



TOWN OF ACTON

RFP for Photogrammetry and GIS Base Map Development

1 GENERAL INFORMATION

1.1 Introduction

This Request for Proposals (RFP) is intended to provide vendors with a common, uniform set of instructions to guide them through the development of their proposals. The RFP is in compliance with Chapter 30B of the Massachusetts General Law.

Terms used and conditions imposed in this RFP are not intended to imply or denote a particular vendor nor are they to be construed as restrictive in any way.

In responding to this RFP, vendors must follow the prescribed format, where specified, and use the included forms, where provided, or reasonable facsimiles thereof. By so doing, each vendor will be providing the Town with information comparable to that submitted by other vendors and thus be assured of fair and objective treatment in the Town's review and evaluation process.

1.2 Project Overview

The Town of Acton (hereafter "the Town") plans to produce a new basemap for the Town-wide Geographic Information System (GIS). This new base-mapping project is seen as a critical next step in upgrading and modernizing the Town's GIS. The Town currently has and/or anticipates funding availability to support the completion of a 40-scale base mapping project based on digital aerial photography that was photographed in Spring 2007.

FY2007 Project

- Ground control to support subsequent mapping products
- DTM to support planimetrics and topography
- Orthophotography
- Townwide Planimetric mapping at 1":40'
- Townwide 2' Contours and Spot Elevations

The Town has selected ESRI's GIS products as the Town standard for GIS software. Consequently, all vector deliverables must be provided as ESRI GeoDatabase format. The specifications below will provide the details on data delivery formats.

The Town is also requesting a detailed price breakdown for all mapping products and options. Vendors are asked to fill out the price sheet included in this solicitation.

1.3 Acton Vital Statistics

The Town of Acton is located in suburban Massachusetts, approximately 25 miles northwest of Boston.

Several of the following Town characteristics must be considered the “best guess” of the Town:

- Total Area: 20 sq. miles land area
- Population: 20,000

1.4 Submission of Proposals

Each proposer must furnish all requested information in the formats specified by this RFP. Unnecessary promotional materials and other non-essential documents are not wanted and will not be considered as meeting any of the requirements of this RFP.

Each proposal must include a letter of transmittal containing the signature of an authorized representative of the prime contractor and identify not more than two individuals authorized to negotiate and sign a contract with the Town on behalf of the prime contractor. The transmittal letter should not exceed two pages in length.

All vendors responding to this RFP will submit **non-price** and **price** proposals, packaged in two separate sealed and marked envelopes as outlined below:

- I. Sealed Package #1, with a bound original and four bound copies (five total) of the following:
 1. Technical and Business Proposal
 2. Plan for Services
 3. Form for Expected Capture Rate of Planimetric Features
 4. Evaluation Criteria
 5. Required “Exhibit” Forms

- II. Sealed Envelope #2, with original and one copy (two total) of:
 - A. Cost Proposal

The content of each of the five sections of the non-price proposal must be as described in the instructions in Section 1.5 below. In accordance with State procurement law, vendors must not include any price information in any part of the Technical and Business Proposal or Plan for Services.

A sealed package containing the bound original and five bound copies of the Technical and Business Proposal, Plan for Services and Evaluation Criteria forms must be labeled as follows:

<Vendor Name>: "Acton Photogrammetry/GIS Mapping:
Technical Proposal".

A separate sealed package containing the original and one copy of the Price Proposal must be labeled as follows:

<Vendor Name>: "Acton Photogrammetry/GIS Mapping:
Price Proposal".

These proposals must be delivered no later than:

2:00 P.M., September 7, 2007

To the following person and location:

Mark Hald
Town Manager's Office, Acton Town Hall
472 Main Street
Acton, MA 01720

Delivery will be at the vendor's expense. Any and all damages that may occur due to packaging or shipping will be the sole responsibility of the vendor.

A determination whether and from whom a proposal will be accepted by the Town shall be made no later than September 18, 2007.

1.5 RFP Response Requirements

The proposal must contain the following sections:

I. BUSINESS AND TECHNICAL PROPOSAL

A. Introduction

B. Corporate Profile (including all subcontractors)

C. Prior Project Experience Summary

1. A minimum of five references, including name, position, address, and telephone numbers, for prior or ongoing projects conducted by the Contractor, with a brief description of the *relevant work* performed for each client *that highlights the elements that are similar to the Acton project*. Each subcontractor should provide a minimum of three references. (The proposal evaluation team, at its option, may request further references to clarify specific claimed experience.)
2. Documentation to support the Contractor's and any applicable subcontractor's ability to provide the deliverables requested in accordance with the technical specifications, including resumes and past project descriptions.
3. Documentation, where applicable, to support that the Contractor meets the minimum requirements as specified in Minimum Evaluation Criteria.

D. Names and Resumes of Key Personnel

1. The name(s) of the individual(s) who will:
 - a) Be responsible to work with the Town's GIS project manager to coordinate this project's activities. At a minimum, the vendor's Project Manager must be identified.
 - b) Be responsible for the delivery of any work product (i.e., "deliverable"), including any presentations.
2. Qualifications and work experience with comparable clients for all personnel on the prime and any sub-contractors. In particular, the Town is interested in understanding if the **personnel proposed for this project worked on the projects that are used as references.**

E. Required Support from the Town

1. A description of any support needed from the Town, other than availability of appropriate individuals to meet with the consultant(s) for coordination purposes.

II.

PLAN FOR SERVICES

The following is a listing of text that must be included in the Plan for Services. Any proposer who does not include the requested information may be disqualified from consideration.

- A. A concise but responsive description of methods and equipment to be used, including specifics requested later in this RFP, for all tasks identified under the Description of Services, including a description of any proposed technical alternatives.
 - B. List of Contractor's in-house equipment and other equipment that will be utilized for this project. The list should indicate clearly which equipment is owned and which is leased.
 - C. A clear description of activities to be subcontracted, including the name and address of subcontractor.
 - D. A work schedule and timeline with proposed major delivery milestones.
 - E. Quality Assurance/Quality Control procedures.
- III. **Form for Expected Capture Rate of Planimetric Features** (Attachment A)
- IV. **Evaluation Criteria Forms with Specifically Justified Responses**
- A. **Minimum Evaluation Criteria** (Attachment B) - Criteria which must be met by vendors in order to be considered responsive.
 - B. **Comparative Evaluation Criteria** (Attachment C) - Criteria which will be applied to responsive vendors who have met the Minimum Evaluation Criteria.
- V. **Required Tax Compliance Certification, Certificate of Non-collusion and Certificate of Vote** (Note: these will only be required of the selected vendor)
- VI. **Price Proposal Form** (Attachment D) **submitted in a separately sealed envelope.**
- The Price Proposal form provided with this RFP must be completed and submitted. For any additional alternatives that might be proposed which would have a cost impact, an additional copy of the relevant price proposal form with appropriate descriptive heading and prices must be included.

1.6 Pre-bid Questions

All questions pertaining to this RFP must be sent in writing or by e-mail to:

Mark Hald, mhald@acton-ma.gov
Town Manager's Office, Acton Town Hall
Acton Town Hall
472 Main Street
Acton, MA 01720

The Town will take these written questions up to **August 24, 2007 at 3 PM**. The Town will then answer questions in writing and e-mail copies of the answers to all vendors that have expressed interest in bidding on this project.

