



State of West Virginia
 Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

Solicitation

NUMBER
TAX12007

PAGE
1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
CONNIE HILL 304-558-2157

RFQ COPY

TYPE NAME/ADDRESS HERE

Atlas Geographic Data, Inc.
1015 Ashes Drive, Suite 104
Wilmington, NC 28405
Voice: 910 256 9892
Fax: 910 256 9979

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STATE TAX DIVISION
 PROPERTY TAX DIVISION
 GREENBROOKE BUILDING
 1124 SMITH STREET
 CHARLESTON, WV
 25301 304-558-3940

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DATE PRINTED
06/13/2012

BID OPENING DATE: 07/17/2012

BID OPENING TIME

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
0001		EA		962-52	25,986@ \$2.94197 ea.	\$76,450
<p>THE STATE OF WEST VIRGINIA AND ITS AGENCY THE WEST VIRGINIA STATE TAX DIVISION AND WEST VIRGINIA PROPERTY TAX DIVISION REQUEST A QUOTE FROM QUALIFIED VENDORS TO DEVELOP A GIS DATABASE FOR THE DIGITAL CONVERSION OF COUNTYWIDE TAX MAPS PER THE ATTACHED SPECIFICATIONS.</p> <p>**BID OPENING: JULY 17, 2012 AT 1:30 PM</p> <p>LOCATION: PURCHASING DIVISION, BUILDING #15 2019 WASHINGTON STREET, EAST CHARLESTON, WV 25305</p> <p>GIS DATABASE FOR THE DIGITAL CONVERSION OF COUNTYWIDE TAX MAPS PER THE ATTACHED SPECIFICATIONS.</p> <p>ATTACHMENTS: SPECIFICATIONS INSTRUCTIONS TO BIDDERS GENERAL TERMS & CONDITIONS CERTIFICATION & SIGNATURE PAGE ADDENDUM ACKNOWLEDGEMENT VENDOR PREFERENCE CERTIFICATE PURCHASING AFFIDAVIT</p>						

RECEIVED

2012 JUL 17 AM 9:32

WV PURCHASING DIVISION

SIGNATURE <i>Jimmy E. Kriditz</i>	TELEPHONE 910 256 9892	DATE July 16, 2012
TITLE Vice President/Secretary	FEIN 20-3251160	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO SOLICITATION, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'



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 Department of Administration
 Purchasing Division
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BID OPENING DATE: 07/17/2012

BID OPENING TIME

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
***** THIS IS THE END OF RFQ TAX12007 ***** TOTAL:						\$76,450

SIGNATURE <i>Lynn E. Kutzotak</i>	TELEPHONE 910 256 9892	DATE July 16, 2012
TITLE Vice President/Secretary	FEIN 20-3251160	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO SOLICITATION, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

Figure 2. Tax map statistics for prospective counties within West Virginia for converting to GIS systems.

Table 1. County Tax Map (369) and surface Parcel (25,986) Breakdown (WVPTD 2011).

County	District Numbers and Names	# of Tax Maps	# of Surface Parcels
30 Mingo	01 Delbarton Corp.	8	726
	02 Gilbert Corp.	7	949
	03 Hardee	50	2,874
	04 Harvey	38	1,520
	05 Kermit	27	1,310
	06 Lee	33	2,002
	07 Magnolia	72	4,589
	08 Matewan Corp.	9	636
	09 Stafford	55	3,427
	10 Tug River	46	2,933
	11 Williamson Corp.	19	4,491
	12 Kermit Corp.	5	529
Totals		369	25,986

Table B2

County	# of Parcels (Maps)	Price/Parcel (Map)	Extended Price
Digital Tax Parcel Polygon Data			
30 Mingo	25,986	\$2.80	\$72,760
GIS Map Link with IAS Database			
Included in above pricing			
Finished tax map publication			
30 Mingo	369	\$10.00	\$3,690
Warranty of Fixes Months in RFQ			
Included in above pricing		6	
Grand Total			\$76,450

TAX12007 COST SHEET

COUNTY	Digital Tax Parcel Polygon Data	Cost	Finished Tax Map Publication	Cost
BRAXTON	16,439		277	
CALHOUN	8,766		149	
GRANT	12,172		260	
HARDY	14,655		298	
JACKSON	19,474		322	
LEWIS	15,223		231	
LINCOLN	17,029		264	
LOGAN	29,212		399	
MCDOWELL	31,020		535	
MINGO	25,986	\$72,760	369	\$3,690
MONONGALIA	49,865		638	
MONROE	13,483		255	
ROANE	14,521		241	
TYLER	8,994		149	
WEBSTER	10,765		251	
Total	287,604		4638	
	Total Cost	\$	Total Cost	\$

Phone # & Fax #	Email address	Date	Vendor's name & signature
910 256 9892 Voice 910 256 9979 Fax	kirkpatrick@ atlasgeodata.com	7-16-2012	Atlas Geographic Data, Inc. <i>Larry E. Kirkpatrick</i>

Larry E. Kirkpatrick
V. President / Secretary

Basis for Award: Award shall be made to the lowest vendor meeting specifications.

the pre-bid meeting are preliminary in nature and are non-binding. Official and binding answers to questions will be published in a written addendum to the Solicitation prior to bid opening.

- 4. **VENDOR QUESTION DEADLINE:** Vendors may submit questions relating to this Solicitation to the Purchasing Division. Questions must be submitted in writing. All questions must be submitted on or before the date listed below and to the address listed below in order to be considered. A written response will be published in a Solicitation addendum if a response is possible and appropriate. Non-written discussions, conversations, or questions and answers regarding this Solicitation are preliminary in nature and are non-binding.

Question Submission Deadline: June 27, 2012

Submit Questions to:

- Connie Hill
- 2019 Washington Street, East
- P.O. Box 50130
- Charleston, WV 25305
- Fax: 304-558-3970
- Email: Connie.S.Hill@wv.gov

- 5. **VERBAL COMMUNICATION:** Any verbal communication between the Vendor and any State personnel is not binding, including that made at the mandatory pre-bid conference. Only information issued in writing and added to the Solicitation by an official written addendum by the Purchasing Division is binding.
- 6. **BID SUBMISSION:** All bids must be signed and delivered by the Vendor to the Purchasing Division at the address listed below on or before the date and time of the bid opening. Any bid received by the Purchasing Division staff is considered to be in the possession of the Purchasing Division and will not be returned for any reason. The bid delivery address is:

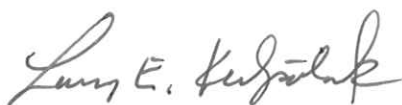
Department of Administration, Purchasing Division
 2019 Washington Street East
 P.O. Box 50130,
 Charleston, WV 25305-0130

The bid should contain the information listed below on the face of the envelope or the bid may not be considered:

SEALED BID
 BUYER: Connie Hill
 SOLICITATION NO.: RFQ: TAX12007
 BID OPENING DATE: July 17, 2012
 BID OPENING TIME: 1:30PM
 FAX NUMBER:

CERTIFICATION AND SIGNATURE PAGE

By signing below, I certify that I have reviewed this Solicitation in its entirety; understand the requirements, terms and conditions, and other information contained herein; that I am submitting this bid or proposal for review and consideration; that I am authorized by the bidder to execute this bid or any documents related thereto on bidder's behalf; that I am authorized to bind the bidder in a contractual relationship; and that to the best of my knowledge, the bidder has properly registered with any State agency that may require registration.



Atlas Geographic Data, Inc.

(Company)

Larry E. Kirkpatrick, Vice President/Secretary

(Representative Name, Title)

910 256 9892 (Voice) 910 256 9979 (Fax)

(Contact Phone/Fax Number)

July 16, 2012

(Date)



ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: TAX12007
TAX12007

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:

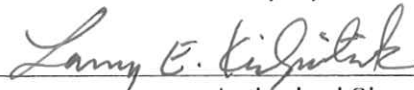
(Check the box next to each addendum received)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Atlas Geographic Data, Inc.

Company



Authorized Signature

July 16, 2012

Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

State of West Virginia
VENDOR PREFERENCE CERTIFICATE

Certification and application* is hereby made for Preference in accordance with *West Virginia Code*, §5A-3-37. (Does not apply to construction contracts). *West Virginia Code*, §5A-3-37, provides an opportunity for qualifying vendors to request (at the time of bid) preference for their residency status. Such preference is an evaluation method only and will be applied only to the cost bid in accordance with the *West Virginia Code*. This certificate for application is to be used to request such preference. The Purchasing Division will make the determination of the Resident Vendor Preference, if applicable.

1. **Application is made for 2.5% resident vendor preference for the reason checked:**
 Bidder is an individual resident vendor and has resided continuously in West Virginia for four (4) years immediately preceding the date of this certification; or,
 Bidder is a partnership, association or corporation resident vendor and has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or 80% of the ownership interest of Bidder is held by another individual, partnership, association or corporation resident vendor who has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or,
 Bidder is a nonresident vendor which has an affiliate or subsidiary which employs a minimum of one hundred state residents and which has maintained its headquarters or principal place of business within West Virginia continuously for the four (4) years immediately preceding the date of this certification; or,
2. **Application is made for 2.5% resident vendor preference for the reason checked:**
 Bidder is a resident vendor who certifies that, during the life of the contract, on average at least 75% of the employees working on the project being bid are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; or,
3. **Application is made for 2.5% resident vendor preference for the reason checked:**
 Bidder is a nonresident vendor employing a minimum of one hundred state residents or is a nonresident vendor with an affiliate or subsidiary which maintains its headquarters or principal place of business within West Virginia employing a minimum of one hundred state residents who certifies that, during the life of the contract, on average at least 75% of the employees or Bidder's affiliate's or subsidiary's employees are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; or,
4. **Application is made for 5% resident vendor preference for the reason checked:**
 Bidder meets either the requirement of both subdivisions (1) and (2) or subdivision (1) and (3) as stated above; or,
5. **Application is made for 3.5% resident vendor preference who is a veteran for the reason checked:**
 Bidder is an individual resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard and has resided in West Virginia continuously for the four years immediately preceding the date on which the bid is submitted; or,
6. **Application is made for 3.5% resident vendor preference who is a veteran for the reason checked:**
 Bidder is a resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard, if, for purposes of producing or distributing the commodities or completing the project which is the subject of the vendor's bid and continuously over the entire term of the project, on average at least seventy-five percent of the vendor's employees are residents of West Virginia who have resided in the state continuously for the two immediately preceding years.

Bidder understands if the Secretary of Revenue determines that a Bidder receiving preference has failed to continue to meet the requirements for such preference, the Secretary may order the Director of Purchasing to: (a) reject the bid; or (b) assess a penalty against such Bidder in an amount not to exceed 5% of the bid amount and that such penalty will be paid to the contracting agency or deducted from any unpaid balance on the contract or purchase order.

By submission of this certificate, Bidder agrees to disclose any reasonably requested information to the Purchasing Division and authorizes the Department of Revenue to disclose to the Director of Purchasing appropriate information verifying that Bidder has paid the required business taxes, provided that such information does not contain the amounts of taxes paid nor any other information deemed by the Tax Commissioner to be confidential.

Under penalty of law for false swearing (*West Virginia Code*, §61-5-3), Bidder hereby certifies that this certificate is true and accurate in all respects; and that if a contract is issued to Bidder and if anything contained within this certificate changes during the term of the contract, Bidder will notify the Purchasing Division in writing immediately.

Bidder: **Atlas Geographic Data, Inc.**

Signed: _____

Larry E. Kilgus

Date: **July 16, 2012**

Title: **Vice President/Secretary**

*Check any combination of preference consideration(s) indicated above, which you are entitled to receive.

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

West Virginia Code §5A-3-10a states: No contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and the debt owed is an amount greater than one thousand dollars in the aggregate.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Debtor" means any individual, corporation, partnership, association, limited liability company or any other form or business association owing a debt to the state or any of its political subdivisions. "Political subdivision" means any county commission; municipality; county board of education; any instrumentality established by a county or municipality; any separate corporation or instrumentality established by one or more counties or municipalities, as permitted by law; or any public body charged by law with the performance of a government function or whose jurisdiction is coextensive with one or more counties or municipalities. "Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

EXCEPTION: The prohibition of this section does not apply where a vendor has contested any tax administered pursuant to chapter eleven of this code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

Under penalty of law for false swearing (*West Virginia Code §61-5-3*), it is hereby certified that the vendor affirms and acknowledges the information in this affidavit and is in compliance with the requirements as stated.

WITNESS THE FOLLOWING SIGNATURE

Vendor's Name: **Atlas Geographic Data, Inc.**

Authorized Signature: *Larry E. Kiefert* Date: 7/16/2012

State of Alabama

County of Jefferson, to-wit:

Taken, subscribed, and sworn to before me this 16th day of July, 2012.

My Commission expires 10/1/13, 2013.

