Contract, or any part thereof, shall be valid or effective unless in writing signed by the party or parties sought to be bound or charged therewith; and no waiver of any breach or condition of this Contract shall be deemed to be a waiver of any other subsequent breach or condition, whether of a like or different nature.

24.3 The Contractor shall, during the term of this Contract, repair any damage caused to real or personal property of the City and/or its tenants, wherever situated, caused by the intentional, reckless, or negligent acts or omissions of the Contractor's officers, agents, or employees, and any subcontractors and their officers, agents, or employees, or, at the option of the City, the Contractor shall reimburse the City for the cost of repairs thereto and replacement thereof accomplished by or on behalf of the City.

24.4 The Contractor warrants to the City that no work performed or materials purchased pursuant to the Contract, whether by, from, or through the Contractor or a subcontractor, shall cause any claim, lien or encumbrance to be made against any property of the City, and the Contractor shall indemnify and save the City harmless from and against any and all losses, damages and costs, including attorneys' fees, with respect thereto. If any such claim, lien or encumbrance shall be filed, the Contractor shall, within thirty (30) days after notice of the filing thereof, cause the same to be discharged of record by payment, deposit, bond, order of a court of competent jurisdiction or otherwise. This provision shall survive the expiration or termination of the Contract.

24.5 The language of this Contract shall be construed according to its fair meaning, and not strictly for or against either the City or the Contractor. This Contract shall be deemed to be made, construed and performed according to the laws of the State of Georgia. Any suit or proceeding initiated for the purpose of interpreting or enforcing any provision of this Contract or any matter in connection therewith shall be brought exclusively in a court of competent jurisdiction in DeKalb County, Georgia, and the Contractor waives any venue objection, including, but not limited to, any objection that a suit has been brought in an inconvenient forum. The Contractor agrees to submit to the jurisdiction of the Georgia courts and irrevocably agrees to acknowledge service of process when requested by the City

24.6 The section headings herein are for the convenience of the City and the Contractor, and are not to be used to construe the intent of this Contract or any part hereof, or to modify, amplify, or aid in the interpretation or construction of any of the provisions hereof.

24.7 The use of any gender herein shall include all genders, and the use of any number shall be construed as the singular or the plural, all as the context may require.

24.8 The delay or failure of the City at any time to insist upon a strict performance of any of the terms, conditions and covenants herein shall not be deemed a waiver of that breach or any subsequent breach or default in the terms, conditions, or covenants of this Contract. The Contractor shall not be relieved of any obligation hereunder on account of its failure to perform by reason of any strike, lockout, or other labor disturbance.

24.9 If the City shall, without any fault, be made a party to any litigation commenced between the Contractor and a third party arising out of the Contractor's operations and activities at the premises, then the Contractor shall pay all costs and reasonable attorney's fees incurred by or imposed upon the City in connection with such litigation for all trial and appellate proceedings. The City shall give prompt notice to the Contractor of any claim or suit instituted against it by such third party. The provisions of this Section supplement and are not intended to be in lieu of the indemnification provisions of Section 5 hereof. The provisions of this Section shall survive the acceptance of the services and payment therefore, and the expiration or earlier termination of this Contract.

24.10 The City shall have the right to recover from the Contractor all of the City's costs and expenses incurred in enforcing the provisions of this Contract including, but not limited to, (1) the cost of administrative investigation and enforcement (including, without limitation, audit fees and costs, attorneys' fees) and (2) the cost of any trial, appellate or bankruptcy proceeding (including, without limitation, investigation costs, audit fees and costs, attorneys' fees, court costs, paralegal fees and expert witness fees). This provision shall survive the expiration or termination of the Contract.

24.11 The Contractor shall not during the term of the Contract knowingly hire or employ (on either a full-time or part-time basis) any employee of the City.

24.12 The Contractor shall be required, during the term of the Contract, at no additional cost to the City, to take such reasonable security precautions with respect to its operations at City Hall as the City in its discretion may from time to time prescribe. The Contractor shall comply with all regulations, rules and policies of any governmental authority, including the City, relating to security issues.

24.13 The City may, but shall not be obligated to, cure, at any time, upon five (5) days written notice to the Contractor (provided, however, that in any emergency situation the City shall be required to give only such notice as is reasonable in light of all the circumstances), any default by the Contractor under this Contract; whenever the City so cures a default by the Contractor, all costs and expenses incurred by the City in curing the default, including, but not limited to, reasonable attorneys' fees, shall be paid by the Contractor to the City on demand.