1.7 Clarification of Proposals

The vendor of any proposal may be required to discuss or clarify its proposal with the Town any time during the evaluation and selection process.

1.8 Evaluation of Proposals

The Evaluation Criteria are contained in attached forms (Attachments B and C).

The Town will first examine all proposals for compliance with the Minimum Evaluation Criteria. Proposals determined to be non-responsive with Minimum Evaluation Criteria of this RFP may be disqualified without further evaluation. The Town reserves the right to waive minor defects or deviations in the responsiveness of proposals. The Town also may seek clarification from a vendor, allow the vendor to make minor corrections and consider the correction for purposes of evaluation.

Subsequently, the Town will examine all proposals that meet the minimum criteria in comparison to the Comparative Evaluation Criteria. Each proposal will be given a score and a ranking based on the comparative evaluation criteria prior to the Price Proposal being opened.

1.9 Rejection of Proposals

The Town reserves the right to reject any and all proposals received in response to this RFP. Among other reasons, a vendor's proposal may be rejected if the vendor:

1. Fails to adhere to one or more of the provisions of the RFP;
2. Fails to supply the minimum information requested, or fails to submit its proposal at the time or in the format specified;
3. Fails to meet the minimum evaluation criteria as specified in this RFP;
4. Fails to submit its proposal to the required address on or before the specified submission deadline;
5. Misrepresents its services or provides demonstrably false information in its proposal, or fails to provide material information;
6. Fails to submit required prices on the enclosed Price Proposal form.

1.10 Vendor Selection

The supplier of these services will be selected based upon comparing the relative merits of proposals submitted by competing vendors, taking into consideration their score on the comparative evaluation criteria and the prices submitted. The selected vendor *may not necessarily* be the responder offering the lowest prices. If appropriate, the Town may

identify a short list of responders and ask that short-listed vendors come in for an interview/presentation to the selection committee.

1.11 Schedule of Events for RFP

The Town intends to progress in this procurement in a series of orderly steps. The schedule that follows has been developed in order to provide adequate information for vendors to prepare definitive proposals and to permit the Town to fully consider various factors that may affect its decision. Should circumstances warrant changing any of these dates, vendors who have expressed interest in responding will be notified.

Event	Date
RFP Available for Pick-up & Mail Requests	August 14, 2007
Deadline for Questions	August 24, 2007 @ 3PM
Deadline for Proposal Receipt	September 7, 2007 @ 2PM
Winning Proposal Selected	September 18, 2007

1.12 Firm Price

Prices offered by the respondent will be firm and not subject to increases during the term of any agreement between the Town and the successful respondent, unless otherwise stated.

1.13 Confidentiality

The Town cannot assure the any materials or information that may be submitted by a vendor in response to this RFP will remain confidential. Vendors who choose to submit confidential information do so at their own risk.

1.14 Execution of Contract

1. Upon the acceptance of a vendor's proposal, the Town will incorporate into its standard contract form appropriate specifics for this procurement and submit the contract to the successful respondent for signing. In the event that the successful respondent fails, neglects or refuses to execute the contract within a specified number of days after receiving a copy of the contract from the Town, the Town may at its option revoke its acceptance and cancel its action in awarding the contract and the contract shall become null and void and of no effect. In such event, the Town reserves the right to negotiate an agreement with another respondent to this RFP.
2. Incorporated by reference into the contract which is to be entered into by the Town and the successful vendor pursuant to this RFP will be:
 - A. All of the information presented in or with 1) this RFP and 2) the vendor's response thereto. In the event that the RFP language and the vendor's proposal-response language conflict, the RFP language will be interpreted as binding.

- B. Any amendments in writing to this RFP or the agreement between the Town and the successful respondent.

A designated official of the vendor and the Town Manager of Town of Acton shall execute the contract.

2 DESCRIPTION OF EXISTING AERIAL IMAGERY AND AIRBORNE GPS

The Town was flown in April 2007 by The Sanborn Map Company, Inc. using a Z/I DMC Digital mapping Camera and airborne GPS. The color and color infrared (CIR) imagery was captured at a scale of 1":300', with overlap and sidelap suitable for stereo photointerpretation. There are 494 exposures. The imagery is saved in 3-band JPG format for the color and a separate 3-band (infrared, blue, green) JPG format file for the CIR. The imagery and the airborne GPS data will be made available to the winning bidder.

3 DESCRIPTION OF REQUIRED SERVICES

3.1 Ground Control

The vendor shall develop a geodetic control network capable of creating ASPRS Class I accuracy for the planimetric and topographic products, according to the American Society of Photogrammetry and Remote Sensing (ASPRS) and Federal Geodetic Control Committee standards for 40-scale mapping. The procedures for establishing a ground control network should address:

1. Horizontal Control
2. Vertical Control
3. Tie-ins to existing National Geodetic Survey points
4. Use of existing control points (e.g. potentially created as part of previous engineering projects)
5. Use of other existing control (e.g. Massachusetts Highway Department, et al)
6. Survey methods, including use of field crews, GPS, and other techniques

The control network must be suitable for development of all specified products (planimetric, topographic, digital orthophotography) at the specified accuracies. The approach should be described in detail.

3.2 Fully Analytical Aerial Triangulation (FAAT)

3.2.1 FAAT Technical Requirements

Fully Analytical Aerotriangulation (FAAT) will be used to densify control. The Plan for Services should describe the expected positional accuracy of the horizontal and vertical control. A step-by-step discussion of the procedures and equipment used for the FAAT should be included in the Plan for Services. This discussion should also describe:

1. Use of pugging
2. Use of passpoints

3. Use of diapositives
4. Point Mensuration
5. Quality Control
6. Software programs and methodologies for processing

3.3 Tiling

Vendors should propose a tiling scheme and tile numbering system that will be used for this project. Although data will ultimately be delivered on a seamless, Town-wide basis, the individual tiles will be used to define the orthophotography georeferenced TIFF images. The tile grid should be based on the Massachusetts State Plane Coordinate System (NAD83 feet) and tile corners should be “round-number” (to the nearest 100 ft.) increments of state plane feet.

It is Acton’s intent to have the final data delivered as a seamless, Town-wide GeoDatabase. Because of its relatively small size, the Town anticipates one pilot delivery followed by a Town-wide draft deliverable.

3.4 Pilot Project for Orthophoto, Planimetric and Topographic Products

In order to assure that the vendor can create all required deliverables, a pilot project will precede the creation of any final deliveries. This pilot will cover an area of at least four contiguous tiles. The pilot is intended to test all production methodologies and establish successful procedures to follow throughout the rest of the project. While it is understood that the ground control, and FAAT will be conducted for the entire Town prior to the pilot, the rest of the project tasks that are contracted will be initially conducted only for the pilot area until the pilot is reviewed, corrected and approved. This will ensure that data is correctly compiled to project specifications.

During the pilot, the contractor will also:

1. Work with the Town to resolve any questions about the GeoDatabases design. A draft database design for the project is included as Attachment E. The vendor will be provided with a fully designed electronic Geodatabase for the planimetric and topographic data.
2. Finalize the delivery schedule

The above tasks will be undertaken with the cooperation of Town personnel and its consultant. Upon successful completion of the pilot, the Town will authorize full production of all orthophoto, planimetric and topographic products described in detail below. It is imperative that the pilot project be completed on-time, according to the winning vendor’s approved schedule.