AFFIX SEAL HERE

NOTARY PUBLIC *Susan Jane Mathis*

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: TAX12007

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:

(Check the box next to each addendum received)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Atlas Geographic Data, Inc.
Company

Larry E. Kirsch
Authorized Signature

July 16, 2012
Date

NOTE: This addendum acknowledgment should be submitted with the bid to expedite document processing.
Revised 6/8/2012



State of West Virginia
 Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

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CONNIE HILL 304-558-2157

VENDOR

RFQ COPY
 TYPE NAME/ADDRESS HERE
Atlas Geographic Data, Inc.
1015 Ashes Drive, suite 104
Wilmington, NC 28405

SHIP TO

STATE TAX DIVISION
 PROPERTY TAX DIVISION
 GREENBROOKE BUILDING
 1124 SMITH STREET
 CHARLESTON, WV
 25301 304-558-3940

DATE PRINTED
07/10/2012

BID OPENING DATE: 07/17/2012 BID OPENING TIME 1:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
				ADDENDUM NO. 01		
				1. QUESTIONS AND ANSWERS ARE ATTACHED.		
				2. ADDENDUM ACKNOWLEDGEMENT IS ATTACHED AND SHOULD BE RETURNED WITH YOUR BID. FAILURE TO RETURN WITH YOUR BID MAY RESULT IN DISQUALIFICATION.		
				3. NO CHANGE IN BID OPENING DATE.		
				END OF ADDENDUM NO. 01		

SIGNATURE <i>Larry E. Kibystak</i>	TELEPHONE 910 256 9892	DATE July 16, 2012
TITLE Vice President / Secretary	FEIN 20-3251160	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO SOLICITATION, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

SOLICITATION NUMBER: TAX12007
Addendum Number: 01

The purpose of this addendum is to modify the solicitation identified as ("Solicitation") to reflect the change(s) identified and described below.

Applicable Addendum Category:

- Modify bid opening date and time
- Modify specifications of product or service being sought
- Attachment of vendor questions and responses
- Attachment of pre-bid sign-in sheet
- Correction of error
- Other

Description of Modification to Solicitation:

Questions & Answers are attached.

No change in bid opening date.

*Received: Atlas Geographic Data, Inc.
Lynn G. Kuzulak, July 16, 2012
V. Pres / Secretary*

Additional Documentation: Documentation related to this Addendum (if any) has been included herewith as Attachment A and is specifically incorporated herein by reference.

Terms and Conditions:

1. All provisions of the Solicitation and other addenda not modified herein shall remain in full force and effect.
2. Vendor should acknowledge receipt of all addenda issued for this Solicitation by completing an Addendum Acknowledgment, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

ATTACHMENT A

WV State Tax Division

TAX12007

Questions for RFQ

- 1.) Q. Are the Purchasing Affidavit and/or the Vendor Preference Certificate to be submitted along with our response?

A. Yes.
2. Q. On Page 0036 of the RFQ there is a "TAX12007 Cost Sheet", is this to be completed and submitted along with our response?
A. Yes, this is the bidding sheet for this RFQ.
3. Q. On Page 0043 of the RFQ the "Workers' Compensation Insurance" box is checked. Does proof of insurance need to be included with our submission or would this just be part of the contractual agreement to be submitted by the winning bidder?

A. The Workers Compensation Insurance may be provided prior to *award* of contract. It does not need to be submitted with your bid.
4. Q. On Page 0039 in the RFQ under the "Bid Submission" section, it makes reference to a request for proposal and submitting one technical and one cost proposal. Does that statement apply to this RFQ (i.e. Do vendors need to make two separate submissions or can the technical and cost be all together in one submission)?

5. No, this is a RFQ not a RFP. One submission listing both technical and cost.
6. Q. May we submit our bid via email in the form of a PDF document?

A. No. All documents must be submitted in writing via USPS or dropped off in person at the Purchasing Division by the bid closing time.
7. Q. On Page 39 the number of convenience copies is left blank, please confirm that no convenience copies are required, and that the bid submittal consists of one technical and one cost proposal ONLY.

A. Only one (1) copy of the bid is required. This is not a RFP so therefore, only one complete copy is due to the Purchasing Division.
8. Q. Please confirm that the selected vendor will choose the pilot project area and that that area will consist of one district.

A. Confirmed; area will consist of one tax district with moderate challenges.
9. Q. Please confirm that the cost proposal consists of the Solicitation (first) page of the RFQ (front and back) ONLY.

A. The solicitation consists of pages 1 thru 54. Please refer to instruction to Bidders.

10. Q. Please confirm or clarify the scope of tax map conversion to be quoted – page 8 indicates that the Scope of Work is ONLY for Mingo County. Our understanding therefore is that the Bid should be only for the tax map conversion for Mingo County and make no reference to nor include any costs for other counties.

A. Tax map conversion is for Mingo County only.

11. Q. What is the purpose of the Tax12007 Cost Sheet on Page 36 of the RFQ?

A. To list your cost for each item so that we can compare prices for each vendor that submits a price. To discover the price per parcel.

12. Q. Please clarify the evaluation criteria and scoring factors for the RFQ.

- a. Is it simply lowest bid price? Yes.
- b. Does the technical proposal have any weight in the evaluation? Vendor must meet mandatory requirements of the solicitation.
- c. What is meant by “lowest vendor meeting specifications” (page 36)? Lowest cost vendor that meets ALL the specifications will be awarded the contract.
- d. How do you wish vendors to demonstrate that they meet “specifications”? By confirmation of the specifications and meeting all mandatory requirements.

13. Q. Can a sample scanned district map for Mingo County be provided? Can the associated IAS property records for that district also be provided?

A. We have no problem with an applicant checking out Mingo County and their maps – we are not providing sample data prior to assignment of project. Once the assignment has been made we will have a ‘kick-off’ meeting where sample data will be distributed.

14. Q. What are the expectations for the format and content of the technical proposal? Please provide an outline of the major sections and instructions.

A. Refer to page 3 reading thru page 7; there is no specific format but the bidding vendor must provide evidence that they can successfully meet the needs stated in pgs. 1-7 and can use the “Tax12007 Cost Sheet” (Pg.36).

15. Q. Page 32 (15 1-3) describes the “potential” for software customization – shall we assume that this is out of scope and NOT to be included in the bid price until after award and at such time as the task is defined? If not, then the following questions apply:

- a. What is meant exactly by a “functional interface”? Can an example be provided? Functional interface is the map books. No sample at this time.
- b. What is the current chosen software system of Mingo County? Mingo County does not have software at the present time. We assume they will go with Ersi software.

- c. Please provide more detail of the customization of queries and reports needed by the county. To name a couple of necessary items, map books, linking to assessment system (IAS) to accompany updates and other needs the county may encounter.

16. Q. Page 34 (19.2 b) presents the specification of "near 100%" match rate for parcels to property records. This is a common goal but achieving it is not under the control of the consultant. A common approach is for the consultant to link parcel polygons to property records and report on the match rate and identify the specific cases of missing or mismatched records, after which the County is responsible for correcting errors of commission and omission. Please reconsider this QC standard in light of the respective roles and responsibilities of the consultant and the county.

A. We recommend notes to accompany trouble spots, allowing the county(ies) to correct or update as needed.

17. Q. On page 6 it refers to Liquidated damages. Would the State consider a hold back percent rather than liquidated damages? Is that something that could be negotiated with the State at time of contracting?

A. We are unsure of the 'hold back' wording – if you are asking if there will be no cost extension the answer is no. We will not negotiate changing liquidated damages.

18. Q. We currently have geographic parcel data for the entire State of West Virginia, compiled in a manner consistent with the methodology describe in the RFQ, and currently being used by numerous private sector clients. We would like to offer this data to the State as part of the final deliverable, but we would need to maintain redistribution rights for our product. Is this acceptable?

A. PTD is an agent acting on behalf of the counties for the conversion of tax surface maps to a digital format, we are not the custodian - therefore the distribution is not within our control. Mapping disclaimer states the documents are copyright protected, also, the legislative regulations prohibits reproduction, coping, distribution and/or selling without written permission of the County Assessor.

19. Q. Would the State be willing to sign our standard Data Evaluation Agreement so that we could submit Mingo County digital parcel data for evaluation with our proposal?

A. No.

20. Q. The bid documents page 0008 indicates the RFQ - scope of work pertains only to Mingo County with an acknowledgement that the remaining fourteen counties represent potential candidates for future work. The cost sheet on page 0036 includes all fifteen counties with locations for pricing both the parcel polygon data and the finished tax map publication. Is the RFQ only for Mingo or are you requesting pricing for all counties?

A. Mingo only.

21. Q. The 2012 State transparency web site for the tax division indicates a \$300,000 amount for Marshall State Research Corp - an entity that has completed tax map preparation for the tax division in the past. Is this firm being considered as a sole source for this project if no other bids are received or have they been awarded some other project?
- A. We have requested an open bid to all vendors; there is no sole source involved.
22. Q. Is this bid open to all vendors, or do we have to be pre-qualified in advance before we can submit a proposal?
- A. This bid is open to all vendors. However, if you are the selected vendor, you must be registered with the State and meet all the "requirements" to be awarded the contract.
23. Q. The first paragraph on page 0008 says that the Scope of Work pertains only to Mingo County. Pages 0009 through 0023 document the parcel counts for the 15 counties that have not yet been completed and the pricing sheet on Page 0036 shows all 15 counties. Does pricing need to be submitted for all 15 remaining counties or only for Mingo County?
- A. Mingo only.
24. Q. If pricing is required for all 15 counties, does a separate cost breakdown need to be submitted for each county or can a single cost sheet as shown on Page 0036 of the RFP be submitted?
- A. No- Mingo only.
25. Q. Does the December 15, 2012 project completion deadline apply only to Mingo County?
- A. Yes.
26. Q. Will the selected vendor be required to use any source maps other than the tax maps (i.e. subdivision plats, survey drawings, deeds, CADD files, etc.) for the parcel GIS database construction?
- A. Yes.
27. Q. Will the selected vendor have to come on-site to the County to copy/scan the source maps or will the source maps be provided electronically?
- A. Source maps will be provided electronically.
28. Q. If the selected vendor has to copy/scan the source maps, does the County have equipment on-site to perform this work or will we need to provide our own copier or scanner on-site.
- A. See #10.

29. Q. Will the selected vendor be required to perform any field survey work or field verification during the project?

A. No.

30. Q. Will the selected vendor be required to perform any deed research or will they only be required to use tax maps to create the parcel GIS database?

A. No.

31. Q. If deed research is required, do you have an estimate from the counties that have already been completed as to how many parcels or what percentage of parcels may require deed research?

A. See #13.

32. Q. Under Additional Requirements on Page 0006, the third bullet says "Submit to the WVPTD a one-time cost analysis". Can you please describe this requirement in a little more detail?

A. Detail of price per parcel.

33. Q. Item 6 on pages 0038 and 0039 of the RFQ contains the Bid Submission requirements. At the end of that Section, there is an option defining the Bid Type as Technical or Cost. Neither of the two items is checked. Should we just submit a cost proposal or should we submit a full proposal with technical approach, QA/QC procedures, project management procedures, resumes, references, project experience, organization chart, etc.?

A. Basis for award: Award shall be made to the lowest vendor meeting specifications.

34. Q. In regards to RFQ Page No. 3 "The scope of work (SOW) for the tax maps includes both digital and manual elements....." The term digital & manual elements required more clarification, kindly elaborate.

A. Within the context of this project (for conversion and final products), the vendor is to follow all specifications during the "digital" conversion with the ability to produce print print-ready ESRI Mapbooks for post document formats, pdfs. Within the WV Statewide Procedures §189-5-3, all requirements for this can either be found in the sections referring to digital or manual sections, and in some cases referenced to the IAAO Standards on Manual (2004) and Digital (2012) Cadastral Maps and Parcel Identifiers.

In some cases, the vendor may also be required to physical handle hardcopy or draft tax maps provided by the County if updated maps are relevant for the conversion (e.g. urban regions).

35. Q. In regards to Statement of Work RFQ Page No. 4, we assumes that the QC benchmark guidelines of WVPTD will be shared with the Vendors? Please confirm.

- A. Yes, we will work with the vendors for many of parameters that will assist in QC measures. Although there may be unique situations, previous experiences with previous projects will be provided as need.
36. Q. We assume that the Geodatabase schema for production of conversion of tax maps into GIS will be provided by the West Virginia having all of the layers (FC) etc. Please confirm.
- A. Correct, we will provide Geodatabase schema, but allow vendor to make improvements where see fit after consulting with the WVPT for desired changes.
37. Q. Please confirm, what kind of attribute needs to be tagged? Does it need to be tag in tax maps (pdf form) or somewhere else? Kindly elaborate.
- A. Attribute Tagging is referring to digital Table fields as digitization occurs (See Pgs. 29-31 for attribute examples) This is essential for a) Data Driven Pages Mapbooks within ArcMap10.x. Road features that contain essential geometry and routing attributes for future development of network connectivity datasets may be necessary; Tags are considered annotation and is essential for final Mapbooks.
38. Q. What is IAS data? Please explain about its format and structure. Please confirm, the format of the IAS data which needs to be linked and with whom the data need to be linked? Kindly elaborate.
- A. IAS stands for Integrated Assessment Data and contains the necessary information to complete county tax maps-the data and necessary schema will be provided to you. It will be provided in a access/database base format file and will used to populate fields in vector files.
39. Q. Please confirm, what kind of Annotation/symbol needs to be tagged? Kindly elaborate.
- A. These are provided in Appendix B- and include-but not limited to- all the features on the county's tax maps. Details can be found in the referenced literature within the RFQ (see WV Statewide Procedures §189-5-3)
40. Q. Does rectification of maps also include Orthorectification? Kindly clarify.
- A. Use of ortho-rectified imagery for rectification of scanned tax maps (tiff image). (pg. 27)
41. Q. In regards to Final Product, RFQ Page No. 5 – 6, does this mean that Road & Hydrology features also need to be captured? Please confirm.
- A. Correct, All features on the tax maps will include these features.
42. Q. We assume that aerial photographs, Map Grids as an Input or reference data will be provided by the West Virginia, Please confirm.
- A. Correct; standardization of imagery for all maps is essential for edge-matching adjacent Counties and tax maps.

