Addendum 1
Vendor Questions

Questions will be listed as they are received. Check back often as this document will be continuously updated.

Q: Reference Attachment A- Project area: Please confirm that all 792 tiles require digital Orthophoto and/or topographic mapping data. Page 7 – Overall Specifications specifies that "photography must cover all grid cells in their entirety".

A: *All 792 tiles require Orthophotograpy at a minimum*

Q: Reference Attachment A- Project Area: We noticed that on the most easterly column of tiles (East of Stonington) is outside of the town boundary- please confirm that these tiles are required and part of the project area

A: *Yes - These tile are required*

Q: Reference Attachment A- Project Area: The total land area provided in the RFP is less than the 792 tiles- which of the areas should be used for the estimate.

A: *The area for the 792 tiles should be included for any imagery estimates. The land area should be used for estimates pertaining to planimetric or topographic acqusition.*

Q: Project area- Please confirm that all islands need to be captured that are within the provided/outlined tile grid in Attachment A.

A: *Yes - All islands need to be captured*

Q: Town of Groton- Can the town certify the accuracy of the on-screen digitizing effort to meet the 1"=100' map scale. Was this done from orthophotos or by stereo compilation?

A: *No. These edits do not meet 100 scale map accuracy standards. They digitized off of the orthophoto. No stereo compilation was used.*

Q: Town of Groton-Does the original ArcGIS database distinguish between features identified in the Comments (i.e. paved and unpaved; etc.)

A: *Yes*

Q: Can you provide us with a shape file for all ground control points (all towns from the 1999 aerial flight)? Has the town maintained the ground control points? What types of monuments were used?

A: *Groton and Stonington can provide ground control but neither town maintains the dataset. Monuments used are unknown. Waterford has ground control available in a shapefile that we maintain. The monuments are either concrete with disks or disks drilled in ledge. We also have description sheets and coordinates of all control points in Town.*

Q: Is a CT licensed surveyor required for the ground control?

A: *Yes*

Q: Page 12 - Checkplots for orthophotos- Please confirm that the towns are wishing color/CIR plots of the digital orthophotography?

A: *Yes*

Q: page 12 Checkplots for orthophotos- Please clarify of the checkplots are only for the pilot project area (4 tiles per town).

A: *No. check plots are for entire towns but will be required for pilot project also. No need to resubmit pilot area for final check plots.*

Q: Is there a consultant supporting this project? If so who?

A: *Nobody*

Q: Regarding the “Color IR” option, could you clarify the purpose the Color IR will be used for and what the actual “CIR” deliverable is? Does the “Color IR” refer to film-based true CIR? (Digital cameras produce “Near-IR” which has some of the spectral values of CIR but not all). Does the town have a preference in this regard?

A: *Color IR wold be used for projects such as impervious surface delineation, vegetation analysis, wetland delineation. We currently do not have any experience using CIR and do not know what would be the best product for us. It may be beneficial to discuss the pros and cons of each product in your response and provide pricing for each (if different).*

Q: The cost pages are broken out per town. Should we consider that perhaps all the towns do not have funds appropriated, or should we price as all four towns will be participating and show the breakout or per-town share on a per-town basis?

A: *Price on a per-town basis. All towns will be participating to some capacity. The prices will determine what products each town will purchase.*

Q: Waterford features to be compiled include various types of manholes. We cannot identify the various types of manholes photogrammetrically. Is it the intent that check plots be used for Waterford personnel to mark which type of manhole is which?

A: *Waterford will identify the manhole type in the field prior to the flight. The manholes to be captured will be painted with an agreed to symbol in order to identify specific types.*

Q: Is there a last date to submit additional questions?

A: *Last day to submit questions will be January 23, 2009 at 4:00pm. Any questions asked up to this point will be finalized and posted to this document by January 25, 2005 at 4:00pm.*

REQUEST FOR QUALIFICATIONS/PROPOSALS

Color Digital Orthophotography and Planimetric Vector Data

The Towns of Groton, Ledyard, Stonington and Waterford (the Towns) are seeking qualified vendors to provide 1" = 100' color digital orthophotography (all towns) and planimetric vector data

A more detailed description of the project and background for the RFQ/P may be obtained at the Town of Ledyard Mayor's Office at 741 Colonel Ledyard Highway, Ledyard, CT. by email to **bmpal@town.ledyard.ct.us**.

Sealed statements of qualifications (4 copies) will be received at the Mayor's Office until 4 pm on January 30, 3009. The process used to select a vendor for this project will be a two step process. Under this RFQ/P,the towns request that vendors submit their qualifications as outlined within this document. Representatives from the towns will review all proposals based on their qualifications and merits. Vendors will be short-listed based upon the above criteria. Cost proposals of these firms will then be opened and award will be made to the lowest fully responsive respondent.

Women and Minorities are encouraged to submit a proposal.

The Towns reserve the right to accept or reject any or all options, bids, response to the request for qualifications, or proposals; to waive any technicality in a statement or part thereof submitted, and to accept the statement deemed to be in the best interest of the Towns. All materials submitted shall become the property of the Towns. The receipt of any response to this request shall in no way be construed to create or imply a contract or obligation between the parties.

Town of Groton, Connecticut
Town of Ledyard, Connecticut
Town of Stonington, Connecticut
Town of Waterford, Connecticut

Request for Proposals Color Digital Orthophotography, Planimetric and Topographic Vector Data

Issue Date:
January 2, 2009

Proposals Due:
January 30, 2009

STATEMENT OF PURPOSE

Under this Request for Proposal (RFP) the Towns of Groton, Ledyard, Stonington and Waterford (hereafter "the towns") wish to solicit proposals from vendors who are qualified to provide 1" = 100' color digital orthophotography (all towns) and planimetric vector data (Groton, Ledyard, Waterford). Groton and Waterford also wish to update or create new topographic vector data.
Specific layers will be described in Attachment B (Individual town Specifications). Although the towns are entering into this RFP jointly, they each will be funding their respective town's data acquisition separately. The data developed from this project will be incorporated into the respective town's existing Geographic Information System (GIS). The towns intend to select a vendor and have a contract signed in time for the aerial photography to be flown in the **Spring of 2009.**

PROJECT BACKGROUND

The towns in the project area are located in southeastern Connecticut with the eastern most border being the Rhode Island/Connecticut State line. The project area consists of 792 2500' x 2500' tiles. This calculates to approximately 177.56 square miles. Please see Attachment A of this document for further illustration. The towns currently utilize ESRI's GIS products as their standard GIS software. Consequently, all digital deliverables must be readable in ArcGIS 9.x format with preference being given to ESRI File Geodatabase format.