3.5 Color Digital Orthophotography

Due to the utility of orthophotos for conducting QA/QC on the planimetric and topographic data products, the Town requires that the orthophotos be delivered before, or at the same time as all other products. The digital orthophotography should be delivered in color and have a pixel resolution of .25'. The delivery format must be in both geo-tiff and JPEG2000 formats, with paneling and delivery areas to be decided at the project kick-off meeting. It is expected that the digital images will be clear, carefully mosaicked, corrected for elevation and have standardized color balance throughout the project area.

3.6 Color Infrared Orthophotography

The digital color infrared orthophotography shall be produced to the same accuracy standards as the color orthophotography. It shall have a pixel resolution of .25'. The delivery format must be in both geo-tiff and JPEG2000 formats, with paneling and delivery areas to coincide with the color orthophotography. The digital images shall be clear, carefully mosaicked, corrected for elevation, and have standardized color balance throughout the project area.

3.6.1 Methodology and Equipment

The Plan for Services must concisely but thoroughly explain the methodology to be followed to develop the digital orthophotography, as well as list the equipment to be used. The following points must be covered in the Plan for Services:

1. Elevation model generation (use of DEM/DTM)
2. Breaklines and significant points
3. Image resolution
4. Image mosaicking
5. Radiometric verification
6. Scanning, image source (negatives vs. diapositive, etc.), and scanning equipment
7. Quality Assurance/Quality Control (QA/QC)
8. Data delivery formatting
9. The Team Member and staff performing the digital orthophotography

3.7 Photogrammetric Compilation

Acton requires a set of planimetric features on which to develop its GIS base map. Planimetric features will be compiled in digital format to meet ASPRS Class I standards for large scale maps at the contracted scale. Each type of feature will be coded in conformance with the ESRI GeoDatabase design that will be finalized during the pilot project (see Attachment E, for the database design). The town will provide a GeoDatabase template for the planimetric and topographic data.

3.7.1 Planimetric Features

All mapping will be compiled using direct digital data capture on either precision analog or softcopy stereoplotters that utilize the relative and absolute orientation derived from the FAAT results.

Attachment E is a complete list of features that are to be compiled planimetrically. The list also specifies the digital feature type requirements, as well as those features that are expected to have annotation and Z coordinates captured. Vendors are encouraged to provide relevant information of their experience with planimetric feature compilation and data layer formatting for ESRI GeoDatabases in their technical proposal.

3.7.2 Capture Rates

The vendor should estimate the capture rate for each data set described in Attachment A and expect that the estimate will be considered binding upon completion of a contract with the Town. Vendors are encouraged to provide a discussion of factors that influence capture rates that can be expected on this project. Capture rate estimates should be provided by filling out the capture rate form found in Attachment A.

3.7.3 Attributes

The Town and the contractor will develop a final database design structure into which attributes will be placed, following the guidelines in Appendix E and based on the results of the pilot. This structure will be commented on and approved by the Town as the standard for all data deliveries in the project. All data will be delivered in conformance to this standard. Any files that contain incorrectly coded data or data that does not adhere to the standard will be returned to the vendor for correction. The Town will provide attribute and/or annotation source materials to the contractor where appropriate.

3.7.4 Edgematching

All data files will be edgematched with data from adjoining files. No data elements will be repeated in two files. All coding of features will be consistent from one file to the next.

3.8 *Topographic Mapping*

Vendors should provide proposals for creating topography at a 2' contour interval and spot elevations to accompany the contours. In addition, the underlying digital terrain model (DTM) will be required to be prepared for delivery to the Town. Spot elevations should be captured, at a minimum, for the following features: local high points (ridges, summits), local low points (basin bottoms, saddles), stationary water bodies, street intersections and at other appropriate points.

3.8.1 Methodology and Equipment

The Plan for Services must concisely but thoroughly explain the methodology to be followed to develop the topography, as well as list the equipment to be used. The following points must be covered in the Plan for Services:

1. Digital Terrain Model generation
2. Use of breaklines and other significant points
3. Software and methods used for contour interpolation, or description of manual contour interpretation process
4. Quality Assurance/Quality Control
5. The Team Member performing the contour creation

3.8.2 Attribute Coding & Annotation

Vendors should assume that the topographic data will include coding for the following types of information:

- Code indicating the elevation (numeric)
- Code indicating whether the topographic line is a depression contour
- Code indicating whether each contour is an “index” contour line at a 10' interval
- Code indicating whether the contour line is “hidden” beneath such features as a building, or a piece of annotation.
- Code indicating whether the contour line is “obscured” by such things as heavy vegetation, which would have potentially lessened the accuracy of the contour interpolation.
- Each index contour line should have its elevation displayed as annotation. Contour lines should not have gaps where annotation is placed (although hidden coding could be used to allow hard copy products to be created with gaps showing).

3.9 Interim Data Delivery

3.9.1 Draft Data Delivery

The vendor will submit a digital copy of the seamless ESRI GeoDatabase and the raster orthophotography data in seamless JPEG2000 format compressed 15:1. These data will be examined by the Town and its contractors for conformance to the database design specification. Any errors in the data will be noted in a report, and will be returned to the vendor for correction and resubmission to the Town.

3.9.2 Final Data Delivery

When all draft data is approved by the Town, the vendor will make the required corrections and deliver the data to the Town for final checking and final acceptance. The JPEG2000 format orthophotography will be delivered as a seamless data set. Geo-tiff format orthophotography tiles will also be delivered.

4 PROJECT MANAGEMENT AND MEETINGS

In the Plan for Services, the respondent will identify the main contact person – Project Manager - for the project. The Town requires a minimum series of meetings with the Project manager and other key personnel, as follows:

1. Project kick-off meeting and pilot project planning meeting
2. Pilot review meeting
3. Review meeting to resolve any significant problems.

The Plan for Services shall include these meetings as milestones in the project schedule and timeline. If the vendor feels that more or fewer meetings are necessary, this should be indicated and justified in the Plan for Services.

5 DELIVERABLES

The following describes the required deliverables. All final digital data will be delivered on CD-ROM or DVD. Two copies of each disk are required.

All work products developed in fulfilling a contract let to perform these services or provide these deliverables will become the property of the Town of Acton.

5.1 Coordinate System

All deliverable data products should be delivered in the Massachusetts State Plane Coordinate System, Mainland Zone, state plane feet. The horizontal datum shall be the NAD1983 datum. Vertical Datum shall be NAVD1988.

5.2 Deliverables

5.2.1 Ground Control Deliverables

It is expected that the resultant ground control will be delivered to the Town as a ground control report. The ground control report should include:

1. The ground control field notebook(s), including swing-tie sketches to all points.
2. A map showing the ground control station locations with numbers accurately referencing the appropriate features in the ground control field notebook.
3. A digital data layer (ESRI coverage format) containing the ground control points along with pertinent attributes (e.g. X, Y and Z coordinates, type of point, etc.).

5.2.2 FAAT Deliverables

The contractor will submit an aerotriangulation report at the completion of the FAAT step.