43. Q. The term Aerial Photography has same meaning as the (2 feet) seamless mosaic of Orthophotography 2003 countywide, Please confirm.
- A. Correct.
44. Q. Is symbol creation under the current scope of work? If yes, kindly provide the details of the symbols to be created.
- A. See Page 32 and is based upon Standars on Manual Cadastral Maps and Parcel Identifiers (IAAO 2004). The symbology will match the County's tax maps.
45. Q. Since the ROW need to be extracted from Road center line, kindly confirm whether the center lines are available for the entire county?
- A. Yes
46. Q. Please clarify whether West Virginia requires an application or facility for the generation of the PDF Maps from the existing data in the MXD?
- A. The application within ArcMap 10.x permits batched Mapbook MXD to PDF exports using Python scripting. No large-scale printing is required from the Vendor.
47. Q. In regards to Appendix B – Technical Information Specifications, Section 3.1 a Secondary Imagery, RFQ Page No. 24, we assume that all the required secondary imageries will be provided by the Department.
- A. Correct. Single-source imagery of WVSAMB 2003 data is preferred for edge-matching of adjacent tax maps, but additional sources may be required to aid technician in digitization of tax maps elements.
48. Q. In regards to Appendix B – Technical Information Specifications, Section 5 Roads, RFQ Page No. 25, Does this mean that there are other maps also available (Scale 1:400), which needs to be converted other than the tax maps? Please explain.
- A. Pre-existing road networks may be utilized (Rahall Transportation Institute and US Tiger lines), but these may need to be adjusted to meet the specifications contained within the RFQ.
49. Q. We assume that the County will provide the necessary information on addition or removal of the roads.
- A. Correct, close relationships with County is essential for success of tax map conversion.
50. Q. In regards to Appendix B – Technical Information Specifications, Section 9 Parcel Layer Attributes, RFQ Page No. 25-26, we assume that the attributes shown in the Table 2 are the required attributes and no additional attributes are required to be captured?
- A. These needs will be finalized by the County and WV State Property Tax- the table is a "list of desirable..." elements.

51. Q. In regards to Appendix B – Technical Information Specifications, Section 10 Tax Map Rectification Section 10.1 Control Points and Transformations – 1st Order Affine RFQ Page No. 27, we assume that orthophotographs and tax maps will be sufficient to identify features as Ground Control Points (GCP) for the required rectification accuracy and no additional GCP collection is required?
- A. Correct
52. Q. In regards to Appendix B – Technical Information Specifications, Section 15 IAS Data Linkages, RFQ Page No. 32, kindly elaborate on the functional interface for the GIS graphic data and IAS textual data. Kindly elaborate on the county's chosen software for compatible interface.
- A. Unique fields are populated as technicians digitize tax maps-these are joined/merged with IAS table dataset provided by WVPTD.
53. Q. In regards to Instructions to Vendors Submitting Bids, Section 6 Bid Submission, RFQ Page No. 39, is the Technical Proposal desired in a defined format? If yes, kindly provide the desired format.
- A. No.
54. Q. We assume that West Virginia will provide all kind of source material i.e. tax parcel mapsheet, Street centreline, hydrology features, ortho photos or imagery for the GIS conversions. Kindly confirm.
- A. Yes. Features and baselayers (e.g. topos and ortho-rectified imagery) may consist of more than one source (it is up to the vendor and County to work together using the best source data to accurately digitize the tax maps with minimal errors.
55. Q. Are all the Maps having any specific naming convention? If yes, please elaborate.
- A. These are on the tax maps and tax map index's.
56. Q. Please provide the details of post implementation maintenance and also number of staff to be trained and location of training?
- A. Vendor's Post implementation maintenance staff numbers depend on quality of tax map conversion and quality control. Since this the answers to this question is variable, it is hard to determine; however, I would say one to two staff member should be on stand-by if issues are found. or as many to fix necessary. The location of training is between the County and Vendor; If possible, training should occur at the county using their hardware/software.
57. Q. Please specify that is it required to execute project in onsite or whether offshore conversion is acceptable.
- A. If work is conducted by a vendor's technician, a supervisor must be on-site-where on-site is the vendor's normal operating location resides.

58. Q. We understand that there is no Survey envisaged under the scope of this RFQ, Please confirm?

A. If this is referencing the final deliverable product, then the answer would be to geospatially replicate the county's tax maps using ESRI software with MapBook (Data Driven Page) technology.

59. Q. In reference to the Technical Information Specifications included as part of Appendix B (specifically 16. Metadata) can you please provide some clarification? The text of the RFQ states that "The metadata reference should define the parcel dataset for any given jurisdiction and should meet The North American Profile (NAP) of ISO 19115, the 5FGDC (1998)". It is my understanding that the ISO 19115 was established in 2003 by the FGDC and contains a different content standard than the 1998 version which is referenced in the footnote. Which standard is the correct for metadata under this RFQ?

A. You are correct; the FGDC footnote is not the endorsement for the transition to the NAP (which I think the referenced paragraph on pg.33 attempted to convey), and was inappropriately cited. The standard under this RFQ will be ISO-19115.



July 16, 2012

State of West Virginia
Department of Administration, Purchasing Division
2019 Washington Street East
P.O. Box 50130
Charleston, West Virginia 25305-0130
Attention: Connie S. Hill

West Virginia State Tax Division
Property Tax Division
Greenbrooke Building
1124 Smith Street
Charleston, West Virginia 25301

Reference: Qualifications and Bid Proposal in response to RFQ: TAX12007
Develop GIS Database for the Digital Conversion of Countywide Tax Maps

Dear Ms. Hill:

Atlas Geographic Data, Inc. (Atlas) is pleased to submit our qualifications and bid proposal for the referenced project. We can provide all required services. Our proposed scope of work is based upon meeting and/or exceeding *all* project technical, administrative and schedule requirements as outlined in RFQ: TAX12007 dated 06-13-2012. This includes performance of all work in complete compliance with the project specifications as referenced: being, *Statewide Procedures for the Maintenance and Publishing of Surface Tax Maps* (189CRS3), International association of Assessing Officer's (IAAO) standards and recommendations in the *Standard on Manual Cadastral maps and Parcel Identifiers (2004)* and the *Standard on Digital Cadastral Maps and Parcel Identifiers (2012)* as well as the technical, administrative and schedule requirements described by RFQ: TAX12007, June 13th 2012.

Atlas Geographic Data is an experienced ArcGIS digital mapping company that specializes in delivery of highest quality cadastral map and E-911 databases to county governments. Atlas has the total in-house technical capability, available capacity and background experience to complete every task and requirement for this project. Thus, we will not require any subcontracting whatsoever. This State of West Virginia project will be managed and produced from Atlas's Wilmington, NC, offices with technical and management personnel working from our Romney, WV satellite office as necessary.

Atlas is *currently under contract* with the following West Virginia Counties for Cadastral Tax Map services:

- **Hampshire County:** On-going tax parcel and mapbook maintenance in an ArcGIS Geodatabase format to include development and management of an ArcServer GIS website.
- **Pendleton County:** On-going tax parcel and mapbook maintenance in an ArcGIS Geodatabase format. We anticipate development of an ArcServer GIS website in late 2012/early 2013.
- **Preston County:** ArcGIS editing and corrections to an existing tax parcel GIS Geodatabase to include converting existing GIS data into an updated ArcGIS Geodatabase design (version 10.1), re-establishing topology and entering text annotations and road rights-of-ways to fully meet the above referenced WV State specifications.
- **Mineral County:** On-going tax parcel and mapbook maintenance in an ArcGIS Geodatabase format to include development of, and updates for an ArcServer GIS website (this is a new contract).
- **Greenbrier County:** On-going GIS support for Tax Assessor GIS Mapping Department staff to include mapbook preparation and development of an ArcServer GIS website in late 2012/early 2013.

West Virginia projects/contracts that Atlas has *completed* in full within the past four years include:

- **Hampshire County:** Digital conversion and mapping of 24,000 parcels into an ArcGIS Geodatabase format to accurately “fit” the 2003 WVSAMB orthophoto imagery. Approximately 14,000 of these parcels were re-mapped by COGO from plats and the remainder were re-mapped by a ‘best fit’ methodology on a parcel-by-parcel basis taking fully into account the parcel locations and configurations as shown on pre-existing hardcopy tax maps.
- **Greenbrier County:** Digital conversion and mapping of 22,000 parcels into an ArcGIS Geodatabase format to accurately “fit” the 2003 WVSAMB orthophoto imagery. Approximately 8,000 of these parcels were re-mapped by COGO from plats and the remainder were re-mapped by a ‘best fit’ methodology on a parcel-by-parcel basis taking fully into account the parcel locations and configurations as shown on pre-existing hardcopy tax maps.

All of the above GIS tax parcel mapping and mapbook development services have been accomplished and delivered in an ArcGIS Geodatabase format, and all have been completed in full compliance with the specifications and standards referenced in the first paragraph of this cover letter. All prior and existing projects have required us to establish a GIS link and reconcile the new ArcGIS map data to the IAS database. We have also established the methodology to acquire current up-to-date IAS data for each County on a monthly basis and thereby keep the tax map Geodatabase and IAS linked and reconciled on an on-going basis.

West Virginia County contacts for reference of these projects are as follows:

Hampshire County: Aaron Cox, GIS Director: 304 822 7513:
911mapping@frontier.com or hampshiregis@gmail.com
and Norma Wagoner, Assessor: 304 822 3326, Fax: 304 822 8327.

Greenbrier County: Tonya Brown, GIS Coordinator: 304 647 6645:
Tonya.Brown@greenbriercounty.net
and Steve Keadle, Assessor: 304 647 6615, Fax: 304 647 6667.

Pendleton County: Ashley Calkins, Real Property Deputy, 304 358 2563
acalkins@assessor.state.wv.us
and Carolyn Sponaugle, Assessor csponaug@assessor.state.wv.us 304 358 2563 Fax:
304 358 2473.

Mineral County: Carole Junkins, Real Estate and Mapping 304 788 3753, Fax: 304 788
4109 and Rose Ann Maine, Assessor rmaine@assessor.state.wv.us

Preston County: Connie Ervin, GIS, 304 329 1220 crervin@assessor.state.wv.us
and Terri L. Funk, Assessor, tfunk@assessor.state.wv.us Fax: 304 329 1643

This proposal by Atlas for GIS Tax Parcel Database development is based upon using the *exact same staff members* that have completed or are performing services on the above listed contracts. Completion of these prior WV projects has brought an in-depth understanding to Atlas staff of the issues with "fit" and geospatial alignment of the current tax parcel data of West Virginia Counties relative to the WVSAMB orthophotography.

The State of West Virginia desires to have existing County tax maps digitally converted for use in an ArcGIS application. Mingo County will be the first County to be completed of the fifteen potential State sponsored projects. Mingo County includes approximately 26,000 Surface parcels within 12 tax districts and the larger municipality of Williamson, with numerous smaller towns and villages. Mingo County is on the order of 423 square miles in extent with parcels currently mapped onto 369 tax maps. The County's tax maps are hardcopy (some minor locations in digital form) with the standard State of WV IAS database. The tax maps were originally compiled in 1961/62 by Michael Baker Corporation and are currently maintained on an annual basis by manual drafting by red lines onto blackline paper copies by Leo Muncy as a contractor to the County. The original mylars are also periodically updated. Approximately 260 of the maps are at a scale of 1"=400', 84 inset maps are at 1"=100', 18 inset maps are at 1"=50' and 7 inset maps are at 1"=200'. The 1"=100' and 1"=50' scale maps consistently include many parcel line dimensions and annotated street/road rights-of-way width. These features are seldom found on the 1"=400' scale maps. Based on the IAS data, we estimate that approximately 13,800 of the County's parcels are mapped onto inset maps. Approximately 12,500 parcels are mapped onto the 1"=400' base set.