24.14 The City shall, in its discretion, be entitled to deduct from the compensation to which the Contractor is otherwise entitled hereunder, an amount equal to any liabilities of the Contractor to the City which are then outstanding. In the event that additional work beyond the scope of this Contract is requested by

the City Manager and it results in any extra charges to the City, the Contractor shall so advise the City in writing of the amount of the extra charges. The City is not required to pay any extra charges for additional work unless such work and the charges therefore have been approved in advance and have been confirmed in writing within twenty-four (24) hours by the City Manager, in his or her exclusive discretion.

24.15 The Contractor is an independent contractor and nothing contained herein shall be construed as making the Contractor an employee, agent, partner or legal representative of the City for any purpose whatsoever. The Contractor acknowledges that it does not have any authority to incur any obligations or responsibilities on behalf of the City, and agrees not to hold itself out as having any such authority. Nothing contained in this Contract shall be construed to create a joint employer relationship between the City and the Contractor with respect to any employee of the Contractor or of its subcontractors.

24.16 The Contractor and its subcontractors, if any, shall maintain complete and accurate books and records in accordance with generally accepted accounting principles, consistently applied, and shall be in a form reasonably acceptable to the City Manager or designee. The Contractor and its subcontractors shall account for all expenses of any nature related to transactions in connection with this Contract in a manner which segregates in detail those transactions from other transactions of the Contractor and subcontractors and which support the amounts reported and/or invoiced to the City. At a minimum, the Contractor's and subcontractor's accounting for such expenses and transactions shall include such records in the form of electronic media compatible with or convertible to a format compatible with computers utilized by the City at its offices; a computer run hard copy; or legible microfilm or microfiche, together with access to the applicable reader. All such books and records and computerized accounting systems, shall upon reasonable notice from the City be made available in DeKalb County, Georgia, for inspection, examination, audit and copying by the City through and by its duly authorized representatives at any time for up to four (4) years after the year to which books and records pertain. Such inspection, examination, or audit may include, but is not limited to a review of the general input, processing, and output controls of information systems, using read only access, for all computerized applications used to record financial transactions and information. The Contractor and subcontractor shall freely lend its own assistance in a timely manner in making such inspection, examination, audit, or copying and, if such records are maintained in electronic and other machine readable format, shall provide the City and/or its representative such assistance as may be required to allow complete access to such records. The City Manager may require the Contractor and subcontractors to provide other records the City Manager, in his or her sole discretion, deems necessary to enable the City to perform an accurate inspection, examination or audit of expenses incurred in and transactions related to performance of this Contract. Such records shall be provided within thirty (30) days of request thereof. In the event that expenses incurred or reimbursed are found by such inspection, examination, or audit to have been overpaid, the Contractor and its subcontractors agree that such amounts shall be payable to the City. If, prior to the expiration of the above-stated four (4) year record retention period, any audit or investigation is commenced by the City, or any claim is made or litigation commenced relating to this Contract by the City, the Contractor, or a third party, the Contractor shall continue to maintain all such records, and the City shall continue to have the right to inspect such records in the manner stated above, until the inspection, examination, audit, claim, or litigation is finally resolved (including the determination of any and all appeals or the expiration of time for an appeal). This provision shall survive the expiration or earlier termination of this Contract. In the event of any conflict between any provision of this Contract and generally accepted accounting principles or generally accepted auditing standards, the provisions of this Contract shall control even where this Contract references such provisions or standards. In particular, without limitation, the Contractor and subcontractors shall maintain all records required under this Contract to the full extent required hereunder, even if some or all such records would not be required under such generally accepted accounting principles or auditing standards. If as a result of an inspection, examination or audit, it is established that amounts are due from the Contractor to the City, the Contractor shall forthwith, upon written demand from the City, pay the City such amount, together with interest on the amount due at the rate of eighteen (18%) percent per annum, or if less, the maximum rate of interest allowed by law, from the date such additional amounts were overpaid by the City. Further if such inspection, examination or audit establishes that the

Contractor has over billed such amounts for any Contract period by two (2%) percent or more, then the entire expense of such inspection, examination or audit shall be paid by the Contractor.

24.17 The Contractor and subcontractors shall prepare and provide the City with all detailed reports as required under the Contract on a timely basis. The City reserves the right to modify the reporting procedures or the form and content of any report as it deems necessary.