5.2.3 Digital Orthophotography and Color Infrared (CIR) Deliverable

1. Digital data will be required for the final delivery of the digital orthophotography. Digital orthophotography and CIR data should be delivered in both georeferenced .tiff format and JPEG2000 compressed format. These data must be readable in ArcGIS.
2. Digital Elevation Model (DEM) data used to create the digital orthophotos will be delivered in both ASCII and ESRI coverage format.
3. One tile index map and sheet index GeoDatabase for the tile layout.

5.2.4 Planimetric Data Deliverables

1. Final seamless digital data shall be delivered in ESRI GeoDatabase format on a CD-ROM or DVD suitable for use with ArcGIS.

5.2.5 Topography Deliverables

1. Digital data shall be delivered in ESRI GeoDatabase format on CD-ROM or DVD suitable for use with both ArcGIS. Digital data will include the contour coverage as well as spot elevation data.
2. Digital Terrain Model (DTM) data used to create the topography will be delivered in both ASCII and ESRI GeoDatabase format.

6 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

The vendor shall conduct quality assurance/quality control checks during all phases of the project. The Plan for Services should describe each of these checks, and which team member or staff person will be conducting the QA/QC. The proposal should be specific and not generalize the QA/QC “philosophy” of the firm.

6.1 Acceptance of Deliverables and QA/QC Procedures

In addition to QA/QC performed by the vendor, the Town will subject interim and final deliverable products to a series of visual, digital, and data accuracy checks as described in Attachment E. In general, products with missing data, gross errors, poor edgemark, incorrect attributes, and/or formatting errors will be returned to the vendor for correction.

7 TECHNICAL ALTERNATIVES

The Plan for Services must respond to all points in this Description of Services. However, the vendors are encouraged propose innovative and/or alternative methods for accomplishing portions of the work, or to suggest supplemental work to enhance the project. These alternatives should be described and justified in a section of the proposal titled “Technical Alternatives”. As appropriate, references to applicable alternatives should be made in the Plan for Services.

For each and every additional technical alternative that might be proposed which would have a cost impact, an **additional copy of the relevant** Price Proposal form labeled as an alternative proposal with appropriate descriptive heading and prices should be included.

8 ANTICIPATED SCHEDULE

The following table displays what the Town thinks is a reasonable schedule for this project. The Town would the final deliverables as soon as possible. The vendor should supply a detailed schedule in the form of a timeline as part of their Plan of Services.

Milestone	Completion Date
Contract award	September 18, 2007
Ground Control and FAAT Delivered for Review	October 19, 2007
Pilot completed for review	November 30, 2007
Pilot Review Meeting	December 14, 2007
Townwide data delivered for review	March 14, 2008
Townwide Data review complete	March 28, 2008
Final Delivery of all deliverable data	April 18, 2008

9 ATTACHMENTS

- A. Form for Expected Capture Rate of Planimetric Features: to be completed and returned with proposal
- B. Minimum Evaluation Criteria
- C. Comparative Evaluation Criteria
- D. Form for Proposal Price: to be completed and returned with proposal **in a separate envelope**
- E. GeoDatabase Design
- F. Acceptance Criteria

Feature Capture Rate Form Instructions

The form on the following page asks the vendor to estimate the overall capture rate for each planimetric feature type based on photogrammetric interpretation. For major features such as buildings and driveways it is assumed that capture rates of near 100% are possible. For smaller features such as hydrants or catchbasins the estimated capture rate is extremely important since it will dictate the amount of future fieldwork the town may need to fully map those systems. The town is requesting the overall capture rate information so that the town has an objective standard to apply when performing QA/QC.

Upon contract award, it is expected that the capture rates in this form will be binding. The town will reserve the right to perform QA/QC that verifies that the estimated capture rates are being met. It is assumed that the capture rate presented will be the **overall feature capture rate** (as opposed to the “photo-visible feature capture rate”). The overall capture rate will be calculated by counting the number of features that are observed in the field and comparing that to the number of features provided by the vendor in the digital data. This definition of capture rates is final, and cannot be superceded by any language, caveats or footnotes elsewhere in the proposal. Features that are “invisible” (e.g. are buried, paved-over, etc.) will not be considered when calculating the overall feature capture rate. The vendors should consider the typical photography and field condition flaws (e.g. parked cars) that can influence capture rates when making their estimates.

FEATURE DESCRIPTION	40-scale Capture Rate
Edge of Paved Street (attribute for curbing)	%
Edge of Unpaved Street	%
Sidewalk (coded for sidewalk type, paved, brick, concrete)	%
Building Foot/Roofprints (all visible buildings, tanks, mobile homes, foundations, etc.)	%
Building Porches and Decks	%
Rail Lines (coded active, abandoned)	%
Street Centerlines	%
Water bodies (ponds, lakes, wider rivers/streams)	%
Streams, Rivers, Creeks	%
Wet areas, Marshes, Swamps	%
Drainage Ditches	%
Headwalls/ Floodwalls	%
Culverts	%
Flood basins, empty retention ponds	%
Retaining Wall	%
Fences	%
Hedges	%
Stone Walls	%
Guard Rails	%
Driveways (paved vs. unpaved attribute)	%
Parking Lot (greater than 4 spaces, paved vs. unpaved attribute)	%
Swimming Pools	%
Large Vegetation Areas (forest, brush, cultivated fields) larger than 0.25 acres, forest defined by tree trunks .	%
Parks & playgrounds	%
Athletic Fields	%
Tennis Courts	%
Basketball Courts	%
Golf Courses	%
Docks and piers	%
Street Trees (trees adjacent to public ways)	%
Misc: smokestacks, flag poles, monuments, etc.	%
Trails (< 8 ft. width)	%
Pavement markings	%
Private walks (from sidewalk to front/rear doors)	%
Manholes	
Fire Hydrants	%
Utility Poles and Street Lights	%
Traffic: signal poles, street signs, parking meters	%

Evaluation Criteria

For the comparative evaluation criteria, the evaluation committee will assign a rating to each response. The rating categories, not all of which are used for each criteria, are as follows:

- **Unacceptable (UA):** This represents a response that is unsatisfactory or non-responsive with respect to the specification. One or more ratings of UA may disqualify a respondent from further consideration by the Town.
- **Not Advantageous (NA):** This represents a response that fails to meet the standard for a satisfactory response to the RFP, but is responsive.
- **Advantageous (A):** This represents a response that satisfies the evaluation standard specified in the RFP.
- **Highly Advantageous (HA):** This represents a response that offers more than the specification and provides a particularly impressive or advantageous response to the RFP.

**ATTACHMENT B:
Minimum Qualification Criteria Form**

Contractor Name: _____

Date Submitted: ___/___/2007

The Contractor, and pertinent subcontractors, must meet each of the following qualifications to be eligible to perform this work for Acton:

1. The Contractor, or sub-contractor must have at least 3 years experience in photogrammetry. This must be substantiated elsewhere in the proposal.
2. The Contractor must have successfully performed at least 2 projects involving **city, or countywide planimetric and topographic mapping** and the delivery of products in an ESRI GeoDatabase format. These projects must have been at a project scale of 1":40'.

Provide here specific project names, each of which identifies a project whose references and description are provided in the "Prior Project Experience Summary" section of the proposal:

Project/Client Name Page# in proposal with Description	Project Scale	Data Delivery Format	Client and Project manager's Name	Reference Phone

3. The Contractor must have successfully performed at least 2 projects where color digital orthophotos were delivered in a GeoTIFF format, for a project of the same magnitude (similar number of square miles) or larger. Those projects must have also delivered a seamless MrSID or JPEG2000 final deliverable, and at least one must have been with 3" pixels at a project scale of 1":40'.