Participating Towns' Background

Town of Groton

- Total land area: 31 Square Miles
- Population: 52,341

The Town of Groton currently has an enterprise Geographic Information System which is utilized for everyday business operations. All data used in the town of Groton is stored in an ArcSDE Geodatabase. The data currently used in Groton's GIS was developed from an aerial flight performed in April 1999 at a scale of 1":100'. Groton has a plan in place to perform an aerial flight every ten years to supplement our town wide revaluation. Groton leased aerial photography from AT&T's (formerly SBC) 2004 flight and updated limited planimetric data by town of Groton staff using on-screen digitizing. These limited updates have sufficed for the past several years, but we need a complete update of all planimetrics and topography as well as up-to-date orthophotography for the upcoming revaluation. It is the Town of Groton's intent to have completed as part of this project:

- New 100 scale digital orthophotographs (color; 0.25' or 0.5' pixel resolution)
- A New digital terrain model
- Contour lines (2 foot)
- Full 100 scale planimetrics
- Color IR (Optional)

Groton requests a detailed price breakdown for all mapping products and options contained in this solicitation. Vendors are asked to fill out the price sheet included in this solicitation. This will give the town greater flexibility in evaluating the proposals and the ability to chose products to match budget conditions. Samples of the existing planimetric basemap and its ground control can be obtained from the Town of Groton's GIS Coordinator.
The Town of Groton is willing to provide the following:

- Existing digital terrain model (DTM) from the 1999 base mapping project.
- Existing ground control from 1999 base mapping project
- Airborne GPS and Exterior Orientation Results (Hardcopy only)

- Town Boundaries in shapefile format (for all participating towns)
- 2500x2500 tile grid in shapefile format (coverage includes all participating towns)

Town of Ledyard

- Total land area: 40 square miles
- Population: 15,084

The Town of Ledyard utilizes its Geographic Information System daily in its Planning, Zoning & Assessor's offices. The most recent data used in Ledyard is stored in a Personal Geodatabase, however, some data still exists in individual shapefiles. While Ledyard participated in the same April 1999 aerial flight, the town does not have digital images. As a result, Ledyard's existing data was developed from various sources available in town Hall. Ledyard's data has been updated by town staff and by outside contractors, however, comprehensive planimetrics have not been completed.

It is the Town of Ledyard's intent to have completed as part of this project:

- New 100 scale digital orthophotographs (color; 0.25' or 0.5' pixel resolution)
- 100 scale planimetrics as prioritized in Attachment B
- Contour lines- 2 foot (optional)
- New Digital Terrain Model (optional)

Ledyard requires a detailed price breakout for mapping products and options contained in this solicitation. Vendors are to submit a completed price sheet for Ledyard that is included in this solicitation.

Ledyard can provide the following:

- Existing ground control from 1999 base mapping project (hardcopy only)
- Airborne GPS and Exterior Orientation Results

Town of Stonington

- Total area: 50.7 square miles
- Total land area: 38.7 square miles
- Population: 18,262

The Town of Stonington maintains an enterprise Geographic Information System for use by town departments and the public community. The current system is managed in house by staff with annual updates of parcels being outsourced. The town currently stores its geographic data in a Microsoft SQL based ArcSDE DBMS. Most of the planimetric and topographic data is in Shapefile or Geodatabase format. The town of Stonington currently utilizes color orthophotography at a scale of 1" = 100' acquired from an aerial flight in 1999 and a black and white orthophotos at a scale of 1" = 200' acquired from an aerial flight in 2004.

The goal of the town is to capture recent changes in land development not reflected in the above orthophotos and potentially update planimetric and topographic data with a new flight.

It is the Town of Stonington's intent to have completed as part of this project:

- New 100 scale digital color orthophotographs with 0.25' or 0.5' pixel resolution

The Town of Stonington would also like the future option to purchase the following based on the above request:

- Full 100 scale planimetrics
- Color IR
- A new digital terrain model
- 2 foot contour lines

Stonington requires a detailed listing of all requested options for the project with complete price breakdown of all costs. If the vendor requires any samples of existing data the town's IT Manager will

provide it upon request.

Town of Waterford

- Total land area: 33.2 Square Miles
- Population: approx 20,000

The Town of Waterford currently maintains a Geographic Information System utilizing Desktop GIS with two dedicated computers that provide data storage of individual Shapefiles, Geodatabases, ArcInfo Coverage files and GeoTIFFs. The users of the GIS within the town of Waterford run ArcGIS Desktop 9.3 utilizing ArcView and ArcInfo; also ArcView 3.2a and MapObjects embedded within a permit tracking software application. The planimetrics were originally created from an aerial flight performed in April of 1995 at a scale of 1":100'. A series of tiles containing planimetric data was compiled from the aerial orthophotography. These tiles were created and delivered to the town as cadfiles in *.dwg format. town staff later converted the cadfiles to Shapefiles. Various layers from these Shapefiles were then extracted to create individual feature Shapefiles. Selective updates to these existing feature shapefiles have been performed by town staff however a comprehensive update has not occurred since the creation of the original datasets.

Products requested:

- New 100 scale digital orthophotographs (color; .5' pixel resolution as a 1st priority or 0.25' as a second priorty option)
- Full 100 scale planimetrics
- Contour lines (2 foot)
- DTM

Waterford requires a detailed price listing for all the mapping products and options contained in this solicitation. The vendors are to submit a completed price sheet for Waterford that is included in this solicitation. Waterford has available samples of existing planimetric base mapping and ground control.

PROPOSAL SUBMITTAL AND SELECTION GUIDELINES

Interested vendors should submit four (4) copies (one copy per town) of the Technical and Cost proposals in separate sealed envelopes.
Each of the envelopes is to be clearly labeled as follows:

TECHNICAL PROPOSAL
Digital Orthophotography and Basemapping Project (RFP# 2009-07)
<<DATE>>
<<FIRM NAME>>

COST PROPOSAL
Digital Orthophotography and Basemapping Project (RFP# 2009-07)
<<DATE>>
<<FIRM NAME>>

Additionally an electronic version of both the cost and technical proposals, in a standard format such as Adobe Acrobat PDF, shall be provided on separate CD-ROMs. Four (4) CD-ROMs, each containing the Cost Proposal, shall be included in the Cost Proposal Sealed envelope. Four (4) CD-ROMs, each containing the Technical Proposal, shall be included in the Technical Proposal sealed envelope.

All proposals must be received no later than 4:00 p.m. on January 30, 2009 at the Address Below:

Marcia Hancock, Director of Finance Town of Ledyard
741 Colonel Ledyard Highway
Ledyard, CT 06339
ATTENTION: RFP# 2009-07, Digital Orthophotography and Basemapping Project

Each vendor assumes full responsibility for delivery of the completed proposal on or prior to the deadline. Any proposal received after the appointed time and date will not be considered. All clarifications and any additional information will be provided in the form of written addenda. Such addenda will become part of the RFP, and, therefore, will be considered as part of the binding contract. Addenda will be issued to all firms registered as having received an official copy of the RFP.