This project has been designed to rely primarily for source information upon the existing tax maps, partially completed tax parcel digital files, and the 2003 1"=400' scale digital orthophotography. Supplemental digital data, such as hydrography and road centerlines from the WVSAMB project (WV Statewide Addressing and Mapping Board) is also

available. However, road rights-of ways (ROW) are to be converted using best sources which may include WVDOT information and ROW plans in addition to what is shown on the tax maps. We have visited with the Mingo County Tax Assessor and Clerk's office on two occasions, but have not yet visited the WV DOT regional office to examine available ROW plans. Our proposal is based imaging and digitally mapping rights-of-ways from the most current of these documents for at least the major roadways of US Highways 119 (Corridor G) and 52 and WV State Road 49. We have also examined and inventoried all of the recorded property and subdivision plats within the Mingo County Clerk of Court's Office. ***Our base proposal includes mapping of selected and appropriate multi-parcel Subdivisions by Coordinate Geometry (COGO) methods, just as we have previously done in Hampshire and Greenbrier Counties.*** We will be pleased to provide an optional proposal to extend COGO procedures that will also include mapping of selected individual property surveys (that are platted) and older subdivisions and town plats by COGO.

Within the past four years Atlas has completed mapping and GIS conversion of tax parcel maps for Greenbrier and Hampshire Counties, WV. Both of these projects were completed through a combination of COGO for available plats combined with a "Best Fit" methodology to map non-platted parcels. This produced a superior tax parcel basemap that resolved many of the more apparent land records and parcel boundary location and "fit" issues. We propose this same basic approach for even our minimum (base) proposal for Mingo County. There were ***significantly*** more subdivisions and platted parcels within Hampshire County (60%) than for Greenbrier County (40%). Based upon a detailed review by Atlas staff of the plats within the Clerk's office of Mingo County, we anticipate that no more than perhaps 20% of the county's parcels are a valid candidate for COGO by our procedure. However, even at only 20% (or less), these parcels will provide an excellent and extremely accurate "adjoiner" base map for those parcels which are subsequently mapped by a "best fit" methodology.

The newly mapped GIS tax parcels will be digitally linked with the WV Integrated Assessment Systems (IAS) database. Atlas will provide reports of both mapped parcels and IAS records which do not have an apparent link. We will also report all instances of "many-to one and one-to-many" mapped parcel PIDs relative to the IAS database.

Our proposal has been developed from the following:

- A detailed review of nearly all source documents, maps and databases as examined by our staff within Mingo County.
- The experience that Atlas staff has gained with tax parcel maps, land records data, plats, IAS database issues, WV State specifications, WVDOT ROW plans, and tax map plotting from an ArcGIS mapbook from our past and on-going work for five West Virginia Counties.
- A detailed review of the West Virginia RFQ TAX12007, as well as the applicable State and IAAO specifications and guidelines.

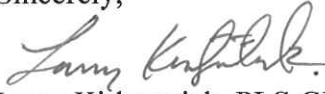
- Atlas staff has an extensive background with GIS tax parcel mapping by COGO methods from the legal conveyances of deeds, plats and surveys, as well as direct conversion from existing maps. This has included complete recompilation of tax parcels from deeds and plats into an ESRI based GIS format onto digital orthophotography for 38 counties totaling more than 1,300,00 parcels. Another 40 counties (1,100,000 parcels) have involved direct digital conversion from tax maps by a “Best Fit” method to an orthophoto base. This experience has involved county-wide GIS cadastral mapping projects within sixteen states in the past twenty five years. The deed (COGO) mapping experience of our staff has provided an insight into land records issues and parcel line “fit” for tax parcel maps and databases that is not generally acquired by GIS technicians who have previously only digitized existing maps and documents.
- Atlas is an experienced supplier of GIS data to county governments within all formats of the ESRI software suite. Our most recent projects have all been mapped and delivered in a Geodatabase design (versions 10, 10.1 and 9.3). A number of these projects have involved Atlas programming staff installing and configuring ArcServer and training county staff in the use and maintenance of this integrated system. All cadastral mapping and conversion projects completed by Atlas initially involve design of GIS data within a Geodatabase format to meet the specific requirements and expected applications of each client.

Mr. Hays Lambert, PLS (GIS specialty) GISP, will serve as day-to-day project manager for this tax parcel mapping project. Mr. Lambert has the hands-on experience to complete and supervise every task, having worked as an ArcInfo/ArcGIS cadastral mapper for ten years, and having directly managed numerous major GIS cadastral mapping projects. Project administration will be provided by Mr. Larry Kirkpatrick, PLS (GIS & Photogrammetry specialties) GISP, who has more than 26 years experience with design and production of major mapping and GIS projects for county governments. These are the same Atlas staff members in the same critical roles that are currently managing the five West Virginia projects listed above as references.

Atlas has completed tax parcel mapping and/or GIS conversion for twenty-one county projects (totaling more than half a million parcels) in the past five years; five in North Carolina, two in West Virginia, one in Michigan, one in Georgia, one in Pennsylvania, seven in Maryland, and two in Mississippi. Our current cadastral mapping/conversion workload involves completion of Chesterfield and Marion Counties, SC (50,000 parcels) and Warren and Lincoln Counties, MS (52,000 parcels) in the coming twenty-four months. We have closely analyzed our available capacity relative to our existing workload and the requirements to complete this Mingo County project. Atlas can easily complete all tasks and *deliver all products and services for this project within the required timeframe as specified by the RFQ.*

We appreciate this opportunity to be of service. If you should have any questions, please do not hesitate to contact us.

Sincerely,



Larry Kirkpatrick, PLS GISP
Vice President/Secretary/Partner
Project Administration and Management



Hays Lambert, PLS GISP
President/Partner
GIS Division Manager

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By signing and submitting Bid Forms and other required documents of RFQ: TAX12007, Atlas Geographic Data, Inc. is in compliance with all pre-bid administrative requirements and agrees to comply with all administrative, technical, schedule, etc. and all other terms and conditions of RFQ: TAX12007.



Website: www.atlasgeodata.com

Company Profile

Atlas Geographic Data, Inc (AGD) is a GIS professional services company with project management and production facilities in Wilmington, North Carolina. AGD also has a satellite office facility in Romney, WV. Products and services provided by AGD include:

- GIS implementation, primarily for county and municipal governments.
- Cadastral mapping from deeds and plats and tax parcel map conversion.
- ArcGIS database designs and Geodatabase development.
- Optical scanning and digital indexing of deeds and plats for tax mapping applications with processing of data for computer and website access to land records documents.
- GIS website development for county and municipal governments within formats of ArcIMS, Arc MapServer and MapGuide.
- Client training and on-going support with GIS systems for tax parcel, E-911, AVL and utility feature applications.
- E-911 address database development to include address point database development by field and database verification, digital address assignment and inventory, MSAG reconciliation, Telco ALI reconciliation, road centerline mapping and address range development. Digital map and database development for E-911 addressing applications are generally targeted towards Computer Aided Dispatch (CAD) implementation and enhancement using NENA specifications for database structure.
- Utility feature digital conversion to include water, sewer, storm water, gas and electric power distribution systems.
- Field survey/inventory applications to include mapping grade GPS field surveys for addressed structures, utility features, etc.
- ArcGIS Server implementation and conversion of Arc "Workstation coverages" and AutoCAD files to GeoDatabase formats for county government GIS datasets.
- AVL implementation, particularly for E-911 PSAP applications to include software for in-vehicle map display and routing to call location by either lat/long from wireless or address for landline. System installation includes PSAP hardware/software to map and monitor all active and selected inactive calls as well as location and progress of all vehicles.

Atlas Geographic Data, Inc (AGD) was formed in early 2005 through the partnership of four senior experienced GIS professionals, three of which are Professional Registered Land Surveyors (PLS), having both GIS and photogrammetry specialty as well as GISP certification. The senior management staff (individual GIS career experience ranging from 8 to 27 years) represents a seasoned GIS experience for developing cadastral, E-911, and utility map datasets. Data delivery formats include AutoCAD, ArcInfo, ArcGIS, ArcView, and Bentley MicroStation. AGD staff experience also includes numerous related software formats to include ESRI packages of personal Geodatabase, ArcGISServer, ArcWebServer, ArcSDE, ArcIMS, and relational database systems including ORACLE, MS Access, Dbase, etc.

GIS mapping capability and experience includes both cadastral mapping from deeds as well as direct conversion of existing maps. In addition, AGD staff has extensive experience with complex E-911 database construction, including address attribution of structures and road centerlines for direct linkage to ANI/ALI data for dispatch of both landline and Phase II wireless applications.

Atlas Geographic Data is a member of the **ESRI Developer Network (EDN)**. As such, we have in-house access to all of the programming source codes and software for the entire suite of ArcGIS products.

The senior staff of AGD has an extensive background with GIS implementation within county and municipal governments, primarily within eastern US states; however, major GIS and mapping projects have also been completed and supported within more than 30 states in the past 25 years. This past background of projects has involved tax parcel mapping and/or conversion for GIS for more than 75 counties totaling nearly 3,000,000 parcels, E-911 address databases for 45 counties, and orthophoto base mapping for more than 100 counties (45,000+ orthophotos).

Contact Information

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Branch Office:

716 Royal Bonnet Drive (two fulltime GIS employees, of which one is PLS and GISP)
Wilmington, NC 28405
Phone: 910 632 8270
Contact: Larry Kirkpatrick, PLS GISP, Vice President/Secretary
Cell: 910 352 2491
Email: lkirkpatrick@atlasgeodata.com

Equipment and Software Capability

Digital mapping at Atlas Geographic Data, Inc. is generally accomplished within an ESRI Arc Geodatabase and/or ArcEditor environment using versions 10.1 and 9.3, or within an AutoCAD format. ArcView and ArcGIS (ArcView 10.1 and 9.3) are used for those applications where polygon topology is not required during data development, such as road centerline mapping, attribution of address ranges or data editing. Computer Aided Drafting & Design (CADD) programs such as AutoCAD and Microstation are utilized by AGD for data capture and processing where the client's applications are best suited to these programs. Tax parcel mapping is edited and final-formatted within ArcGIS Geodatabase to provide polygon topology. Arc Coordinate geometry (Arc COGO) is used for metes and bounds parcel construction. AGD stays current with ESRI maintenance programs in order to keep our software capability up-to-date in behalf of both our production staff and support of our installed client base. Data delivery formats as direct output from our data conversion and mapping processes include ArcGIS Geodatabase (both for ArcEditor and Arc Server configured systems) and Shapefiles. AGD is a certified ESRI software development firm, thereby, having in-house access to all ArcGIS extensions and programs such as TINS, Spatial Analyst, COGO, Network, etc. This total capability also includes the older 7x version of ArcWorkstation (coverages) in order to continue in-house capability to support those ArcInfo clients who have not yet upgraded to the ArcGIS Desktop Geodatabase product suite.

ArcGIS Server 10.1 and 9.3 are utilized within the AGD internal network to store and manage client projects and files. This system includes four rack mounted file servers with on-line storage exceeding twenty terrabytes among multiple Raid configured hot swappable hard drives.

Digital mapping, editing and quality control is accomplished using twenty (20) high end networked PC workstations running under Windows XP Professional and having 19" to 25" monitors. Most workstations are configured with dual monitors in order that cadastral mappers and GIS operators can view the map construction window simultaneously with deed, plat and source document files and imagery.

Data back-up and data delivery for clients is generally accomplished with USB port exterior hard drives, as well as CD and DVD formats. All GIS and file server workstations include DVD writer capability. Four rack mounted Dell file servers are used for all data storage and backup on AGD's computer network. These servers operate under MS Server and provide platforms for GIS, as well as client GIS, website development and hosting.

Full size map plots are prepared using HP 500 and HP 1055C plotters that are networked to workstations. An HP 5550n high speed laser color printer is used for high quality check plots up to tabloid size (11 x 17 inch), as well as "Map Book" production.

Documents are scanned on-site with 42 and 36 inch format (E size) Context and Vidar document scanners as well as high resolution Nikon digital cameras that are stand mounted using interactive PC software for indexing and image capture. Several 11 x 17 inch desktop scanners are also used, which include UMAX, Epson, Plustek and Mustek scanners.

A Minolta microfilm reader printer is used to view, edit and print hardcopies from both 35 mm and 16 mm film acquired from state and county Archives of tax maps, deeds, plats and grantee/grantor indexes.

Additional Qualifications of Atlas Geographic Data, Inc.

Atlas Geographic Data, Inc. is a subchapter S corporation that is incorporated within North Carolina and registered with the Secretary of State's office in North Carolina. Atlas is also registered to conduct business with Secretary of State in West Virginia, Maryland, Mississippi, South Carolina and Virginia. Federal Tax ID Number is: 20-3251160. Atlas is an employee owned firm, with majority Stock ownership by fulltime employees: Hays Lambert, PLS GISP, President; Larry Kirkpatrick, PLS GISP, Vice President/Secretary; Teresa Kirkpatrick, Treasurer; Mark (Robert) Bratcher and Tre Penegar. There have been no mergers, acquisitions or sales of Atlas Geographic Data, Inc. since founding.