Provide here specific project names, each of which identifies a project whose references and description are provided in the "Prior Project Experience Summary" section of the proposal:

Project/Client Name Page# in proposal with Description	Color (Y/N)	Data Delivery Format	Client and Project manager's Name	Reference Phone

**ATTACHMENT C:
Comparative Evaluation Criteria Form**

Contractor Name: _____

Date Submitted: ___/___/2007

1. Photogrammetric/Planimetric/Topographic Mapping Experience

HA: The project team has successfully performed comparable digital planimetric and topographic mapping for at least 7 comparable projects, at least 5 of those municipalities with ESRI GeoDatabase deliverables.

A: The project team has successfully performed comparable digital planimetric and topographic mapping for at least 3 projects, with ESRI GeoDatabase deliverables.

NA: The project team has successfully performed comparable digital planimetric and topographic mapping for at least one project in ESRI GeoDatabase format.

UA: The project team has not successfully performed comparable digital planimetric and topographic mapping for any comparable project.

Provide here specific project names, each of which identifies a project whose references and description are provided in the “Prior Project Experience Summary” section of the proposal:

Project Name	Proposal page #	Client & Reference Name	Reference Phone

2. Orthophotography Experience

HA: The project team has successfully delivered comparable color digital orthophotography to at least 5 clients.

A: The project team has successfully delivered comparable color digital orthophotography to at least 4 clients.

NA: The project team has successfully delivered comparable color orthophotography to at least 3 clients.

UA: The project team has not successfully delivered comparable digital orthophotography to a client.

Provide here specific project names, each of which identifies a project whose references and description are provided in the “Prior Project Experience Summary” section of the proposal:

Project Name	Proposal page #	Client & Reference Name	Reference Phone

3. Capture Rates

Attachment A contains a capture rate form, and instructions for filling this form out. The Town will compare the capture rate estimates from each firm. Capture rates will be examined both as a sum of all features listed, and on a feature by feature basis. Vendors will be expected to meet the proposed capture rates.

HA: The vendor's proposed capture rates are in highest third (top-33%) of the proposal received.

A: The vendor's proposed capture rates are in middle third (mid-33%) of the proposal received.

NA: The vendor's proposed capture rates are in lowest third (bottom-33%) of the proposal received.

4. History of On-Time Performance

HA: All references contacted by the Town confirmed that vendor had met schedule expectations and delivered an "on-time" project.

A: No more than one of the references contacted by the Town confirmed that vendor had not met schedule expectations and delivered an "on-time" project.

NA: More than one reference stated that there had been **significant** difficulties with the vendor's ability to meet their stated schedule.

UA: No references indicated that vendor had the ability to meet their stated schedule.

5. Quality Assurance/Quality Control (QA/QC)

HA: The vendor clearly described QA/QC procedures that would ensure high-quality deliverables.

A: The vendor provided only a general description of the firm's QA/QC philosophy and approach.

NA: The vendor has provided only minimally acceptable QA/QC documentation.

UA: The vendor has not described the QA/QC procedures that would be used.

6. Overall Quality of the Proposal Package

HA: The vendor met all submittal requirements, filled out all forms and presented a clear and logical Plan of Services. The Plan of Services demonstrated a clear understanding of the tasks and attendant complexities and will enable the project to commence immediately. The proposal clearly defines the roles and responsibilities of all of the vendor's personnel as well as sub-contractors and the Town.

A: The vendor met all submittal requirements, filled out all forms and presented a Plan of Services. The Plan of Services demonstrated a sufficient understanding of the tasks and attendant complexities that will enable the project to commence with minimal input from the Town. The proposal basically defines the roles and responsibilities of all of the vendor's personnel as well as sub-contractors and the Town.

NA: The vendor's proposal met most submittal requirements and provided a basic plan of services. Proposal disclosed only a basic understanding of the Town's objectives. Proposal was found to be general in nature and did not adequately address the roles and responsibilities of personnel and sub-contractors.

UA: The vendor's proposal omitted certain requirements or left some forms blank. Proposal disclosed a failure to fully understand the Town's objectives. Proposal was found to be deficient in a significant fashion.

7. Overall Quality of References

HA: All references contacted spoke favorably of the work performed by the contractor and would use them again for a similar project without hesitation.

A: One of references spoke stated that there had been significant difficulties with the vendor's ability to deliver the contracted services and deliverables.

NA: More than one reference stated that there had been significant difficulties with the vendor's ability to deliver the contracted services and deliverables.

Attachment D Price Submittal Form
Town of Acton - GIS Base Map Development
Vendor:

Line#	Item	40-Scale Mapping
		Proposed Price
1	Ground Control , FAAT	\$
2	Planimetric mapping of all features in Attachment E	\$
3	Topographic mapping, 2 ft. contours, spot elevations, DTM (See Attachment E)	\$
4	Color digital orthophotos at .25' pixel resolution	\$
5	Colorinfrared orthophotos at .25' pixel resolution	\$
6	TOTAL	\$

Attachment E
 Acton, Massachusetts
 GeoDatabase Specification for Acton GIS Planimetric and Topographic Data

14-Aug-07

Feature Class	Feature Class Description	Feature Types (required topology)	Attribute Type	"Z" elev	Attribute Column Name(s) & Definition	Attribute Value Domain	Attribute Value Description	Notes				
REQUIRED FEATURES												
LAYER BASIC PLANIMETRICS												
1	ROAD	Edge of Pavement	Poly,Line	POLY	TYPE	PAVED	Paved street polygons	Portions of streets that lie under bridges or tunnels should have both linework and polygons coded as hidden. The border of the hidden polygons should be coincident with the bridge/tunnel lines.				
						12,12,C	UNPAVED		Unpaved street polygons			
							MED-ISLAND		Interior of city blocks and highways			
							BRIDGE		Bridge decking and structures			
							LINE		TYPE	PAVED	Edge of paved streets	
									12,12,C	UNPAVED	Edge of unpaved streets	
										CURB	Street curbs	
										BRIDGE	Boundary of bridge structure	
										PAVED-HID	Hidden paved roads	
										UNPAVED-HID	Hidden unpaved roads	
										BRIDGE-HID	Hidden bridges	
										EDGE	Tile edge	
			ANNO	ANNO.NAME	Road Name in ALL CAPS		The interior of all roads should be a closed polygon					
							Unpaved roads should be closed where they meet paved					
							TO BE REMOVED WHEN SEAMLESS COVER MADE					
							2 layers, #2 is shields and symbols for numbered roads					
2	ROADCL	Street Centerlines	Line	LINE	TYPE	PAVED	Paved street centerlines	Line segments that cross, but do not intersect (e.g. one road that goes over another on a bridge) should *NOT* have a node created at the crossing point.				
						12,12,C	UNPAVED		Unpaved street centerlines			
							NONE					
							NAME		Street names	The individual street name of each segment.		
							40,40,C					
			Z				*Elevation of intersections to be put in SPOT_E coverage					
							Annotation should be placed to be legible at project scale with a single street name, for each street, appearing on each checkplot sheet submitted. Annotation names should be taken from the arc attribute table (AAT) and the value of annotation should match exactly the values of the street centerline name attribute.					
3	RAIL	Rail roads	Line	LINE	TYPE	ACTIVE	Active rail roads	Centerline of rails				
						12,12,C	ABANDON		Abandoned rail roads			
							NAME		Railroad names	The individual railroad name on each segment.		
							40,40,C					
			ANNO	ANNO.NAME	Rail Name in ALL CAPS							
4	SWALK	Sidewalk polygons	Poly,Line	POLY	TYPE	SIDEWALK	Public sidewalk polygons	Sidewalks are captured as polygons with an attribute describing whether polygon is/is not an swalk.				
						12,12,C	BITUMINOUS		Public bituminous sidewalk polygons			
							BRICK		Public brick sidewalks polygons			
							GRAVEL		Public gravel sidewalks polygons			
							WALKS		Private walks (e.g. sidewalk to door)			
							NONE		Interior blocks formed by sidewalks			
							LINE		TYPE	SIDEWALK	Public sidewalk boundaries	
									12,12,C	SIDEWALK-HID	Hidden sidewalk boundaries	
										EDGE		
5	BLDG	Building foot/roofprints	Poly,Line	POLY	Z	TYPE	BLDG	Polygon is a building	All buildings should be closed polygons.			
							12,12,C	NONE		Polygon is not a building (e.g. an interior courtyard)		
								WATERTANK		Water storage tank		
								FUELTANK		Fuel storage tank		
								SMOKESTACK		Smokestacks		
								MOBILE		Mobile home, trailer		
								FOUNDATION		Building foundation		
								PORCH		Porch		
								DECK		Decks		
								RUINS		Ruined building		
								LINE		TYPE	BLDG	All lines
											12,12,C	BLDG-HID
							Three or more stairs in a flight					