24.18 There are no third party beneficiaries to this Contract and nothing contained herein shall be construed to create such.

24.19 Time is of the essence for the performance of each of the Contractor's obligations under this Contract.

24.20 In computing any period of time established under this Contract, except as otherwise specified herein the word "days," when referring to a period of time that is ten (10) days or less means business days, and when referring to a period of time that is more than ten (10) days means calendar days. The day of the event, from which the designated period of time begins to run shall not be included. A business day is any day other than Saturday, Sunday, or Federal, State of Georgia or City holidays.

24.21 The Contractor agrees to perform all acts and execute all supplementary instruments or documents which may be reasonably necessary to carry out or complete the transaction(s) contemplated by this Contract.

24.22 The City reserves the right to further develop, improve, repair and alter the facilities and all roadways, and parking areas, as it may reasonably see fit, free from any and all liability to the Contractor for loss of business or damages of any nature whatsoever to the Contractor occasioned during the making of such improvements, repairs, alterations and additions, including, but not limited to, any damages resulting from negligence of the City or its employees, agents or contractors.

24.23 The Contractor and the City hereby mutually waive any claim against each other and their respective members, officials, officers, agents and employees for damages (including damages for loss of anticipated profits) caused by any suit or proceedings brought by either of them or by any third party directly or indirectly attacking the validity of this Contract or any part thereof, or any addendum or amendment hereto, or the manner in which this Contract was solicited, awarded or negotiated, or arising out of any judgment or award in any suit or proceeding declaring this Contract, or any addendum or amendment hereto, null, void or voidable or delaying the same, or any part thereof, from being carried out.

24.24 At the option of the Contractor, the products and/or services provided under the Contract resulting from this solicitation may be provided to other governmental agencies, including the State of Georgia, its agencies, political subdivisions, counties and cities under the same terms and conditions, including price, as such products and/or services are provided under this Contract. Each governmental agency allowed by the Contractor to purchase products and/or services in connection with this Contract shall do so independent of the City or any other governmental entity. Each agency shall be responsible for its own purchases and shall be liable only for goods and services ordered, received and accepted by it. The City shall have no liability to the Contractor or any governmental agency resulting from the purchase by that agency of products and/or services from the Contractor in connection with this Contract.

24.25 Contractor must adhere to the City's Travel Policy.

* * * * * * * END OF GENERAL CONDITIONS * * * * * * *

OFFEROR'S RFP CHECKLIST

10 Critical Things to Keep in Mind When Responding to an RFP for the City of Dunwoody

1. _____ **Read the *entire* document.** Note critical items such as: supplies/services required; submittal dates; number of copies required for submittal; contract requirements, if any (e.g. bonding and insurance requirements).
2. _____ **Note the Purchasing Manager's name, address, phone numbers and e-mail address.** This is the only person you are allowed to communicate with regarding the RFP and is an excellent source of information.
3. _____ **Attend the pre-proposal conference** if one is offered. These conferences provide an opportunity to ask clarifying questions, obtain a better understanding of the Project, or to notify the City of any ambiguities, inconsistencies, or errors in the RFP. This conference may be mandatory.
4. _____ **Take advantage of the "question and answer" period.** Submit your questions to the Purchasing Manager by the due date listed in the *Schedule of Events* and view the answers given in the formal "addenda" issued for the RFP. All addenda issued for an RFP will be distributed by email to the RFP participants.
5. _____ **Follow the format required in the RFP** when preparing your response. Provide point-by-point responses to all sections in a clear and concise manner.
6. _____ **Provide complete answers/descriptions.** Read and answer **all** questions and requirements. Don't assume the City or Evaluation Committee will know what your company capabilities are or what items/services you can provide, even if you have previously contracted with the City. The responses are evaluated based solely on the information and materials provided in response to the RFP.
7. _____ **Use the forms provided**, e.g. cover page, reference questionnaire, etc.
8. _____ **Review the RFP document again** to make sure that you have addressed all requirements. Your original response and the requested copies must be identical and complete. The copies are provided to the Evaluation Committee members and will be used to rank your submittal.
9. _____ **Submit your proposal on time.** Note all the dates and times listed in the *Schedule of Events* and within the document, and be sure to submit all required items on time. Late proposals will not be accepted.

This checklist is provided for assistance only and should not be submitted with Offeror's proposal.