Atlas Geographic Data, Inc. has been providing GIS tax parcel mapping, E-911 address database development and GIS implementation services for county and municipal governments in an ArcGIS environment for seven years. Key staff have extensive background and experience with the specific services as shown on attached resumes and summarized below:

1. **Larry Kirkpatrick, PLS GISP, Vice President/Secretary/Owner: 27 years GIS experience.** BS Geology 1974, MS Civil Engineering 1979. Professional Land Surveyor (PLS) NC, VA & SC. Certified as Geographic Information Systems Professional (GISP) by the National Association.
2. **Frank Hays Lambert, PLS GISP, President/Owner: 14 years GIS experience.** BS Geography, with concentration in GIS 1998. Professional Land Surveyor (PLS) SC. Certified as Geographic Information Systems Professional (GISP) by the National Association.
3. **Mark (Robert) Bratcher, Owner: 9 years GIS/Programming experience.** BS Geography, with concentration in GIS, 2003. Stockholder.
4. **John McMorran, PLS GISP, 35 years mapping/GIS/computer programming experience.** BA Architecture 1968. Professional Land Surveyor (PLS) NC. Certified as Geographic Information Systems Professional (GISP) by the National Association.
5. **Teresa Kirkpatrick, Treasurer/Owner: 14 years GIS experience.** BS Science Education 1973.
6. **Samuel (Tre) Penegar, Owner: 8 years GIS experience.** BS Geography, with concentration in GIS, 2004. Stockholder.
7. **Joe Walpole, 6 years GIS experience.** BS Geography, with concentration in GIS 2005.

Summary of Project Experience and References By Atlas Geographic Data, Inc.

Atlas Geographic Data (AGD) has previously provided for numerous county GIS implementations, Arc Server installation, GIS websites, client ArcGIS training, E-911 database development, cadastral mapping, utility mapping, custom ArcGIS programming, , and GIS support services. A summary of selected projects (*last five years*) completed or underway includes:

Digital conversion from existing tax maps:

1. **Greenbrier County, WV:** 18,000 parcels from existing maps (ArcGIS Geodatabase). On-going parcel maintenance by AGD staff. *Note: 8,000 of the parcels were mapped by COGO.*
Contact: Tonya Brown, GIS Coordinator: 304 647 6645: Tonya.Brown@greenbriercounty.net
Steve Keadle, Assessor: 304 647 6615, Fax: 304 647 6667
2. **Hampshire County, WV:** 22,000 parcels from existing maps (ArcGIS Geodatabase). On-going parcel maintenance by AGD staff. *Note: 11,000 of the parcels were mapped by COGO.*
Contact: Aaron Cox, GIS Director: 304 822 7513: 911mapping@frontier.com
hampshiregis@gmail.com
Norma Wagoner, Assessor: 304 822 3326, Fax: 304 822 8327
3. **Pendleton County, WV:** On-going parcel map maintenance for existing ArcGIS geodatabase.
Contact: Ashley Calkins, Real property deputy, 304 358 2563 acalkins@assessor.state.wv.us
Carolyn Sponaugle, Assessor csponaug@assessor.state.wv.us Fax: 304 358 2473
4. **Preston County, WV:** Conversion of existing parcel geodatabase from version 9.3 to 10.1, update and edit Valley Tax district data to include rights-of-ways and text annotation.
Connie Ervin, GIS, 304 329 1220 cervin@assessor.state.wv.us
Terri L. Funk, Assessor, tlfunk@assessor.state.wv.us Fax: 304 329 1643
5. **Queen Anne's County, MD:** 24,000 parcels from existing maps (ArcGIS Geodatabase). On-going parcel maintenance by AGD staff. *Note: 14,000 of the parcels were mapped by COGO.*
Contact: Megan DelGaudio, GIS Specialist: 410 758 1255: mdelgaudio@qac.org
6. **Cecil County, MD:** 48,000 parcels from existing maps (ArcGIS Geodatabase). On-going parcel maintenance by AGD staff. *Note: 24,000 of the parcels were mapped by COGO.*
Contact: David Black, AICP, GIS Coordinator: 410 996 5220: dblack@ccgov.org
7. **McDowell County, NC:** 24,000 parcels digitally converted for ArcGIS from tax maps.
Contact: Keith Renfro, Tax Admin: 828 652 7121: krenfro@mcdowellgov.com
8. **Dorchester County, MD:** 24,000 parcels digitally converted for ArcGIS from tax maps.
Contact: Contact: Kate Donovan, GIS: 410 228 3234: kdonovan@docogonet.com
9. **Kent County, MD:** 10,000 parcels digitally converted for ArcGIS from tax maps.
Contact: Contact: Gregg Bird, Director Emergency Services: 410 778 3758:
gbird@kentgov.org

10. **DeKalb County, GA:** 225,000 parcels from existing maps (ArcGIS Geodatabase). On-going parcel maintenance by AGD staff. *Note: 90,000 of the parcels were mapped by COGO.*
Contact: Stacy Gear, GIS Director: 404 371 3619: scgrear@dekalbcountyga.gov

11. **Martin County, NC;** 18,000 parcels from existing AutoCAD data (ArcGIS Geodatabase) completed in 2008. State NCLRMP specifications.
Contact: Bobby Beach: 252 789 4350: rbeach@martincountyncgov.com

12. **Charles County, MD:** 60,000 parcels from existing maps (ArcGIS Geodatabase). On-going project by AGD to be completed September 2011. *Note: 50,000 of the parcels are being mapped by COGO.*
Contact: Glenn Gorman, GIS in Planning & Growth Management:
 Fax 301 638 2403: gormang@charlescounty.org

13. **Garrett County, MD:** 24,000 parcels from existing maps (ArcGIS Geodatabase). On-going project by AGD to be completed September 2011. *Note: 12,000 of the parcels are being mapped by COGO.*
Contact: Deborah Carpenter, GIS in Planning & Land Development; 301 334 1920:
debbiec@garrettcounty.org

GIS Website Development, Implementation and Hosting:

Hampshire Co, WV: Contact: Aaron Cox, GIS Director: 304 822 7513:
911mapping@frontier.com , hampshiregis@gmail.com
 Norma Wagoner, Assessor: 304 822 3326, Fax: 304 822 8327
 Search Parcel Maps; <http://ags.hampshirewv.com/map/>
 Parcel Data Ownership Search: <http://ias.hampshirewv.com>

Queen Anne's Co, MD: Contact: Megan DelGaudio, GIS Specialist: 410 758 1255:
mdelgaudio@qac.org County Departmental Intranet based on Arc Web Server,
 hosted on County Server.

Cecil Co, MD: Contact: David Black, AICP, GIS Coordinator: 410 996 5220:
dblack@ccgov.org Internet based on Arc Web Server, hosted on County Server
http://www.ccgov.org/dept_planning/gis.cfm

Talbot Co, MD: Contact: Mark Cohoon, GIS Manager: 410 770 8170: mcohoon@talbgov.org
 County Departmental Intranet based on Arc Web Server, hosted on County Server.

Dorchester Co, MD: Contact: Kate Donovan, GIS: 410 228 3234: kdonovan@docogonet.com
 County Departmental Intranet based on Arc Web Server, hosted on County Server.

McDowell Co, NC: Contact: Keith Renfro, Tax Admin: 828 652 7121:
krenfro@mcdowellgov.com <http://www.mcdowellcountygis.com/>

Hyde Co NC: Contact: Linda Basnight, Tax Administrator: 252 926 4188:
lbasnight@hydecountync.gov <http://www.hydecountygis.com/>

Tyrrell Co NC: Contact: Allison Snell, Tax Administrator: 252 796 4964:
asnell@tyrrellcounty.net <http://tyrrellcountygis.com/>

Jones Co NC: Contact: Wayne Vanderford, Tax Admin: 252 448 2546:
wvanderford@co.jones.nc.us <http://www.jonescountygis.com/>

Perquimans Co NC: Contact: Rhonda Money GIS: 252 426 7010:
rhondamoney@perquimanscountync.gov <http://gis.perquimanscountync.gov/>

Washington Co NC: Contact: Tim Esolen, PLS GIS Director: 252 793 2662:
tesolen@washconc.org <http://www.washingtoncountygis.com/>

Martin Co NC: Contact: Bobby Beach: 252 789 4350: rbeach@martincountyncgov.com
<http://www.martincountygis.com/>

Pamlico Co NC: Contact: Miriam Prescott, GIS Coordinator: 252 745 3791;
m_prescott@dishmail.net http://www.co.pamlico.nc.us/OnlineServices_GIS.aspx

Northampton Co NC: Contact: Joy Edwards, Land Records Manager; 252 534 5941:
joy.edwards@ncmail.net <http://gis.northamptonnc.com/>

Madison Co NC: Contact: Frank House, Tax Assessor: 828 649 3014:
fhouse@madisoncountync.org <http://www.madisoncountygis.com/>

Gates Co NC: Contact: Renee McGinnis, Tax Admin: 252 357 1360;
gatescotax@inteliport.com <http://www.gatescountygis.com/>

Bertie Co NC: Contact: William Roberson, IT Director: 252 794 6147:
william.roberson@bertie.nc.gov <http://www.co.bertie.nc.us/website/bertiegisweb/viewer.htm>
(Arc IMS hosted on County Server)

Chowan Co NC: Contact: Julie Sharpe, GIS Mapping: 252 482 7157:
Julie.sharpe@chowan.nc.gov <http://www.chowancountygis.com/>

Digital Cadastral mapping by COGO methods from deeds and plats:

1. **Gates County, NC;** 7500 parcels (ArcGIS Geodatabase). State NCLRMP specifications.
On-going parcel maintenance by AGD staff.
Contact: Renee McGinnis, Tax Admin: 252 357 1360; gatescotax@inteliport.com
2. **Pamlico County, NC;** 14,000 parcels (ArcGIS Geodatabase). State NCLRMP specifications.
On-going parcel maintenance by AGD staff.
Contact: Miriam Prescott, GIS Coordinator: 252 745 3791; mprescott@dishmail.net
3. **Hyde County, NC;** 7800 parcels (ArcGIS Geodatabase). State NCLRMP specifications.
On-going parcel maintenance by AGD staff.
Contact: Linda Basnight, Tax Administrator: 252 926 4188; lbasnight@hydecountync.gov

4. **Tyrrell County, NC:** 4800 parcels (ArcGIS Geodatabase). State NCLRMP specifications. On-going parcel maintenance by AGD staff.
Contact: Allison Snell, Tax Administrator: 252 796 4964: asnell@tyrrellcounty.net
5. **Vance County, NC:** 2200 parcel splits from plats and deeds for period 2006 until present.
Contact: Jordan McMillan, Planning Manager: 252 738 2091: jmcmillen@vancecounty.org

Arc Server implementation to include custom setup of Arc Webserver and network:

Hampshire Co, WV: Contact: Aaron Cox, GIS Director: Office: 304 822 7513,
Cell: 304 359 0176: 911mapping@frontier.com

Queen Anne's Co, MD: Contact: Megan DelGaudio, GIS Specialist: 410 758 1255:
mdelgaudio@qac.org

Cecil Co, MD: Contact: David Black, AICP, GIS Coordinator: 410 996 5220:
dblack@ccgov.org

Talbot Co, MD: Contact: Mark Cohoon, GIS Manager: 410 770 8170: mcohoon@talbgov.org

Dorchester Co, MD: Contact: Kate Donovan, GIS: 410 228 3234: kdonovan@docogonet.com

McDowell Co, NC: Contact: Keith Renfro, Tax Admin: 828 652 7121:
krenfro@mcdowellgov.com

Bertie Co, NC: Contact: William Roberson, IT Director: 252 794 6147:
william.roberson@bertie.nc.gov (Arc SDE and IMS)

E-911 and CAD Situs Address Point database projects with Street Centerlines and MSAG

1. **Hampshire County, WV:** This is a county-wide re-addressing project. Hampshire County has 14,000 structures that are currently addressed by the old USPS rural route schema. Atlas is mapping address points and inventorying the current addresses. New addresses are being assigned based on a road centerline linear schema of 5.28 feet. The project entails development of an MSAG, address conversion reports for the USPS and Frontier Telco as well as full implementation of road centerlines, Emergency Service Zones (to include mutual aid for fire and rescue), and address points for InterAct CAD. Project was initiated August 2010 and is scheduled for completion in June 2011.
Contact: Aaron Cox, GIS Director: 304 822 7513: 911Mapping@Frontier.com
2. **Wetzel County, WV:** This is a county-wide re-addressing project. Wetzel County has 9,000 structures that are currently addressed by the old USPS rural route schema. Atlas is mapping address points and inventorying the current addresses. New addresses are being assigned based on a road centerline linear schema of 5.28 feet. The project entails development of an MSAG, address conversion reports for the USPS and Frontier Telco as well as full implementation of road centerlines, Emergency Service Zones (to include mutual aid for fire and rescue), and address points for EmergiTech CAD. Project was initiated August 2011 and is scheduled for completion in June 2012.
Contact: Edgar W. Sapp, 911 Director: 304 455 6960: wc911@frontier.com