Technical Proposal Submission

Technical Proposals should include the following:

- A project approach description that covers the entire Scope of Services as described below.
- A timetable or timeline showing key milestones and progress
- A listing of similar projects completed by the vendor within the past 3 years with reference information (name, address, phone, etc.) for a representative for each of their clients. At least one of these references must have involved town-wide mapping for a municipality.
- Clear enumeration of any sub-contractors that will be working on the project, and their roles. The towns require that all work be done in the United States.
- Corporate Qualifications and financial stability (Balance sheet/income statement for most recent fiscal year)
- Staff resumes for individuals who will be working on this project. Omitting any of these items may be considered grounds for elimination. After a review of all proposals the towns anticipate creating a short-list. The towns may elect to interview short-listed vendors and will provide vendors with no fewer than 5 days of advance notice of an interview.

Cost Proposal Submission

Cost proposals in both hardcopy and digital format are to be submitted in a separate, sealed and clearly marked envelope. The envelope should be clearly marked "COST PROPOSAL" along with the firm name and project. These proposals will only be opened for the final group of qualified firms as described above. The Cost Proposal must include the completed Attachment C (Mapping Price Form).

Inquiries

All inquires regarding this RFP must be in writing and must be postmarked or delivered prior to the submission date. Acceptable forms of contact include U.S. Mail, Fax, Email. Phone calls will not be accepted.

Due to the size of this project, and the multiple municipalities involved, each town has designated a main point of contact for all technical questions. These contacts are listed below:

Town of Groton:
Andrew Bowne, GIS Coordinator
45 Fort Hill Road Groton, CT 06340
Fax: 860-441-6625
Email: abowne@town.groton.ct.us

Town of Ledyard:
Brian Palaia, Director Planning & Development
741 Colonel Ledyard Highway Ledyard, CT 06339
Fax: 860-464-1125
Email: bmpal@town.ledyard.ct.us

Town of Stonington:
Jason M. Jones, IT/GIS Manager
152 Elm Street Stonington, CT 06378
Fax: 860 535-9261
Email: jjones@stonington-ct.gov

Town of Waterford:
Mark Wujtewicz, Planner
15 Rope Ferry Road Waterford, CT 06385
Fax: 860-444-5879
Email: mwujtewicz@waterfordct.org

All Non-Technical questions about this RFP can be directed to:
Marcia Hancock, Director of Finance Town of Ledyard
741 Colonel Ledyard Highway Ledyard, CT 06339
Fax: 860-464-1125
Email: mthan@town.ledyard.ct.us

Selection Process

The process used to select a vendor for this project will be a two step process. Under this RFP,the towns request that vendors submit their qualifications as outlined within this document. Representatives from the towns will review all proposals based on their qualifications and merits.

Proposals will be evaluated based on the following criteria - listed in no specific order:

- Overall Plan of Services / Proposal
- The proposal shall be organized in a logical order using appropriate technical knowledge.
- The proposal shall not use excessive or unexplained technical jargon.
- The proposal shall demonstrate an excellent understanding of the towns needs.
- Vendor's background
- Past vendor performance
- Vendor's references
- Technical evaluation and approach
- Ability to meet project schedule
- Quality Assurance / Quality Control measures
- Guarantee of work and timeliness
- Vendor's ability to work synchronously with multiple municipalities under the same contract

Vendors will be short-listed based upon the above criteria. Cost proposals of these firms will then be opened and award will be made to the lowest fully responsive respondent.
Those vendors who were not short-listed will be so notified and their unopened cost proposals shall be returned to them.
The towns reserve the right to reject any and all proposals, to waive technical and minor defects, and make an award for what they deem to be in the towns' best interest.

Special Considerations

The project region shares many environmental and industrial variables that should be considered when proposing on this project. Vendors should take the following into considerations:

- Because the project area is mainly a coastal region, vegetation begins to bloom earlier in the spring season than that of inland areas. Vendors should take this into consideration when developing their timeline.
- The Town of Waterford contains the Millstone Nuclear Power Generation facility and the vendor will need to obtain the proper clearance and permissions including any permits required to fly over and photograph this facility.
- The town of Groton contains several facilities which may need special permission to be flown over in order to capture aerial photography. The vendor will be responsible for obtaining any necessary permits or permissions in order to fly over these areas. The areas include, but are not

limited to:

- Groton/New London Airport
- United States Submarine Base
- Electric Boat Corporation
- Pfizer Pharmaceuticals

SCOPE OF SERVICES

The products to be obtained through this soliciation are:

- Color aerial photography (Groton, Ledyard, Stonington, Waterford)
- Ground Control (Groton, Ledyard, Stonington, Waterford)
- FAAT (Fully Analytical Aerial Triangulation) (Groton, Ledyard, Stonington, Waterford)
- Development of color digital orthophotography (Groton, Ledyard, Stonington, Waterford) • Development of Planimetric vector data (Groton, Ledyard, Waterford, Stonington optional)
- Development of Topographic data (Groton, Waterford, Ledyard - optional, Stonington optional)
- Color IR (Optional) (Groton, Stonington)

Overall Specifications for Aerial Photography

The digital orthophotography shall comply with the American Society for Photogrammetry and Remote Sensing Accuracy Standards (ASPRS) for Class1, Large scale maps at 1" = 100'.
Horizontal datum shall be the Connecticut State Plan Coordinate System NAD83 (feet).
Vertical datum shall be the National American Vertical Datum of 1988 (NAVD88).
Project Area -The location and size of the project area have been defined in Attachment A. The photography must cover all grid cells in their entirety.
Conditions -The contractor shall take vertical photographs, free of clouds, cloud shadows, atmospheric haze and severe sun glare reflections with a minimum sun angle of 42 degrees.

Imagery shall not be collected when the ground is obstructed by snow, smoke, dust, floodwaters, or other environmental factors. All deciduous vegetation shall be free of leaves and streams shall be within their normal banks. Because the project area is primarily coastal region, the tide should be as close to mean high as possible.
Spacing of Photographs - Overlapping photographs in each flight line shall provide full stereo coverage of the area mapped. Endlap shall average 60 percent and not be less than 55 percent and no more than 65 percent. Sidelap shall average 25 percent and not be less than 20 percent and no more than 40 percent. Photographic crab shall be reduced to a minimum and shall not exceed 5 degrees for any flight line. Both Tilt and Roll shall not exceed 5 degrees.
Re-flights -Unacceptable coverage resulting from deviation from flight plan shall be immediately corrected at the vendor's expense.
Pixel Ground Resolution - The vendor shall capture imagery at a scale where either 0.5 ft or 0.25 ft ground sample distance (GSD) can be achieved. Pixel resolution will be dependent on which town is being captured.
Overage -Images will edgematch with no overlap or underlap.
Tonal/Color Balancing - Each image shall be balanced to adjacent orthophotos to the highest extent.
QA/QC for Aerial Photography - As soon as the aerial photography has been taken, it must be inspected for cloud, snow, shadow, color or any aforementioned variables. The imagery must then be inspected for sidelap, endlap and crab. A QC summary report shall be provided to each of the towns within two weeks of the date of the photography.