Attachment E

Acton, Massachusetts

GeoDatabase Specification for Acton GIS Planimetric and Topographic Data

14-Aug-07

Feature Class	Feature Class Description	Feature Class Description	Feature Types (required topology)	Attribute Type	"Z" elev	Attribute Column Name(s) & Definition	Attribute Value Domain	Attribute Value Description	Notes						
							EDGE		TO BE REMOVED WHEN SEAMLESS COVER MADE						
6	DRIVEWAY	Driveways	Poly, Line	POLY		TYPE	DRIVEWAY	Driveway areas	All driveways will be represented as continuous lines that snap to appropriate features (e.g. buildings, road edges, etc.) allow polygon conversion.						
							DRIVE-UNP								
							NONE	"Islands" within driveways							
							DRIVEWAY	Driveway lines							
							DRIVEWAY-HID	Hidden driveway lines							
			Line	LINE		TYPE	DRIVEWAY	Driveway lines							
							12,12,C	DRIVEWAY-HID	Hidden driveway lines						
							EDGE		TO BE REMOVED WHEN SEAMLESS COVER MADE						
7	PARKING	Parking areas	Poly, Line	POLY		TYPE	PAVED	Paved parking area	Parking areas of more than 4 spaces should be delineated as polygons.						
							UNPAVED	Unpaved parking area							
							NONE	"Islands" within parking areas (e.g. traffic islands, or plantings)							
							BOUND	Line is a parking area boundary							
							BOUND-HID	Hidden parking area boundary							
			LINE			TYPE	BOUND	Line is a parking area boundary	Parking areas should include the "parking driveway".						
							12,12,C	BOUND-HID	Hidden parking area boundary						
							EDGE		TO BE REMOVED WHEN SEAMLESS COVER MADE						
8	HYDRO	Hydrography	Poly, Line	POLY		Z	TYPE	POND	Pond polygon	Coincident features (e.g. lines separating a pond and a wetland) should be stored as a single line feature.					
							12,12,C	WETAREA	Wetland polygon						
								FWETAREA	Forested Wetland polygon						
								UPLAND	Upland surrounded by linear water fe		Wetland boundaries that are also vegetated area boundaries should be coincident (even if stored in separate coverages.				
								WATER	River that appears as poly						
									ISLAND		Islands surrounded by polygon water				
									Z		RETENT	Retention ponds / Flood basins			
											NAME	Pond name	The name of pond/lake feature	*Pond Elevations to be put in SPOT_E coverage	
											40,40,C				
											ANNO.NAME		Feature name in ALL CAPS		
									LINE			TYPE	POND	Pond shoreline	All water bodies and streams will be shown as a continuous polygons or lines regardless if overpassing bridges or other features cause them to appear as two separate features. "Hidden" coding will be used to identify interpolated feature positions.
												12,12,C	RETENT	Retention pond lines	
													RIVER	River shoreline	
													WETAREA	Wetarea shoreline	
													FWETAREA	Forested wetarea shoreline	
													STREAM	Single line streams and brooks	
													POND-HID	Hidden pond shoreline	
													RETENT-HID	Hidden Retention pond lines	
													RIVER-HID	Hidden River shoreline	
						WETAREA-HID	Hidden Wetarea shoreline								
						FWETAREA-HID	Hidden Forested wetarea shoreline								
						STREAM-HID	Hidden stream (e.g. beneath bridge)								
						CONNECT	Invisible but intuited hydro connectio								
						EDGE		TO BE REMOVED WHEN SEAMLESS COVER MADE							
						NAME	Stream name	The name of stream/river features	The town will provide a manuscript of hydrography names as a basis for annotation and NAME attributes.						
						40,40,C									
				ANNO		ANNO.NAME		Feature name in ALL CAPS							
9	INFRA	Street furniture/infrastructure	Point	POINT		Z	TYPE	CB	Catch basins (storm drain)	CB, HYD, and Mnholes have been automated from record p					
								12,12,C	HYD	Fire hydrant	This data will be made available for the project, but the vend				
									Z	MH	Manholes of unknown type	expected to photo interpret these features.			
									Z	MH-E	Electric manhole				
									Z	MH-S	Sanitary sewer manhole				
									Z	MH-TV	Cable TV manhole				
									Z	MH-T	Telephone manhole				
				Z	MH-D	Drain manhole									

Attachment E
Acton, Massachusetts
GeoDatabase Specification for Acton GIS Planimetric and Topographic Data