3. **Mineral County, WV:** This is a county-wide re-addressing project. Wetzel County has 16,000 structures that are currently addressed by the old USPS rural route schema. New addresses are being assigned based on a road centerline linear schema of 5.28 feet. The project entails development of an MSAG, address conversion reports for the USPS and Frontier Telco as well as full implementation of road centerlines for GIS and CAD, Emergency Service Zones (to include mutual aid for fire and rescue), and address points for Entrada PowerMap CAD. Project was initiated May 2012 and is scheduled for completion in December 2012.
Contact: Denny McGahn, 911 Addressing: 304 788 4111: mcaddressing@gmail.com
Michael Bland: 304 788 5921
4. **Pendleton County, WV:** This is a county-wide re-addressing project. Pendleton County has 8,000 structures that have been re-addressed with new physical addresses digitally linked to the old USPS rural route schema. New addresses were assigned by the County based on a road centerline linear schema of 5.28 feet. The Atlas scope of services entails development of an MSAG, address conversion reports for Frontier Telco as well as full implementation of road centerlines for GIS and CAD. Project was initiated January 2012 and is scheduled for completion in July 2012.
Contact: Diana Mitchell: 911 Addressing & Dispatch: 304 358 3724 pc911@shentel.net
5. **Anne Arundel County, MD:** Atlas completed field verification of approximately two thirds of the county's land area involving about 260,000 addresses. This involved field verification of all addressed structures and reconciliation of all address point data and road centerlines to the Telco and MSAG databases for GIS and E-911 Computer Aided Dispatch applications. Address points were reconciled to Telco ALI for better than 99% reliability for CAD mapping location. Data was delivered as ArcGIS Geodatabase files converted to Shapefiles for a Tiburon CAD implementation. The project was initiated October 2008 and completed in November 2009.
Contact: Caroline Gaulke, GIS Manager : 410 222 4022: itgaul90@aacounty.org
6. **Cecil County, MD:** Atlas completed field verification of all addressed structures within the County (~45,000). This involved reconciliation of address point data and road centerlines to the Telco and MSAG databases for GIS and E-911 Computer Aided Dispatch applications. Address points reconciled to Telco ALI for better than 99% reliability for CAD mapping location. Data was delivered as ArcGIS Geodatabase files converted to Shapefiles for CAD. Deliverables also included GIS nautical data for CAD, tabloid size map books and wall maps for PSAP. The project was initiated in 2006 and completed in 2007. Atlas is under contract to provide address point database maintenance for Cecil County through 2013.
Contact: David Black, AICP, GIS Coordinator: 410 996 5220: dblack@ccgov.org
7. **Hertford County, NC:** Atlas completed field verification of all addressed structures within the County (~12,000). This involved reconciliation of address point data and road centerlines to the Telco and MSAG databases for GIS and E-911 Computer Aided Dispatch applications. Address points reconciled to Telco ALI for better than 99% reliability for CAD mapping location. Data is being delivered as ArcGIS Geodatabase files converted to Shapefiles for Southern Software CAD. The project was initiated in October 2010, to be completed May 2011.
Contact: Sara Turner, GIS Director: 252 358 7809: sara.powell.turner@hertfordcountync.gov
8. **Queen Anne's County, MD:** Atlas completed field verification of all addressed structures within the County (~26,000). This involved reconciliation of address point data and road centerlines to the Telco and MSAG databases for GIS and E-911 Computer Aided Dispatch applications. Address points reconciled to Telco ALI for better than 99% reliability for CAD mapping location. Data was delivered as ArcGIS Geodatabase files converted to Shapefiles for

CAD. Deliverables also included GIS nautical data for CAD, tabloid size map books and wall maps for PSAP. The project was initiated in 2005 and completed in 2006.

Contact: Megan DelGaudio, GIS Specialist: 410 758 1255: mdelgaudio@qac.org

9. **Hyde County, NC:** Atlas completed field verification of all addressed structures within the County (~4,000). This involved reconciliation of address point data and road centerlines to the Telco and MSAG databases for GIS and E-911 Computer Aided Dispatch applications. Address points reconciled to Telco ALI for better than 99% reliability for CAD mapping location. Data was delivered as ArcGIS Geodatabase files converted to Shapefiles for InterAct CAD. The project was initiated in 2007 and completed in 2009.
Contact: Linda Basnight, Tax Administrator: 252 926 4188: ibasnight@hydecountync.gov
10. **Tyrrell County, NC:** Atlas completed field verification of all addressed structures within the County (~3,500). This included reconciliation of address point data and road centerlines to the Telco and MSAG databases for GIS and E-911 Computer Aided Dispatch applications. Data has been delivered as ArcGIS Geodatabase files converted to Shapefiles for Southern Software CAD. The project was initiated in 2009 and was completed in 2010.
Contact: Allison Snell, Tax Administrator: 252 796 4964: asnell@tyrrellcounty.net
11. **Wicomico County, MD:** Atlas completed field verification of all addressed structures within the County (~50,000). This involved reconciliation of address point data and road centerlines to the Telco and MSAG databases for GIS and E-911 Computer Aided Dispatch applications. Address points reconciled to Telco ALI for better than 99% reliability for CAD mapping location. Data was delivered as ArcGIS Geodatabase files converted to Shapefiles for CAD. The project was initiated in 2006 and completed in 2008.
Contact: Frank McKenzie, Chief Planning: 410 548 4860: fmckenzie@wicomico.org
12. **Talbot County, MD:** Atlas senior staff completed field verification of all addressed structures within the County (~22,000). This involved reconciliation of address point data and road centerlines to the Telco and MSAG databases for GIS and E-911 Computer Aided Dispatch applications. Address points reconciled to Telco ALI for better than 99% reliability for CAD mapping location. Data was delivered as ArcInfo files, later translated to ArcGIS Geodatabase. Deliverables also included GIS nautical data for CAD, tabloid size map books and wall maps for PSAP. The project was initiated in 2002 and completed in 2004. Atlas was under contract to provide address point database maintenance for Talbot County through 2011.
Contact: Mark Cohoon, GIS Manager: 410 770 8170: mcohoon@talbgov.org
13. **Bertie County, NC:** Atlas re-mapped fire district and emergency service boundaries to include mutual aid. Address ranges were recomputed and attributed to stereo compiled road centerlines with new ESZ boundaries. Road centerlines were reconciled to MSAG and a new MSAG was provided to Telco. ArcGIS Geodatabase delivery with Shapefiles for Southern Software CAD using GeoLynx for map display. (2009).
Contact: William Roberson, IT Director: 252 794 6147: william.roberson@bertie.nc.gov
14. **Northampton County, NC:** Atlas re-mapped fire district and emergency service boundaries to include mutual aid. Address ranges were recomputed and attributed to stereo compiled road centerlines with new ESZ boundaries. Road centerlines were reconciled to MSAG and a new MSAG was provided to Telco. ArcGIS Geodatabase delivery with Shapefiles for Southern Software CAD using GeoLynx for map display. (2010).
Contact: Ronnie Story; E911 Director; 252 574 0205

15. **Martin County, NC:** Atlas updated road centerlines and reconciled data to the MSAG. ArcGIS Geodatabase delivery with Shapefiles for VisionAir CAD with Geolynx for map display (2008)
Contact: Bobby Beach: 252 792 1031: rbeach@martincountyncgov.com
16. **Gates County, NC:** Atlas developed address ranges onto stereo compiled road centerlines with ESNs and MSAG updates. (2005). Updates were completed in 2009. ArcGIS Geodatabase and Shapefiles were delivered for Southern Software CAD and new Map Display module.
Contact: Billy Winn, E911 Director: 252 357 5569: bwinn@embarqmail.com
17. **Caroline County, MD:** Atlas completed field verification of all addressed structures within the County (~25,000). This involved reconciliation of address point data and road centerlines to the Telco and MSAG databases for GIS and E-911 Computer Aided Dispatch applications. Address points reconciled to Telco ALI for better than 99% reliability for CAD mapping location. Data was delivered as ArcGIS Geodatabase files converted to Shapefiles for CAD (PSSI and New World CAD). Deliverables also included GIS nautical data for CAD, tabloid size map books and wall maps for PSAP. The project was initiated in 2003 and completed in 2006.
Contact: Bryan Ebling, Director Emergency Management: 410 479 2622:
bcebling@emwerg.caroline.md.us
18. **Kent County, MD:** Atlas completed field verification of all addressed structures within the County (~10,000). This involved reconciliation of address point data and road centerlines to the Telco and MSAG databases for GIS and E-911 Computer Aided Dispatch applications. Address points reconciled to Telco ALI for better than 99% reliability for CAD mapping location. Data was delivered as ArcGIS Geodatabase files converted to Shapefiles for CAD. Deliverables also included GIS nautical data for CAD, tabloid size map books and wall maps for PSAP. The project was initiated in 2006 and completed in 2006.
Contact: Contact: Gregg Bird, Director Emergency Services: 410 778 3758:
gbird@kentgov.org
19. **Dorchester County, MD:** Atlas completed field verification of all addressed structures within the County (~25,000). This involved reconciliation of address point data and road centerlines to the Telco and MSAG databases for GIS and E-911 Computer Aided Dispatch applications. Address points reconciled to Telco ALI for better than 99% reliability for CAD mapping location. Data was delivered as ArcGIS Geodatabase files converted to Shapefiles for CAD. Deliverables also included GIS nautical data for CAD, tabloid size map books and wall maps for PSAP. The project was initiated in 2007 and completed in 2008.
Contact: Contact: Kate Donovan, GIS: 410 228 3234: kdonovan@docogonet.com

Digital conversion of Utility Features and Implementation of GIS within Dept.

Queen Anne's County Sanitary District, MD: ArcGIS conversion of water and sewer systems countywide to include more than 120,000 point and line segment features. Custom develop and implement Arc Explorer field laptop application to include interactive link to more than 2000 as-built and design documents: **Contact:** Joe Haxton, Manager: 410 643 3535, or Megan DelGaudio, GIS Specialist: 410 758 1255: mdelgaudio@qac.org

Project Management

A key element to successful completion of any project is having experienced and sound project management. Atlas Geographic Data (AGD) has a project management structure and team of technical and supervisory personnel with the skills and background experience to manage every technical and administrative aspect of this major project.

This proposal by AGD for GIS cadastral mapping of West Virginia Counties is based upon using the *exact same staff members* that have previously completed more than a dozen major County projects in just the past three years. Our management team structure is geared towards providing the West Virginia Property tax Division and Mingo County Assessor's staff the opportunity to play key roles in the project, as well as have significant interface with our management and technical personnel to discuss, review and train for every major aspect of production and deliverables.

The AGD team's project management structure is a three level approach:

- *Project Managers* – This level is led by Hays Lambert, PLS-GISP, as Project Manager (Wilmington, NC, office). Hays has extensive GIS management experience with all of the tasks required for this entire project. This has included Cadastral mapping and/or E-911 mapping/databases for numerous County-wide cadastral mapping/conversion projects to include: Greenbrier, Hampshire, Preston, Pendleton and Mineral, WV; Bertie, Brunswick, Gates, Jones, Martin, McDowell, Pamlico, Perquimans, Person, Surry, Stanly, Tyrrell, and Warren, NC; St. Clair, MI; Cecil, Queen Anne's, Dorchester, Kent and Talbot, MD; Crawford, PA; and DeKalb, GA. A 14+ year veteran of the GIS/mapping industry, Hays will provide contractual oversight and make certain that the necessary staff and equipment are in place from the project beginning and throughout all deliverables. Hays will be responsible for the day-to-day production management of the project. Hays will work closely with State and County staff by attending project progress meetings, review sessions, preparing progress reports, as well as working with the State and County to establish and monitor goals for this project. Hays will be assisted by Larry Kirkpatrick, PLS-GISP, with overall project administration. Larry has one of the most extensive backgrounds in the GIS industry with managing tax parcel, photogrammetry and E-911 addressing projects within the eastern US states. This has included more than seventy cadastral mapping/conversion projects for GIS implementation and more than forty E-911 address database development projects. Upwards of forty of these projects have involved parcel mapping from legal conveyances of plats and deeds. Larry has directly managed more than 100 major County-wide orthophoto projects, totaling more than 50,000 orthophotos. Both Hays Lambert and Larry Kirkpatrick will attend the critical project kickoff meeting, the Pilot area meetings, and the project wrap-up meetings.
- *Task Managers* – This level of management will oversee the tasks within their area of expertise. They will be responsible for managing personnel within specific

technical functions, producing task related deliverables and informing project managers of pending action items/problems. The task managers will also play key roles in scheduling and coordination issues. Each task manager will have a clear, specific technical mission within a certain time frame to complete each task in order that all project schedules will be met. Task managers will include Mark Bratcher and John McMorran, PLS, for project ArcGIS Geodatabase design, training, and custom GIS programming. Teresa Kirkpatrick will manage all aspects of source document gathering, scanning, copying, indexing and organizing. Hays Lambert will also take responsibility for the role of task manager for tax parcel map conversion and parcel compilation from deeds and plats.