Overall Specifications for Ground Control and Photogrammetry

The winning vendor may utilize any existing ground control from any of the towns previous flights. The vendor will conduct any additional ground control to produce the products described herein. It will be the responsibility of the vendor to verify the validity of all existing ground control.

Ground Control

Shall meet ASPRS Class 1 Accuracy Standards. The vendor shall provide the description and location sketch of all measured and adjusted coordinate values in a hard-copy report and digital format. The vendors proposal should address the number and type ground control points planned to meet the accuracy specification. The Plan should address the extent to which the existing Ground Control will be used in this project.

The procedures should address:

- Horizontal Control
- Vertical Control
- Tie-ins to existing NGS Points
- Use of existing ground control
- Use of other existing control
- Survey methods, including use of field crews, GPS and other techniques.

The control network must be suitable for development of all specified products at the specified accuracies. The products include: planimetry, digital terrain models (DTM) and topographic contours, and 100-scale digital orthophotos.

Ground Control Deliverables

It is expected that the resultant ground control will be delivered to each town as a ground control report. Although some ground control locations may be reused for each town, it is the responsibility of the vendor to provide each town with their own ground control report. The ground control report should include:

- The ground control field book(s)
- A map showing the ground control station locations with numbers accurately referencing the appropriate features in the ground control field notebook.
- A digital data layer (ESRI File Geodatabase or shapefile) containing the ground control points along with permanent attributes (e.g. X, Y, Z, type of point, etc.)

Fully Analytical Aerial Triangulation (FAAT) Technical Requirements

Fully Analytical Aerial Triangulation (FAAT) will be used to densify ground control. The vendors proposal 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 vendors proposal.

This discussion should also describe:

- Use of pugging
- Use of passpoints
- Use of diapositives
- Quality Control
- Point Mensuration
- Software programs and methodologies for processing

FAAT Deliverables

The vendor will submit to each town an aerial triangulation report at the completion of the FAAT step.

Pilot Project

Each town will define a pilot project area consisting of four contiguous 2500' x 2500' map tiles. The vendor will produce prototype data for each pilot area. Data provided for each town shall be as follows:

- Groton
    - Planimetrics
    - DTM
    - Contours

    - Orthophotos
- Ledyard
    - Planimetrics
    - Orthophotos
    - Contours (option)
    - DTM (option)
- Stonington
    - Orthophotos
    - DTM (option)
    - Planimetrics (option)
    - Contours (option)
- Waterford
    - Planimetrics
    - Orthophotos
    - Contours
    - DTM

The pilot project areas are intended to test methodologies and establish successful procedures to follow throughout the rest of the project. While it is understood that aerial photography, ground control, and FAAT will likely be conducted for the each town prior to the pilot, the rest of the project tasks will be initially conducted only for the map tiles defined as the pilot area. During the pilot project process, the towns will finalize any ESRI Geodatabase design(s) for the capture of any planimetric features. The vendor should be aware that any Geodatabase designs agreed upon during this process may differ between each town.

Planimetric Compilation (Groton, Ledyard, Waterford, (Optional-Stonington))

Planimetric features will be compiled in digital format to meet National Map Accuracy Standards (NMAS) and the American Society of Photogrammetric and Remote Sensing (ASPRS) Class I standards for maps at the proposed scale (1" = 100'). All planimetric features captured will be captured using the relative and absolute orientation derived from the FAAT results.

The towns will provide their existing planimetric and attribute data to the vendor structured in a form required for project deliverables. It is understood that this format may change but should be finalized during the pilot project process.

Groton's existing planimetric mapping, from the 1999 flight, was done at a scale of 1" = 100'. The current contours are at 2' intervals. The current orthophotographs are color with a 0.5' pixel resolution. As mentioned earlier, limited planimetrics were updated using an on-screen, heads-up digitizing process from AT&T's 2004 200' scale orthophoto. Features existing from the 1999 flight have undergone significant changes and must be redrawn and/or reshaped, e.g. buildings, roads, sidewalks. Features updated on-screen using the 2004 AT&T flight should also be updated to match the new photographs. All features updated from the 2004 flight have been coded in the respective layer's attribute table.

Ledyard's existing planimetric mapping is limited; as a result, the town is looking for new planimetrics to be created as part of this project as defined in Attachment B. While Ledyard participated in the 1999 flyover with Groton and Stonington, Ledyard did not acquire digital orthophotographs at that time. Likewise, Ledyard does not have contours available digitally.

Waterford's existing planimetric mapping was compiled from a 1995 flight at a scale of 1" = 100'. The town of Waterford obtained the planimetric features in 1995 but did not acquire the orthophotograph's used to compile the original planimetrics. The current topography is at 2' contour intervals. The current orthophotographs that the town uses are color with a 0.5' resolution. They are

from a flight performed by AT&T in 2004.

Stonington's existing planimetric mapping was created from the 1999 flight at a scale of 1" - 100'. The orthophotographs are color with 0.5' pixel resolution. The current contours are at 2' and 10' intervals. Updates should be based on existing planimetric layers.

Planimetric Feature Development

Attachment B is a list of feature types that must be compiled from the proposed photography and used to update or create new ESRI Geodatabase planimetric data. This list is broken out into four sections. "Groton Base Mapping Layers", "Ledyard Base Mapping Layers", "Waterford Base Mapping Layers" and "Stonington Base Mapping Layers". As indicated, these are the features which each town wishes to capture. Each type of feature defined in Attachment B will be coded in conformance with the ESRI Geodatabase design and agreed upon by the towns and the vendor.

Capture Rate

The proposing vendor should estimate the capture rate for each data set described in Attachment B. Vendors should expect that the estimate will be considered binding upon completion of a contract with the towns. Vendors are encouraged to provide a discussion on factors that influence capture rates that can be expected on this project.