14-Aug-07

Feature Class	Feature Class Description Description	Feature Types (required topology)	Attribute Type	"Z" elev	Attribute Column Name(s) & Definition	Attribute Value Domain	Attribute Value Description	Notes
				Z		WG	Water Gate	
						GG	Gas Gate	
						SUB	Electrical substation	
						POLE	Utility pole	
						POLE-LT	Utility poles with street light	
						LIGHT	Light Pole	
						PARKING-M	Parking Meter	
						TRAFFIC-SIGN	Traffic Sign	
						TRAFFIC-POLE	Traffic Signal Pole	
						UNKNOWN	Unknown	
					ELEV	Elevation value	Elevation of features with Z values	
					4.7.F.2			
10	FENCE	Fences	Line	LINE	TYPE	FENCE	Fence	Fences and property boundary hedges
					12,12,C	HEDGE	Hedges used as a boundary	
						GUARDRAIL	Guardrail along road	
11	WALL	Walls and retaining walls	Line	LINE	TYPE	WALL	Wall	2' min height, 40' length
					12,12,C	RETWALL	Retaining wall	
						STONEWALL	Stone Wall (not retaining)	
12	TRAIL	Trails	Line	LINE	TYPE	TRAIL	Trails < 10 ft. width, captured single	Unpaved trails/footpaths less than 10 ft. width depicted as single lines features. Paved paths will be captured double line, and snapped to other features (e.g. road) allowing later conversion to polygons.
					12,12,C	PATH	Paved foot/bike path	
						TRAIL-HID	Hidden trail (see above)	
						PATH-HID	Hidden path (see above)	
13	MISC_PT	Miscellaneous points	Point	POINT	TYPE	POST	Post	
					12,12,C	RADIO	Radio and cellular phone towers	
						STANDPIPE	Visible standpipes, wellheads	
14	SPORT	Sports facilities/areas	Poly, Line	POLY	TYPE	POOL-IN	Swimming pools inground	TO BE REMOVED WHEN SEAMLESS COVER MADE
					12,12,C	POOL-AB	Swimming pools above ground	
						FIELD	Athletic fields	
						GOLF	Golf courses	
						TENNIS	Tennis courts	
						BASKETBALL	Basketball courts	
						BASEBALL	Baseball Field	
						PARK	Park	
						PLAYGROUND	Playground	
						NONE	"islands" within sports areas	
				LINE	TYPE	POOL-IN	Swimming pools inground	
					12,12,C	POOL-AB	Swimming pools above ground	
						FIELD	Athletic fields	
						GOLF	Golf courses	
						TENNIS	Tennis courts	
						BASKETBALL	Basketball courts	
						BASEBALL	Baseball Field	
						EDGE		
				ANNO	ANNO.NAME		Feature name in ALL CAPS	
15	LANDCOVER	Large vegetation and land cover	Poly, Line	POLY	TYPE	TREES	Tree and forest vegetation areas	Vegetation areas in excess of .25 acres are captured.
					12,12,C	BRUSH	Brush and scrub vegetation areas	
						CROP	Cultivated fields	
						QUARRY	Quarry	
						GRAVEL	Gravel pile	

Attachment E
 Acton, Massachusetts
 GeoDatabase Specification for Acton GIS Planimetric and Topographic Data

14-Aug-07

Feature Class	Feature Class Description Description	Feature Types (required topology)	Attribute Type	"Z" elev	Attribute Column Name(s) & Definition	Attribute Value Domain	Attribute Value Description	Notes
						NONE	"islands" within land cover areas	
			LINE		TYPE	TREES	Tree and forest vegetation borders	
					12,12,C	BRUSH	Brush and scrub vegetation borders	
						CROP	Cultivated fields borders	
						QUARRY	Quarry	
						GRAVEL	Gravel pile	
						EDGE		TO BE REMOVED WHEN SEAMLESS COVER MADE
16	CEMETERY	Cemeteries	Poly, Line	POLY	TYPE	CEMETERY	Cemetery	
					12,12,C	NONE	"islands" within cemetery areas	
					NAME	Cemetery Name	The cemetery name	
					40,40,C			
			LINE		TYPE	CEMETERY	Cemetery	
					12,12,C	EDGE		TO BE REMOVED WHEN SEAMLESS COVER MADE
				ANNO	ANNO.NAME		Feature name in ALL CAPS	
17	TREE	Street trees	Point	POINT	TYPE	TREE	Street tree	Point location of street trees adjacent to streets.
					12,12,C			
18	DOCK	Docks and piers	Poly, Line	POLY	TYPE	DOCK/PIER	Docks and Piers	Docks are floating structures; piers a permanent structs.
					12,12,C	NONE	"Islands" within dock or pier structure	above the water, often on piles.
			LINE		TYPE	DOCK/PIER	Dock and Pier lines	
					12,12,C	EDGE		TO BE REMOVED WHEN SEAMLESS COVER MADE
19	DRAINAGE	Drainage related structures	Line	LINE	TYPE	FLOODWALL	Headwall, wingwall, etc.	If any of these features need to be captured as double lines (e.g. each bank of a wide ditch), then both lines should have the appropriate code.
					12,12,C	DAM	Dams	
						DITCH	Drainage ditch	
						DITCH-HID	Hidden Drainage ditch	
						CULVERT	Culverts	
						OUTFALL	Outfalls	
20	GRID	Tile Grid	Poly	POLY	TILE	tile number	Tile Number	
					2,2,I			
21	CONTROL	Ground control	Point	POINT	TYPE	HPT	Newly created horizontal point	A point coverage of all ground control used during the FAAT should be delivered with attributes for the explicit coordinate values as well as for the type of ground control point, the material used to permanently mark the monument points and a description of whether the point was marked so that it was visible during the fly-over.
					12,12,C	VPT	Newly created vertical point	
						HVPT	Newly created horiz. and vert. point	
						FAATPP	FAAT point from stereomodel	
						MHD	Mass. Highway Dept. point used	
						USGS	USGS point used	
						OTHER	Other existing monument pt.	
			POINT		MATERIAL	SPIKE	A spike marks the point	It is understood that FAAT points will not have markers and will be coded as NONE.
					12,12,C	CEMENT	Cement object marks the point	
						OTHER	Other object marks the point	
						NONE	There is not a marker for point	
			POINT		VISIBLE	Y	Point is visible on photographs	
					3,3,C	N	Point is NOT visible on photos	
			POINT		X	X coordinate	Value of the X coordinate	
					12,12,N,4			
			POINT		Y	Y coordinate	Value of the Y coordinate	

Attachment E
 Acton, Massachusetts
 GeoDatabase Specification for Acton GIS Planimetric and Topographic Data

14-Aug-07

Feature Class	Feature Class Description Description	Feature Types (required topology)	Attribute Type	"Z" elev	Attribute Column Name(s) & Definition	Attribute Value Domain	Attribute Value Description	Notes	
					12,12,N,4				
			POINT		Z	Z coordinate	Value of the Z coordinate		
					12,12,N,4				
22	CONTOUR	2 ft. contour lines & spot elevations	Line	LINE	ELEV	Elevation value	Elevation of the contour line	Contours are created with appropriate reference from retaining walls and other break lines. Contour lines are not broken for annotation placement.	
					4,4,I				
					TYPE	INTV	2 ft. contour lines		
					12,12,C	INTH	contour lines that are hidden		
						INTV-DEP	depression contour lines		
						INTH-DEP	inter-dep-hid		
						INTV-OBS	inter-obs		
						INTH-OBS	inter-obs-hid		
						INTV-DEP-OBS	inter-dep-obs		
						INTH-DEP-OBS	inter-dep-obs-hid		
						INDV	index		
						INDH	index-hid		
						INDV-DEP	index-dep		
						INDH-DEP	index-dep-hid		
						INDV-OBS	index-obs		
						INDH-OBS	index-obs-hid		
						INDV-DEP-OBS	index-dep-obs		
						INDH-DEP-OBS	index-dep-obs-hid		
				ANNO	ANNO.ELEV	Cont. elevation te	Feature name in ALL CAPS		
23	SPOT_E	Elevation to .1 foot	Point	POINT	Z	TYPE	SPOT-RD-INT	Elevation of the road intersection	Spot elevations will be captured at all street intersection locations, water bodies, hilltops, and in other key points.
					Z		SPOT-WATER	Elevation of Stationery water body	
					Z		SPOT-HILL	Elevation of hilltop	
					Z		SPOT-OTHER	Elevation of other spot	
					ELEV		Spot Elev. value	Elevation of the spot	
					6,6,N,1				
				ANNO	ANNO.ELEV	spot elevation tex	Numbers in ALL CAPS		
24	DTM	Digital terrain model points	Point	POINT	TYPE	DTM	DTM masspoints		
					12,12,C	BREAK	Breakline points		
					ELEV	Elevation value	Elevation of the DTM or breakline pt.		
					4,7,F,2				

Town of Acton

Acceptance Criteria for GIS Basemap Project Deliverables

1 Overview

All digital data and plots must pass the following sequence of tests -- to be performed by the client, or client's consultant -- before they are accepted for payment. Acceptance tests are designed to provide criteria for judging whether the specifications contained in the RFP have been met. The following describes the QA/QC tests that will be applied to all project deliverables.