- *Project Administration/senior management* – Our project organization and management program also incorporates hands-on involvement by AGD team senior manager Larry Kirkpatrick, PLS-GISP, who has an extensive background experience of precisely the technical and management requirements of this very large project. This has included direct management of individual GIS/cadastral/mapping contracts exceeding \$6,500,000, and management for delivery of more than 50,000 orthophotos, 3,000,000 parcels, and 40 E-911 county-wide addressing projects.

The AGD team organization effectively utilizes both the technical and management talents of our team members and provides a single point of contact for the State and County (our Project Manager – Hays Lambert). The following topics are all key components of our project management approach:

Progress Reports – The Project Manager will prepare and submit progress reports that document all work that was executed during that reporting period with an accounting of the percentage of work completed to date. These reports will be submitted to WV Property Tax Division and Mingo County Assessor prior to any scheduled progress meetings. The AGD team will prepare these reports in a simple, easy to read format that will include a project summary (updated project scope, schedule information, outstanding issues and corrective actions) and a bulleted list of completed items during the current invoice period.

Schedule Control – In order for AGD to ensure schedule adherence, we will implement the following controls to monitor the tracking of the project:

- Use the schedule that will be finalized based on the results of contract negotiations and the results of a Pilot Project as a guide throughout the entire project to ensure that all deadlines are met.
- Our Project Manager will be responsible for monitoring project milestones and will daily supervise task managers with regards to due dates of various tasks.
- Report on schedule issues to the WV Property Tax Division and Mingo County as a part of our progress reports.

- Streamline the review period within the QA/QC process for Mingo County by submitting highest quality deliverables on the *first* submittal; thereby, eliminating time consuming and frustrating re-work for all involved parties.

The purpose of our schedule control procedure is to coordinate all project tasks so that we can identify potential delays and set-up measures to avoid them.

Interaction with the State and County Operations and Staff – Communication in person with State and County personnel is paramount for proper and prompt communications of schedules, issues, deliverables, meetings, training sessions, etc. Our Project Manager and the County will coordinate a series of meetings that are required for a successful project. At a minimum, the following meetings are suggested:

- *Kick-off Meeting* (typical action items – finalize miscellaneous project details, determine how the project phases will be implemented, finalize a schedule for delivery groups to the State and County and discuss the Pilot Project area, identify communication links for all concerned parties).
- *Pilot Project Review Meeting* (typical action items – review comments on electronic and check plot data, modify check plot and mapbook design, verify data quality and accuracy, and review digital data within the State’s GIS system *on-site* as well as review project metadata).
- *Project Wrap-up Meeting* (typical action items – retire/resolve any outstanding issues, discuss additional implementations, if any, etc).
- *On-site Training* – This AGD proposal includes five full days of on-site training with ArcGIS and this new tax parcel database. This training will be concentrated on data updating and system maintenance procedures using Mingo County data.



Hays Lambert , PLS, GISP
President & GIS Project Manager

EDUCATION & REGISTRATION:

BS, Geography, Concentration in GIS; Appalachian State University, 1998
Professional Land Surveyor South Carolina, GIS specialty. (2005)
GISP, Certification as Geographic Information Systems Professional (2008)

RELEVANT PROJECT EXPERIENCE:

Mr. Lambert has concentrated on GIS implementations for local county governments for the past twelve years. This has involved primarily E-911 and tax parcel databases for a variety of county government applications. Nearly all projects completed, and underway, have involved the use of ESRI Arc technology for data construction. This includes the most recent modules of ArcGIS, Geodatabase and ArcServer. The following example county-wide GIS projects describe the technical scope of services provided by Mr. Lambert in roles of project management, database design, and database production.

Examples of Tax Parcel projects for GIS:

- **Greenbrier County, WV:** Project manager for digital conversion of 32,000 parcels into an ArcGIS Geodatabase format using best fit from existing maps and COGO for Plats. (2009)
- **Talbot, Queen Anne's, Cecil, Kent, Dorchester, & Caroline, MD:** Project manager for digital conversion of 110,000 parcels for these MD Counties into an ArcGIS Geodatabase format. This included re-mapping 40,000 parcels by COGO from plats, with the remainder by best fit from Maryland Property view maps.
- **Crawford County, PA:** Project manager for digital conversion of 65,000 parcels into an ArcGIS Geodatabase format using best fit from existing maps. (2008/09)
- **Pamlico County, NC:** Project manager for cadastral mapping of 10,500 parcels from deeds/plats. E-911 road centerlines and address ranges developed for CAD. *GIS operator for in-the-field inventory of addresses.* Upgrade of GIS data and systems from Arc Coverages to
- **Jones County, NC:** Upgrade of GIS data and systems from Arc Coverages to Geodatabase format. Digital color orthophotography. ArcGIS/Geodatabase. (2007/09).
- **McDowell Co., NC:** Project manager for cadastral map conversion (27,000 parcels) and ArcGIS implementation. (2007/09).
- **Gates County, NC:** Cadastral mapping from deeds/plats for 10,000 parcels. ArcGIS. (2005/06)
- **Vanderburgh Co., IN:** Cadastral map conversion by best fit for 60,000 parcels. ArcInfo. (2000/01)
- **Perquimans Co., NC:** Conversion of tax parcels from ArcInfo Coverages to ArcGIS Geodatabase along with client training in ArcGIS 9.3. (2009)

Examples of E-911 address projects (some with tax parcel mapping and conversion):

- **Talbot Co., MD:** Project manager for address inventory & development of CAD database by individual structure addresses, as well as tax parcel conversion and AVL implementation for ambulances. *GIS operator for in-the-field inventory of addresses.* ArcGIS Geodatabase. (2002/09).
- **Queen Anne Co., MD:** Project manager for address inventory and development of CAD database by individual structure addresses. (2004/05). Project manager for tax parcel mapping by COGO and direct conversion with ArcGIS Geodatabase delivery. *GIS operator for in-the-field inventory of addresses.* (2005/08).
- **Cecil County, MD:** Project manager for address point inventory and development of CAD database. (2006/07). *GIS operator for in-the-field inventory of addresses.* Digital conversion of 45,000 tax parcels by combination of COGO (multiparcel plats) and best fit from MD Property View sources. (2007/08).
- **Anne Arundel Co., MD:** Project manager for address inventory and development of CAD database by individual structure addresses (140,000 field verified). Reconciliation of 260,000 addresses to Telco ALI database.
- **Hyde County, NC:** Project manager for E-911 database development comprised of planimetry, road centerlines, address points and address ranges. Reconciliation to MSAG and ALI databases. ArcGIS Geodatabase delivery. (2008-09)
- **Gates County, NC:** Project manager for cadastral mapping of 7,500 parcels from deeds/plats and E-911 database comprised of planimetry, centerlines and address ranges. GIS website development. (2004/09).
- **Wicomico Co. MD:** Project manager for address inventory and development of CAD database by individual structure addresses (50,000 field verified). Reconciliation of address points to ALI, centerlines to MSAG.

CAREER HISTORY:

August 2005 to Present: President of Atlas Geographic Data, Inc. Responsibilities include project management for all E-911 address database development and tax parcel mapping projects. Responsible for personnel management and company administration.

2002 to July 2005: Cadastral / E-911 / GIS Project Manager for Mapping Resource Group, Inc. Responsibilities at MRG included project management of all Cadastral and GIS projects, database design and deployment, GIS consulting and client relations. All projects involving ArcInfo data processing and database development for E-911 and Cadastral mapping projects.

2001 to 2002: GIS Analyst for 3DI Technologies, Inc. Responsible for database management, data translations and editing, and client communications. Major projects involved complex ArcInfo datasets and database designs.

1999 to 2001: Cadastral mapper for AGD/3DI Technologies, Inc. Responsible for parcel compilation, deed and plat research, extensive orthophoto interpretation, and database analysis and editing. Interactive mapping using ArcInfo for COGO and data capture.

1998 to 1999: GIS/911 technician for Analytical Surveys, Inc.



Larry E. Kirkpatrick, PLS , GISP

Vice President & Partner

REGISTRATIONS:

Professional Land Surveyor: North Carolina (Photogrammetry Specialty) (1999)
Professional Land Surveyor: South Carolina (Photogrammetry & GIS specialties) (2005)
Professional Land Surveyor: Virginia (Photogrammetry specialty) (2009)
GISP Certification as Geographic Information Systems Professional (2009)

EDUCATION:

BS, Geological Engineering, North Carolina State University, 1973
MS, Civil Engineering Curriculum; Geotechnical Engineering, North Carolina State University, 1979
(Minor in air photo interpretation and remote sensing)

RESPONSIBILITIES:

Mr. Kirkpatrick's responsibilities include project administration, project planning, business development, project costing, contract negotiation, document preparation, cost accounting, and project management for selected projects.

RELEVANT PROJECT EXPERIENCE:

Mr. Kirkpatrick has a total of 30 years experience in the digital mapping, surveying, and civil engineering fields. This has included Company Management as President for 17 years for two major North Carolina based Photogrammetric/GIS/Cadastral/E-911 mapping companies, and extensive Project Management and administration for hundreds of local government GIS implementations.

Cadastral mapping and/or conversion projects for **GIS** implementation have included more than 60 counties, totaling more than 3,000,000 parcels. More than one half of these have involved compilation from deeds, with the remainder being conversion projects for GIS implementation

GIS Consulting to include on-site Needs Assessment, staff interviews and report generation for GIS implementation for more than a dozen major County projects. Duties generally included ArcInfo and ArcGIS database designs as well as project staffing recommendations, hardware/software designs, and RFP and RFQ document development for mapping and conversion services.

E-911 Mapping and Addressing projects have included 40 counties, totaling more than 1,000,000 address assignments and tens of thousands digital route and road centerline-address range maps in GIS and CAD formats. Many projects included MSAG development, ESN boundaries, reconciliation to Telco ANI/ALI database, address range attribution onto centerlines and address point attribution of individual structures. Most E-911 projects have been ArcGIS, ArcInfo, and/or Geodatabase.

Project Manager and/or project administrator for **larger multi-year projects**. Examples include Gwinnett County, GA, plan-topo-ortho-cadastral (\$6,500,000); Wake County, NC, plan-topo-ortho-cadastral contracts spanning a period of 8 years (6 contracts totaling more than \$5,000,000); Fulton County, GA, and City of Atlanta, plan-topo-ortho (\$3,000,000); Durham County, NC, (\$3,000,000), and Bibb County, GA (\$1,000,000)

Orthophoto base mapping projects contracted for and/or directly managed include more than 100 major projects, totaling more than 45,000 orthophotos.

Detailed Planimetric and Topographic mapping of entire city/county areas by aerial photogrammetry has included more than 30 major local government entities.

LIDAR project design and data evaluation for use as a DEM/DTM for ground surface modeling includes one full year as a project consultant on one of the teams providing LIDAR data for the NC FloodMap project.

Photogrammetric mapping experience and Project Management for **Transportation Design Projects** have included hundreds of projects directly for NCDOT, SCDOT, GADOT, and/or private design engineers.

CAREER HISTORY:

- **August 2005 to Present:** Vice President and Partner: **Atlas Geographic Data, Inc.** Responsible for company administration, business development, and project management.
- **2001 to July 2005:** Business Development, Project Management and Administration for Mapping Resource Group, Inc. (Wilmington, NC)
- **1999 to 2001:** Business development, project management and administration for local government clients for 3D Imaging, LLC, in Wilmington, NC. Duties included GIS consulting for selected clients.
- **1995 to 1999:** President, American Geographic Data, Inc. Project management and business development, particularly for county and city GIS implementations and database development.
- **1991 to 1995:** Exec. Vice President, Westinghouse Landmark GIS, an aerial photogrammetric, cadastral and utility GIS mapping company in Cary, NC. Responsible for marketing, preparation of proposals, project estimating, negotiation and contract preparation. Responsibilities also included management of select projects for digital orthophotography, cadastral, E-911, and utility mapping.
- **1984 to 1991:** President, Westinghouse Landmark GIS. Directed company development from 15 employees in 1984 to 130 employees by 1991. Responsible for company administration, accounting, project and personnel management, marketing, preparation of proposals, job costing, negotiation and preparation of contracts.
- **1974 to 1984:** Staff engineer/geologist, S&ME, Inc., a Raleigh based geotechnical engineering firm. Managed subsurface geotechnical investigations for more than 300 projects including on-site construction and quality control testing.