Tiling and Delivery Areas

Vendors should expect to use the existing tiling scheme and numbering system as defined in Attachment A. Although data will ultimately be delivered on a seamless basis, the individual tiles will be used to define checkplots and delivery areas. The checkplots should be designed to be no larger than 36" x 36" at a scale of 1" = 100'. It is the intent of Groton, Ledyard, and Waterford to have their data layers be delivered as seamless ESRI Geodatabase Feature Classes covering their respective towns. Stonington would like the same items priced as future options. To facilitate quality assurance/quality control processes, it is anticipated that vendors will propose to submit initial deliverables to each town on a delivery area basis. This will allow QA/QC to proceed in some areas while compilation continues in others. Vendors should propose an appropriate number of delivery areas for each town as part of their proposal.

Attributes

The towns and the vendor will develop a final database design structure into which attributes will be placed, following the guidelines described in Attachment B and based on the results of the pilot. Each towns' data structure will be commented on and approved by the respective town and will be deemed the standard for all data deliverables for this project. Any data that is incorrectly coded or does not follow the coding standard will be returned to the vendor for correction.

Edgematching

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

Checkplots

Upon completion of each delivery area, the vendor will deliver checkplots created from the compiled data in ESRI File Geodatabase format. All feature topology must be validated for its respective geometry. Geometries for each feature class are defined in Attachment B. All data layers will be plotted with the use of shading to demonstrate polygon closure and proper feature coding. The towns will review their respective set of checkplots for data completeness and data representation. Any errors will be noted on the checkplots and returned to the vendor for digital correction and replotting.

Interim Data Delivery

Upon delivery of the checkplots, the vendor will also deliver a digital copy of all data used to create the checkplots. The data will be delivered as an ESRI File Geodatabase formatted to the specifications previously agreed upon. These data will be examined by the respective towns for conformance and database design specifications. Any errors in the data will be noted in writing and returned to the vendor.

The towns are aware that vendors may provide other methods of QA/QC above and beyond what is specified in this document. Prospective vendors are encouraged to provide discussion on other methods they may use to provide QAQC solutions to their clients.

Final Planimetric Data Deliverables

Each Towns' digital data shall be delivered in an ESRI File Geodatabase format on CD-ROM or DVD-ROM. In accordance with Attachment B of this document, each layer will be its own feature class within the respective town's File Geodatabase and shall be seamless and townwide.

Topography (Groton, Waterford (Optional - Ledyard & Stonington))

Vendors should provide a proposal for updating or creating new topography for the Town of Groton and the Town of Waterford. Stonington would like the option to update the existing topography at a future date. Ledyard currently has no topographic data and would like the option to create new two foot contours. The existing contour interval for the three towns who have contours is 2' and any updates or new creation shall be the same. In addition, for the Town of Groton, the underlying DTM should be prepared in an ESRI compatible format and delivered to the town. Also, the Town of Groton currently has a data set of spot elevations. These elevations are located at road intersections, flat water bodies, high points (ridges, summits), and local low points (basin bottoms, saddles). The towns of Waterford and Stonington also have a data set of spot elevations that are distributed throughout the respective towns. The vendor should update spot elevations where appropriate as well as verify existing spot elevations based on the new DTM. Groton, Waterford, and Stonington's current elevation data is in NGVD29. In order to achieve NAVD88 the vendor will need to project the data into the new coordinate system. Topographic features shall be compiled in a digital format to meet National Map Accuracy Standards (NMAS) and the American Society of Photogrammetry and Remote Sensing (ASPRS) Class I standards for large scale maps at the recommended scale. Each type of feature will be coded in conformance with the ESRI File Geodatabase design that will be finalized during the pilot project.

Methodology and Equipment

The vendor's proposal must concisely but thoroughly explain the methodology to be followed to develop or update the topography, as well as listing the equipment used. The following points must be covered in the proposal:

- Digital Terrain Model Generation
- Use of breaklines and other significant points
- Software and methods used for contour interpolation
- Quality Assurance/Quality Control

Attribute Coding and Annotation

The towns and vendor will work together to develop an appropriate database design for the topographic deliverables. The details of the database design will be finalized during the pilot project. Vendors should assume that the topographic data will include attribute coding for the following type of information:

- Attribute Value indicating the elevation (numeric)
- Code indicating whether the topographic line is a depression
- Code indicating whether the topographic line is an index contour (10' intervals)
- Code indicating whether the contour line is "hidden" beneath a feature such as a building

- Code indicating whether the contour line is "obscured" by such things as heavy vegetation, which might potentially lessen the accuracy of the contour interpolation
- Each index contour (10' interval) should have its elevation pleasingly displayed as annotation. Contour lines should not have gaps where annotation is placed. Attribute coding should be used to allow hard copy maps to be created by masking contours where annotation is displayed.

Topography Deliverables

One checkplot for each map sheet (and submission of an interim digital data delivery) shall be produced. Checkplots will have contours and spot elevations clearly symbolized as well as basic planimetric features such as roads, buildings, hydrography and other features used as breaklines. Digital data shall be delivered in an ESRI File Geodatabase format as seamless datasets. Digital data will include contour information as well as spot elevations. Digital Terrian Model (DTM) data used to create the topography will be delivered as a Raster dataset in an ESRI File Geodatabase. DTM grid cell size should be 1foot.

Digital Orthophotography (Groton, Ledyard, Stonington, Waterford)

Color digital orthophotography will be produced for each town from the new aerial photography at a scale of 1" = 100'. The digital orthophotography should have a pixel resolution of either 0.5' or 0.25', with separate pricing as indicated on Attachment C. The vendor should discuss pixel resolution and the rational if proposing a 'best' pixel resolution.

Methodology and Equipment

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

- Digital Terrain Model (DTM) generation
- Image resolution
- Image mosaicing
- Breaklines and significant points
- Tonal/Color Balancing
- Quality Assurance/Quality Control
- Data delivery formatting
- The team member and staff performing the digital orthophotography

Checkplots

Upon completion of each delivery area, the vendor shall provide a set of checkplots displaying the digital orthophotography. The checkplots shall be at 1"=100' scale and shall follow the grid as specified in Attachment A.

Digital Orthophotography Deliverables

Digital data will be required for the final delivery of the digital orthophotography. Digital data shall be delivered in a format which is compatable with ESRI ArcGIS 9.x software. The vendor shall provide to each town a tiled image catalog in conformance with the tiling scheme in Attachment A as well as a seamless mosaic. The vendor should clearly state the image format proposed for the delivery, and the rationale for the selection. The pros and cons of MrSID, GeoTIFF and JPG/ JPG2000 should also be discussed.

GENERAL CONDITIONS PERTAINING TO THIS PROJECT

Quality Assurance/Quality Control

The vendor should conduct quality assurance/quality control checks during all phases of the project. The

vendor's proposal 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.