2 Review Procedures

The review process will be standardized and contain the following sequence of steps:

- a. Data and plots delivered by contractor
- b. QA/QC by city/town and its consultants commences
- c. Data are checked for completeness and readability within ArcGIS
- d. Data are digitally analyzed for conformity with database design
- e. Data and plots are visually inspected within ArcGIS for data quality, accuracy and completeness
- f. City/town and its consultants perform any required fieldwork
- g. City/town and its consultants prepares a written QA/QC memo and provides this memo to the photogrammetry vendor. The memo details all errors, omissions and questions raised during the QA/QC review.
- h. Contractor provides a written response to the QA/QC memo that answers questions, outlines corrective actions and details expected redeliveries (of data and/or plots).
- i. City/town and contractor agree on proposed corrective actions.
- j. Contractor performs corrections and re-delivers data

Open and honest communication between the contractor and the city/town are strongly encouraged throughout the QA/QC process

3 Planimetric Mapping Acceptance

Planimetric data QA/QC may include, but is not limited to the following tests.

3.1 *Planimetric Digital Data Review*

A. **Conformance with the Database Design**

A set of tests will be run to ensure that planimetric data was built in accordance with the specifications agreed upon in the database design. These tests will check for correct:

- Ability to read files in ArcGIS

Attachment F

- Projection
- Fuzzy and Dangle Tolerances
- Feature coding not in conformance to project standards
- Completion and validity of attribute data
- Strict adherence to the Database Design, including the TYPE value domain and item field definitions
- Ensuring coverages with a NAME attribute are given the correct Name value

B. General data quality issues

- Ability to read files in ArcGIS
- Seamless integration between delivery groups
- Absence of slivers and other erroneous features
- Absence of pseudo nodes
- Line quality:
 - Absence of jagged appearance of smooth line features
 - Absence of extraneous vertices (particularly for straight lines)
 - Absence of dangles and overshoots
- Absence of extremely small polygon features (e.g. with an area of less than 1 foot) or extremely short arc features (e.g. with a length of less than 1 foot)
- Features with implausible shape, size or TYPE value
- Attribute values that are implausible or out of range
- Overlapping Features, such as vegetation polygons overlapping ponds
- Consistent handling of reoccurring situations, for example driveway, sidewalk and edge of pavement intersections.
- Complete capture of features

C. Production of an “error report memo”.

All errors and/or omissions will be noted in a memo delivered to the city/town and the vendor. A memo will be prepared for each data delivery.

3.2 Planimetric Plot Review

A. All plots shall be reviewed for:

- Registration consistency between planimetric, orthophoto and topographic data
- Readability/legibility
- Correct symbology as agreed to following pilot approval
- Annotation accuracy and completeness
- Conformance with plot and data capture specifications

B: Errors and omissions will be noted on the plots or in writing and reported to the vendor. Delivery of confirmation plots will be required when a substantial number of edits are noted on a particular checkplot.

4 Topographic Mapping Acceptance

Topographic plots and digital data must pass the following visual reviews -- to be performed by the client or client’s consultant -- before they are accepted for payment. Final QA/QC by the client may include, but are not limited to the following tests.

4.1 Topographic Digital Data Review

- A. Digital files shall be reviewed for:
- Ability to read files in ArcGIS
 - Conformance with the database design
 - Projection
 - Seamless integration between delivery groups
 - Completion and validity of attribute data
 - Crossing contours
 - Un-jagged/smooth line work
 - Consistency with planimetric base map features (e.g. no contours overlapping into water bodies)
 - Contours correctly coded for hidden and obscured attributes
 - Consistent and proper coding of depression contours
 - Contours dead-ends with no corresponding ground features (Retaining Walls, Buildings, etc.)
 - Accurate and appropriate annotation of index contours
 - Correct TYPE attributes of the SPOT Elevation
 - Correct Elevation values including checking for zero values and contours outside of the elevation range for the community
- B. Any errors found will be reported in a memo delivered to the vendor and the Town. The QAQC vendor and the town should expect comments and corrections redelivered for another round of digital inspection.

4.2 Topographic Plot Review

- A. All plots shall be reviewed for:
- Registration consistency between planimetric, orthophotographic and topographic data
 - Readability
 - Correct symbology as agreed to following pilot approval
 - Annotation accuracy and completeness
 - Conformance with plot and data capture specifications
- B. Errors and omissions will be noted on the plots and reported to the vendor. Delivery of confirmation plots will be required when a substantial number of edits are noted on a particular checkplot.

5 Orthophoto Acceptance

Orthophoto plots and digital data must pass the following visual reviews -- to be performed by the client or client's consultant -- before they are accepted for payment. Final QA/QC by the client may include, but are not limited to the following tests. The ortho QA/QC plan uses the methodology described in the paper "*Review Criteria and Methodology for Digital Orthophotos Using ArcView*" by Gary Smith and Harry Roush (17th ESRI International User Conference Proceedings, 1997) as a guideline.

5.1 Orthophotographic Digital Data Review

Attachment F

- A. Digital files shall be reviewed for:
- Ability to read files in ArcGIS
 - Projection
 - Seamless integration between delivery groups or tiles
 - Scratches or debris on the negatives
 - Warping of the image
 - Stretching of the ortho related to a bridges or other raised feature
 - Conformance with the DTM coverage
 - Consistency of tone and color across tiles and delivery areas
- B. Errors, omissions and conditions of non-conformance with the specifications shall be reported in writing to the vendor who will rectify problems and redeliver the data.

6 Fieldwork

Detailed fieldwork will be performed on an as-needed basis. This fieldwork may include simple spots checks for sample areas, or a comprehensive review of all tiles. The fieldwork will be conducted to check for spatial accuracy and completeness as well as to confirm the capture rates achieved during the photogrammetric processes.

A. Spatial Accuracy

A group of well-defined features will be randomly selected from each tile. An x, y coordinate pair will be acquired for each feature by either differential GPS methods or instrument survey based on a traverse commencing at a high accuracy control point. A z (elevation) value will also be measured if appropriate.

Acceptance under this test shall be granted if the photointerpreted location of each point meets the accuracy standards in place for the project (i.e. ASPRS), based on the high accuracy GPS survey.

B. Data Capture Completeness

Personnel shall compare all data on a checkplot/digital data submission to field observations of those same features. Capture rates will be calculated by comparing the number of features observed in the field to the number present in the digital data. In addition, the accuracy of attribute coding will be confirmed at this time (e.g. presence/absence of a street light on a utility pole).