Acceptance of Deliverables and Quality Assurance/Quality Control

The towns will subject interim and final deliverable products to a series of visual, digital, and accuracy checks. These checks will be the basis for accepting or rejecting the products, and may include, but will not necessarily be limited to, the following:

- Ability to access digital files in ESRI software such as ArcGIS 9.x or ArcIMS 9.x
- Digital checks of attribute tables to ensure consistency and the use of correct domain values based on final database design.
- Visual inspection of all checkplots for gross errors, omissions and spatial relationships.
- Visual inspection of digital orthophotography for color consistency, overlap/ underlap, and building lean.
- Comparison of topographic maps, planimetry and digital photography (where applicable by town) All project work must be in accordance with the Secretary of the Interior Standards for Historic Preservation, Projects.

A complete list of checks will be developed by the town during the pilot and will be presented to the contractor. In general, products with missing data, gross errors, poor edgematch, poor color balance, incorrect attributes, and/or formatting errors will be returned to the vendor for correction.

Project Management, Scheduling & Meetings

Due to the significant size of this project and the importance of the digital data deliverables to the towns, the towns anticipate several project management tasks and meetings. The vendor should indicate in the proposal who the main point of contact will be and how the overall project coordination, tracking and management will be achieved. The towns anticipate a series of meeting with the winning vendor, as follows:

- Kick-off meeting
- Pre-Pilot meeting to finalize database design (for applicable towns)
- Pilot review meeting
- Review of 1st photogrammetry deliverables meeting
- Final Delivery/Project wrap-up meeting

The vendor's proposal shall include these meetings as milestones in the project schedule. In addition, the dates for all proposed "delivery area" data and checkplot deliveries should be specified in the project schedule. If the vendor feels that more or less meetings are necessary, this should be indicated in the proposal and justified.

Ownership of Deliverables

The Towns of Groton, Stonington and Waterford will retain exclusive ownership of their respective deliverables developed under this contract. The Town of Ledyard's data will be owned jointly by the Town of Ledyard, the Connecticut Commission on Culture and Tourism and the U.S. Department of the Interior-National Park Service. Each town, or government agency, retains the right to redistribute and/or sell the deliverables without additional compensation to the vendor.

Contractor's Insurance Required

All bidders must carry insurance under which each town (Groton, Ledyard, Stonington and Waterford) is named as an assured, as follows:

A. Worker's Compensation – as required by State statute.

B. Commercial Liability as follows:
$2,000,000 – General Aggregate
$2,000,000 – Products Completed Operations Aggregate
$1,000,000 – Personal & Advertising Injury
$1,000,000 – Each Occurrence Bodily Injury & Property Damage

$100,000 – Fire Damage, Any One Fire
$5,000 – Medical Payments, Any One Person Including Explosion
Collapse & Underground

C. Automobile Liability: $1,000,000 combined Single Limit Bodily Injury & Property Damage

Such insurance must be by insurance companies licensed to write such insurance in the State of Connecticut against the above risks and in the amounts indicated. All insurance in the State of Connecticut against the above risks and in the amounts indicated. All insurance must provide for a thirty (30) day notice to the towns of Cancellation or restrictive amendment.

Certificates of Insurance do not have to be submitted as part of the bid, however they must be submitted to the Director of Finance within ten (10) days after the Notification of Award.

Failure to provide and to keep current the required insurance and certificates may be held to be a willful and substantial breach of this Contract.

Indemnification

The vendor shall indemnify, hold harmless, and defend the towns of Groton, Ledyard, Stonington and Waterford from and against any and all liabilities, claims, penalties, thereto, including but not limited to, costs of defense settlement, and reasonable attorney's fees, which may be alleged against the towns of Groton, Ledyard, Stonington and Waterford which the towns may incur, become responsible for, or pay out as a result of death, bodily injury to any person, damage to or destruction of any property, contamination of or adverse effects on the environment or any violation or alleged violation of governmental law, regulation, order caused by, arising out of, or in any manner connected with his provision of services to the towns of Groton, Ledyard, Stonington and Waterford. The vendor shall be liable for and shall indemnify the towns of Groton, Ledyard, Stonington and Waterford from and against any injury or loss whatever resulting from the negligent act or omission of any employee or agent of the vendor or from the failure of or inadequacy of any of the Contractor's equipment.

Performance and Labor & Materials Bond

A Performance Bond in the full amount of the bid and a Labor and Materials Bond in the same amount will be required from the successful bidder for the faithful performance on the Contract if the contract amount is greater than twenty-five thousand ($25,000) dollars. The Bonds must be in favor of the towns and executed by a Surety Company authorized to do business in the State of Connecticut. In lieu of the above Bonds, alternate surety in the same amount, in the form of a secured passbook, if acceptable to the town Treasurer, may be substituted. The security must be posted and accepted within thirty (30) days of the notification of award and prior to the commencement of any work under the contract.

Equal Opportunity & Affirmative Action

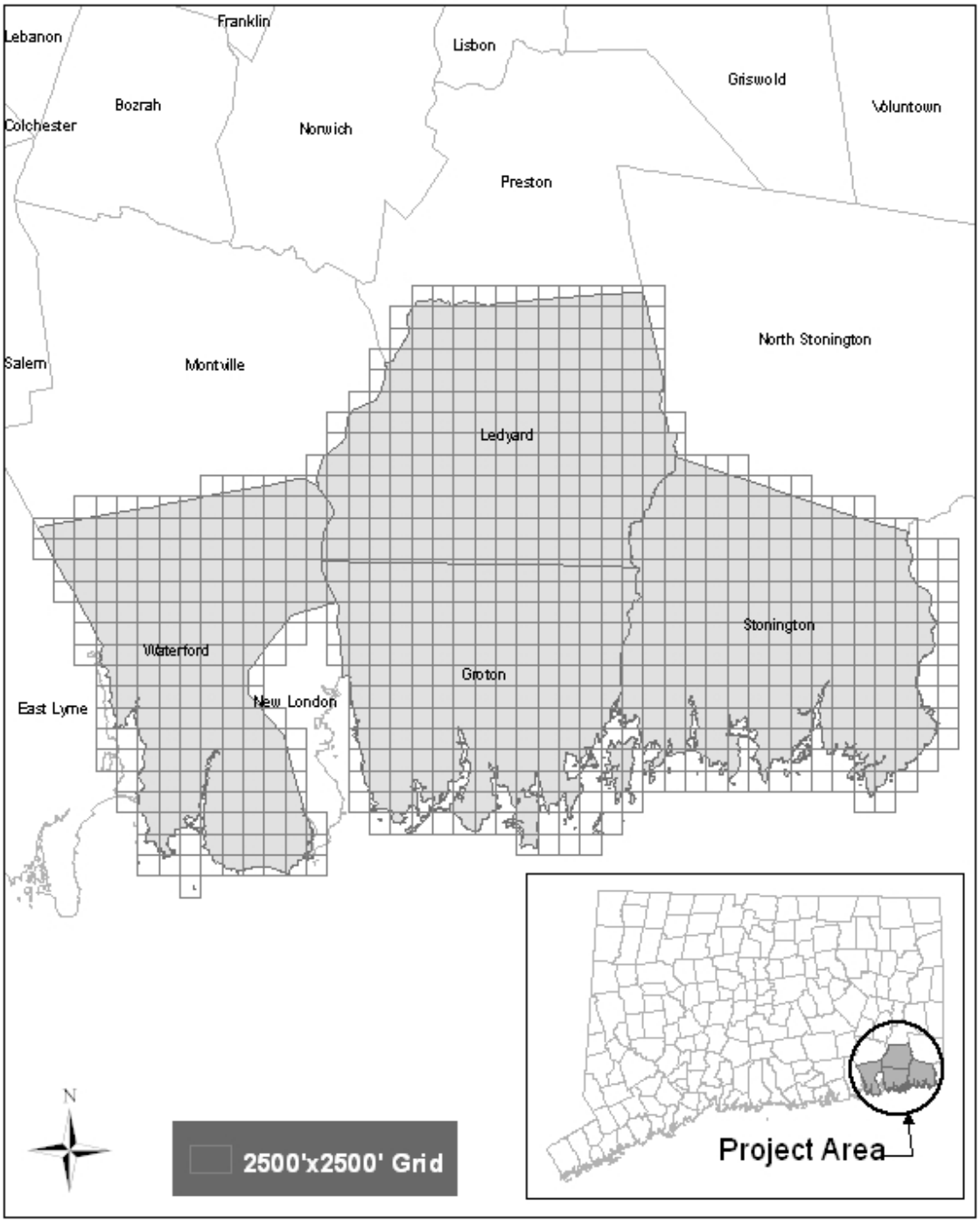
The Vendor and all Subvendors agree to provide equal opportunities to all qualified persons solely on the basis of job related skills, ability and merit, and to take affirmative action to ensure that qualified applicants are employed and that employees are treated during their employment without regard to race, color, religion, gender, national origin, ancestry, age, physical disability, marital status, or mental retardation. Vendors and Subvendors shall make good faith efforts to comply with all Federal and State laws, and with the towns policies, regarding equal opportunities in employment and affirmative action, pursuant to the Connecticut General Statues, Section 46a-60, et. Seq.

Project Funding

The project is partially funded by the Community Investment Act of the State of Connecticut, administered by the Connecticut Commission on Culture and Tourism, Historic Preservation and Museum Division, and is subject to the provisions of Section 4a-60a of the Connecticut General Statutes, and is an Equal Employment Opportunity/Affirmative Action project.

This project is also funded in part by the U.S. Department of the Interior- National Park Service appropriated from the National Recreation and Preservation fund for the Preserve America Grant Program by Public Law 110-161. The terms and conditions of this grant award shall be extended to subrecipients and subcontractors.

Attachment A
Project Area



Attachment B
Individual Town Specifications

Groton Base Mapping Layers:

Geometry	Feature Description	Capture Type	Comments	Est. Capture Rate %
Polygon	Edge of Pavement	Update	Capture both Paved and Unpaved	
Polygon	Bridges	Update		
Polygon	Buildings	Update	Capture footprints, foundations, mobile homes. Only structures >= 100sqft	
Line	Trails	Update		
Polygon	Parking Lots	Update	Capture both paved and unpaved	
Polygon	Driveways	Update	Capture both paved and unpaved	
Polygon	Sidewalks	Update		
Line	Fences	Update		
Line	Stone Walls	Update		
Line	Retaining Walls	Update		
Point	Transmission Towers	New	Cell Phone Towers, Radio Towers, Electrical Towers	
Line	Billboards	Update		
Polygon	Airport Edge of Pavement	Update		
Line	Dam	New		
Polygon	Docks	Update	Include Piers and code appropriately	
Line	Head/Wing Wall	Update		
Point	Utility Pole	Update		
Point	Fire Hydrants	Update		
Point	Street Trees	Update	Trees inside ROW	
Polygon	Wooded Land	Update		
Polygon	Swimming Pools	Update		
Polygon	Tennis Courts	Update		
Polygon	Golf Course	Update	Tee Boxes, Fairways, Greens, Sand traps	
Polygon	Sports Fields	Update	Baseball Fields, Soccer Fields	
Polygon	Basketball Courts	Update		
Polygon	Skateboard Parks	New		
Polygon	Walking Tracks	New	May have been previously coded as sidewalk	
Point	Playgrounds	New		
Polygon	Gas Storage Tanks	Update		
Polygon	Water Storage Tanks	Update		
Polygon	Treatment Plants	Update	Sewer and Water	
Polygon	Cemetery Boundaries	Update		
Polygon	Water Bodies	Update	Lakes, ponds, rivers, wide streams, reservoir	
Line	Streams	Update	Single Sided streams	
Polygon	Wet Areas	Update	Marshlands, Inland wet areas	
Polygon	Coastline	New	As close to mean high water as possible	
Point	Horizontal Control	Update/New		
Point	Vertical Control	Update/New		

Point	Streetlight Signals	New		
Line	Railroad Centerline	Update		
Point	Storm Drains	Update		
Point	Manholes	Update		

Ledyard Base Mapping Layers:

GROUP A (high priority)

Geometry	Feature Description	Capture Type	Comments	Est. Capture Rate %
Polygon	Edge of Pavement	Update	Capture both Paved and Unpaved	
Polygon	Bridges	Update		
Polygon	Buildings	Update	Capture footprints, foundations, mobile homes. Only structures >= 100sqft	
Polygon	Parking Lots	Update	Capture both paved and unpaved	
Polygon	Driveways	Update	Capture both paved and unpaved	
Polygon	Sidewalks	Update		
Line	Fences	Update		
Line	Stone Walls	Update		
Line	Retaining Walls	Update		
Point	Fire Hydrants	Update		
Polygon	Cemetery Boundaries	Update		
Point	Horizontal Control	Update/New		
Point	Vertical Control	Update/New		

GROUP B (medium priority)

Geometry	Feature Description	Capture Type	Comments	Est. Capture Rate %
Point	Utility Pole	New		
Point	Street Trees	New	Trees inside ROW	
Point	Street Light Signals	New		
Point	Storm Drains	New		
Point	Manholes	New		
Polygon	Wooded Land	New		
Polygon	Swimming Pools	New		
Polygon	Tennis Courts	New		
Polygon	Sports Fields	New	Baseball Fields, Soccer Fields, Football Fields	
Polygon	Basketball Courts	New		
Point	Playgrounds	New		
Line	Trails	New		
Polygon	Coastline	New	As close to mean high water as possible	

GROUP C (lower priority)

Geometry	Feature Description	Capture Type	Comments	Est. Capture Rate %
Point	Transmission Towers	New	Cell Phone Towers, Radio Towers, Electrical Towers	
Polygon	Gas Storage Tanks	New		
Polygon	Water Storage Tanks	New		
Polygon	Treatment Plants	New	Sewer and Water	
Line	Railroad Centerline	New		
Line	Dam	New		
Polygon	Docks	New	Include Piers and code appropriately	
Line	Head/Wing Wall	New		

Waterford Base Mapping Layers

Geometry	Feature Description	Capture Type	Comments	Est. Capture Rate %
Polygon	Edge of Pavement	Update		
Polygon	Bridges	Update		
Polygon	Buildings	Update	Capture footprints, foundations. All structures >= 100 sq ft.	
Line	Trails	Update		
Polygon	Parking Lots	Update	Paved and unpaved	
Polygon	Driveways	Update	Paved and unpaved	
Polygon	Sidewalks	Update	Public and Private	
Line	Fences	Update		
Line	Guard Rail	Update		
Line	Stonewalls	Update		
Line	Retaining Walls	Update		
Point	Transmission Towers	Update	Cell Phone, Radio, Electrical	
Polygon	Piers	Update	Docks and piers	
Polygon	Jetty	Update		
Line	Head/Wing Wall	Update		
Point	Utility Pole	Update	Code utility poles with attached street light	
Point	Street Lights	Update		
Point	Fire Hydrants	Update		
Polygon	Wooded Land	Update		
Polygon	Swimming Pools	Update		
Polygon	Sports Fields	Update		
Polygon	Gas Storage Tanks	Update		
Polygon	Water Storage Tanks	Update		
Polygon	Cemetary Boundaries	Update		

Polygon	Water Bodies	Update	Lakes, Ponds, Rivers, Wide Streams, Reservoir, Detention/Retention Basins	
Line	Streams	Update	Single sided	
Polygon	Wet Areas	Update	Marshlands, Inland wet areas	
Point	Horizontal Control	New		
Point	Vertical Control	New		
Point	Streetlight Signals	New		
Point	Catch Basins	Update		
Point	Manholes Sewer	Update		
Point	Gate Sewer	Update		
Point	Manholes Water	Update		
Point	Gate Water	Update		
Point	Manholes Drain	Update		

Stonington Base Mapping Layers (Option):

Geometry	Feature Description	Capture Type	Comments	Est. Capture Rate %
Polygon	Edge of Pavement	Update	Capture both Paved and Unpaved	
Polygon	Bridges	Update		
Polygon	Buildings	Update	Capture footprints, foundations, mobile homes, sheds, etc.	
Polygon	Parking Lots	Update	Capture both paved and unpaved	
Polygon	Driveways	Update	Capture both paved and unpaved	
Polygon	Sidewalks	Update		
Line	Fences	Update		
Line	Stone Walls	Update		
Line	Retaining Walls	Update		
Point	Transmission Towers	Update	Cell Phone Towers, Radio Towers, Electrical Towers	
Polygon	Docks	Update	Include Piers and code appropriately	
Point	Utility Poles	Update		
Point	Fire Hydrants	Update		
Point	Street Trees	Update	Trees inside ROW	
Polygon	Wooded Land	Update		
Polygon	Treatment Plants	Update	Sewer and Water	
Polygon	Cemetery Boundaries	Update		
Polygon	Water Bodies	Update	Lakes, ponds, rivers, wide streams, reservoir	
Line	Streams	Update	Single Sided streams	
Polygon	Wet Areas	Update	Marshlands, Inland wet areas	
Polygon	Coastal Area Management	Update	As close to mean high water as possible	
Point	Streetlight Signals	Update		
Line	Railroad Centerline	Update		

Point	Storm Drains	Update		
Point	Manholes	Update		

Attachment C

Mapping Project Pricing Sheet

Item	Proposed Price
Groton, Connecticut:	
Aerial Photography (Color)	$
Ground Control	$
PLANIMETRIC MAPPING (See Attachment B for a list of features)	
New Planimetrics	$
Update Existing Planimetrics	$
TOPOGRAPHY	
New 2ft Contours, spot elevations (and associated DTM)	$
Update Existing 2ft Contours, spot elevations (and associated DTM)	$
ORTHOPHOTOGRAPHY	
100-Scale Color Digital Orthophotos 0.5' pixel resolution	$
100-Scale Color Digital Orthophotos 0.25' pixel resolution	$
100-Scale Color IR 0.5' pixel resolution (OPTIONAL)	$
100-Scale Color IR 0.25' pixel resolution (OPTIONAL)	$

Attachment C

Mapping Project Pricing Sheet

Item	Proposed Price
Ledyard, Connecticut:	
Aerial Photography (Color)	$
Ground Control	$
PLANIMETRIC MAPPING (See Attachment B for a list of features & groupings by priority)	
Planimetrics- Group A	$
Planimetrics- Group B (OPTIONAL)	$
Planimetrics- Group C (OPTIONAL)	$
TOPOGRAPHY	
New 2ft coutours, spot elevation (and associated DTM)	$
ORTHOPHOTOGRAPHY	
100-Scale Color Digital Orthophotos 0.5' pixel resolution	$
100-Scale Color Digital Orthophotos 0.25' pixel resolution	$

Attachment C

Mapping Project Pricing Sheet

Item	Proposed Price
Stonington, Connecticut:	
Aerial Photography (Color)	$
Ground Control	$
PLANIMETRIC MAPPING (Option - see attachment B)	
Update Existing Planimetrics	$
TOPOGRAPHY (option)	
Update Existing 2ft Contours, spot elevations (and associated DTM)	$
ORTHOPHOTOGRAPHY	
100-Scale Color Digital Orthophotos 0.5' pixel resolution	$
100-Scale Color Digital Orthophotos 0.25' pixel resolution	$
100-Scale Color IR 0.5' pixel resolution (OPTIONAL)	$
100-Scale Color IR 0.25' pixel resolution (OPTIONAL)	$

Attachment C

Mapping Project Pricing Sheet

Item	Proposed Price
Waterford, Connecticut:	
Aerial Photography (Color)	$
Ground Control	$
PLANIMETRIC MAPPING (See attachment B for a list of features for Waterford)	
New Planimetrics	$
Update Existing Planimetrics	$
TOPOGRAPHY	
New 2ft Contours and spot elevations (Identify index contours every 10ft)	$
Update existing 2ft contours and spot elevations	$
ORTHOPHOTOGRAPHY	
100-Scale Digital Orthophotos 0.5' pixel resolution	$
100-Scale Digital Orthophotos 0.25' pixel resolution	$