**Cadastral Mapping and/or GIS Tax Parcel conversion projects
managed by Larry Kirkpatrick, PLSGISP since 1984:**

- Gates County, NC (AGD) 7,500 parcels, ArcGIS, from deeds/ plats
- Hyde County, NC (AGD) 7,500 parcels, ArcGIS, from deeds/ plats
- Greenbrier Co. WV (AGD) 32,000 parcels, ArcGIS from maps & plats
- DeKalb Co. GA (AGD) 225,000 parcels, ArcGIS from plats & maps
- Tyrrell County, NC 4,800 parcels, ArcGIS from deeds/ plats
- St. Clair County, MI (AGD) 62,000 parcels, ArcGIS, from existing maps
- Benzie County, MI (AGD) 18,000 parcels, ArcGIS, from existing maps
- Dorchester Co., MD(AGD) 24,000 parcels, ArcGIS from existing maps
- Crawford County, PA (AGD) 65,000 parcels, ArcGIS, from existing maps
- Queen Anne's Co, MD (AGD) 24,000 parcels, ArcGIS plats & existing maps
- Cecil County, MD (AGD) 40,000 parcels, ArcGIS plats & existing maps
- Kent County, MD (AGD) 10,000 parcels, ArcGIS plats & existing maps
- Caroline Co, MD (AGD) 8,000 parcels from existing maps
- Pamlico County, NC (MRG) 14,000 parcels, ArcInfo from deeds/ plats
- Vanderburgh, IN (AGD) 60,000 parcels, ArcInfo, from existing maps
- Talbot County, MD (MRG) 18,000 parcels, ArcInfo, from existing maps
- Berien County, MI (MRG) 15,000 parcels, ArcInfo, from existing maps
- Saginaw County, MI (3DI) 24,000 parcels, ArcInfo, from existing maps
- Perquimans Co, NC (MRG) 2,000 updates from deeds, ArcInfo
- Jackson Co, Miss (AGD) 50,000 parcels, ArcInfo, existing maps
- Person Co, NC (WLGIS) 22,000 parcels, ArcInfo, from deeds
- Anderson Co, SC (AGD) 88,000 parcels, ArcInfo, from deeds
- Warren County, NC (AGD) 20,000 parcels, ArcInfo, from deeds
- Jones County, NC (AGD) 7,500 parcels, ArcInfo, from existing maps
- Montgomery Co, NC (AGD) 28,500 parcels, ArcInfo, from existing maps
- Charles City Co, VA(AGD) 5,400 parcels, ArcInfo, from existing maps
- Pender County, NC (AGD) 35,000 parcels, USI, ArcInfo, from deeds
- Macon County, NC (AGD) 33,000 parcels ArcInfo, from existing maps
- Chatham County, NC (AGD) 26,000 parcels ArcInfo, from existing maps
- Jackson County, NC (AGD) 28,000 parcels ArcInfo, from existing maps
- Yadkin County, NC (AGD) 24,000 parcels ArcInfo, from existing maps
- Franklin County, NC (AGD) 4,000 parcel splits, ArcInfo, updates for 1994-97
- Harnett County, NC (AGD) 7,000 parcels splits, ArcInfo, updates for 1995-98
- Cherokee Co, NC (AGD) 25,000 parcels, ArcInfo, existing worksheets
- Hyde County, NC (AGD) 7,000 parcels, ArcInfo by transfer existing maps
- Lee County, SC (AGD) 8,000 parcels, ArcInfo by transfer existing maps
- Bibb County, GA (WLGIS) 55,000 parcels, Genasys, from existing maps
- Gwinnett Co, GA (WLGIS) 130,000 parcels, GDS & Intergraph, from deeds
- Pickens Co, SC (WLGIS) 50,000 parcels, ArcInfo, from deeds
- Sumter Co, SC (WLGIS) 55,000 parcels, ArcInfo, from deeds
- New Hanover, NC(WLGIS) 80,000 parcels, ArcInfo, from existing maps
- Carteret Co, NC (WLGIS) 42,000 parcels, ArcInfo from deeds

Cadastral projects, Larry Kirkpatrick (continued)

- Sampson Co, NC (WLGIS) 30,000 parcels, ArcInfo from deeds
- Hoke Co, NC (WLGIS) 7,000 parcels, ArcInfo from deeds
- Richmond Co, NC (WLGIS) 35,000 parcels, ArcInfo from deeds
- Johnston Co, NC (WLGIS) 40,000 parcels, Genasys, Ultimaps from deeds
- Onslow Co, NC (WLGIS) 45,000 parcels, Genasys, System 9 ArcInfo, maps
- Pitt Co, NC (WLGIS) 40,000 parcels, Geobased, ArcInfo, from deeds
- Beaufort Co NC (WLGIS) 25,000 parcels, Geobased, from deeds
- Washington Co, NC(WLGIS) 9,000 parcels, ArcInfo, from deeds
- Edgecombe Co, NC (WLGIS) 25,000 parcels, Geobased, from deeds
- Wake County, NC (WLGIS) 175,000 parcels, GDS, from deeds
- Durham Co, NC (WLGIS) 80,000 parcels, ArcInfo, Intergraph, AutoCAD, from deeds/ plats
- Wilkes Co, NC (WLGIS) 30,000 parcels, Geobased, from deeds
- Caldwell Co, NC (WLGIS) 35,000 parcels, ArcInfo, from deeds
- McDowell Co, NC (WLGIS) 25,000 parcels, Geobased, from deeds
- Watauga Co, NC (WLGIS) 33,000 parcels, Geobased, from existing maps
- Madison Co, NC (WLGIS) 10,000 parcels, Geobased, from deeds
- Franklin Co, NC (WLGIS) 25,000 parcels, ArcInfo, from deeds
- Granville Co, NC (WLGIS) 16,000 parcels, Geobased, from deeds
- Allegheny Co, N C(WLGIS) 10,000 parcels, GENASYS, from deeds
- Transylvania Co NC(WLGIS) 25,000 parcels, ArcInfo, from existing maps
- Clay Co, NC (WLGIS) 8,000 parcels, ArcInfo, AutoCAD, from deeds
- Fauquier Co, VA (WLGIS) 25,000 parcels, Geobased, from deeds/ plats
- Lynchburg, VA (WLGIS) 27,000 parcels, GDS, from existing maps
- Chesterfield Co, VA(WLGIS) 70,000 parcels, ArcInfo, plats & existing maps
- Harford Co, MD maps 50,000 parcels, ArcInfo, Genasys, Intergraph, from existing maps
- York, PA (WLGIS) 7,000 parcels, ArcInfo, from plats
- White Plains, NY (WLGIS) 12,000 parcels, Genasys, from deeds
- Jackson Co, AL (WLGIS) 35,000 parcels, ArcInfo, from existing maps
- Houston Co, AL (WLGIS) 40,000 parcels, ArcInfo, from existing maps
- Avery Co, NC (WLGIS) 25,000 parcels, ArcInfo, from deeds

Note: (AGD); Atlas Geographic Data
(AGD): American Geographic Data
(MRG): Mapping Resource Group
(WLGIS): Westinghouse Landmark GIS



Mark Bratcher

GIS Programming & Analysis, Data Formatting & Mapping

EDUCATION & REGISTRATION:

BS, Geography, Concentration in GIS; Appalachian State University, 2003

RELEVANT PROJECT EXPERIENCE:

Mr. Bratcher has concentrated on GIS implementations for local county governments for the past four years. This has involved primarily ArcGIS and ArcServer installations with E-911 and tax parcel database implementations within ArcGIS formats. Nearly all projects completed, and underway, have involved the use of ESRI ArcGIS Geodatabase, ArcServer, Arc WebServer, ArcIMS and ArcSDE technologies. The following example county-wide GIS projects describe the technical scope of services provided by Mr. Bratcher in roles of project management, database design, and GIS programming.

- **Cecil County, MD:** GIS programmer for ArcServer installations to include tax parcel, address point, planimetry and orthophoto databases. Developed ArcServer website. **GIS operator for in-the-field inventory of addresses.** Performed reconciliation of address points to Telco ALI and developed database design for E-911 application and tax parcel mapping. On-going GIS support. (2005/09)
- **Anne Arundel Co., MD:** GIS programmer for Arc Engine application for field in-vehicle address point verification to develop E-911 database for Computer Aided Dispatch application. **GIS operator for in-the-field address verification.** (2008/09)
- **Queen Anne's Co., MD:** GIS programmer for ArcServer installations to include tax parcel, address point, planimetry and orthophoto databases. Developed ArcServer website. **GIS operator for in-the-field address inventory.** Performed reconciliation of address points to Telco ALI and developed database design for E-911, GIS and tax parcel mapping. On-going GIS support. Developed ArcGIS application for water/sewer system mapping to include source document viewer. (2005/09)
- **Martin Co., NC:** Project Manager for road centerline and address range data development for GIS and CAD application (2006). GIS operator for tax parcel data reformatting from AutoCAD to ArcGIS. Install ArcGIS geodatabase 9.2 and train County staff. Implement public access terminals using GIS Viewer for Land Records data. Develop GIS website, to include custom programming to client's requirements. (2006/09)
- **Talbot Co., MD:** GIS programmer for Automated Vehicle Location (AVL) application for County emergency service vehicles. Includes PSAP and in-vehicle mapping program for real time vehicle locationing and routing. GIS operator for address inventory and cadastral map conversion. Nautical map conversion and Map Book development for E-911 applications. (2004/09)
- **Pamlico County, NC:** GIS programmer for conversion of cadastral mapping from Arc Workstation (7.2) to ArcGIS Geodatabase (9.2). GIS website development. (2008/09)

- **Jones County, NC:** GIS programmer for conversion of cadastral mapping from Arc Workstation (7.2) to ArcGIS Geodatabase (9.2). Includes client training and GIS support. GIS website development and implementation.
- **Four County EMC, NC:** ArcGIS development of power distribution maps for this rural Electric Member Cooperative. On-site training with ArcGIS tax parcel map updates by COGO as basemap for system design. (2007/09)
- **Bertie County, NC:** On-site ArcGIS (9.2) training. Assisted with ArcIMS website development. GIS operator for tax parcel, soils, land use and planimetric database development. (2005/09)
- **Jones County, NC:** Digital orthophoto quality control and data processing for GIS and website implementation. (2008)
- **Tyrrell County, NC:** Digital orthophoto quality control and data processing for GIS applications. (2007)
- **Town of Leland, NC:** Field GPS mapping of transportation and hydrographic features for route planning. (2008)

CAREER HISTORY:

July 2005 to present: GIS programmer for **Atlas Geographic Data**. Responsibilities include ArcServer installation, ArcGIS database designs, AVL programming, development of custom GIS websites, digital conversion and mapping for E-911 and cadastral mapping projects, and custom GIS applications for water, sewer, and electrical utility systems.

August 2003 to June 2005: GIS operator and programmer for Mapping Resource Group. Responsibilities included database development for E-911 Address and tax parcel mapping projects.



Samuel Penegar

E-911 Address database development and GIS Tax Parcel Mapping

EDUCATION & REGISTRATION:

BS, Geography, Concentration in GIS; Appalachian State University, 2004

RELEVANT PROJECT EXPERIENCE:

Mr. Penegar has concentrated on development of E-911 address databases and tax parcel mapping for local county governments for the past six years. This has involved database development and editing within an ArcGIS Geodatabase format. The following example county-wide GIS projects describe the technical scope of services provided by Mr. Penegar in roles of production mapping and database processing:

- **Anne Arundel Co., MD:** ArcGIS editing of field verified address points. Reconciliation of address points to existing databases to include Telco, Public Works and tax parcels. Update road centerlines and address ranges with with reconciliation to MSAG. (2009).
- **Cecil County, MD:** *GIS operator for in-the-field Address inventory* & development of CAD database by individual structure addresses. Reconciliation of address points to existing databases to include Telco ALI, and road centerlines with address ranges to MSAG. (2007/08).
- **Caroline County, MD:** *GIS operator for in-the-field Address inventory* & development of CAD database by individual structure addresses. Reconciliation of address points to existing databases to include Telco ALI, and road centerlines with address ranges to MSAG. (2005/06).
- **Queen Anne's Co, MD:** *GIS operator for in-the-field Address inventory* & development of CAD database by individual structure addresses. Reconciliation of address points to existing databases to include Telco ALI, and road centerlines with address ranges to MSAG. (2005/06).
- **Kent County, MD:** *GIS operator for in-the-field Address inventory* & development of CAD database by individual structure addresses. Reconciliation of address points to existing databases to include Telco ALI and road centerlines with address ranges to MSAG. (2006).
- **Talbot Co., MD:** *GIS operator for address inventory* & development of CAD database by individual structure addresses, as well as tax parcel conversion. Provides COGO mapping for on-going tax parcel maintenance and address point maintenance within an Arc Geodatabase format. (2006/09).
- **Hyde County, NC:** Tax parcel compilation to digital orthophoto using deeds and plats as source within an ArcGIS Geodatabase environment. (2008/09)
- **St Clair County, MI:** Digital editing and QA/QC of digital tax parcel maps converted by AGD staff within ArcGIS Geodatabase format. (2007/08)

- **McDowell Co., NC:** Digital conversion of existing tax parcel maps and Quality control of final data within an ArcGIS Geodatabase format. (2007/08)
- **Martin Co., NC:** Road centerline and address range data development for GIS and CAD application (2006). GIS operator for tax parcel data reformatting from AutoCAD to ArcGIS. (2007).
- **Gates County, NC:** GIS operator for soils and land use mapping from new digital orthophotography and existing ASCS documents. COGO mapping for on-going tax parcel maintenance within an Arc Geodatabase format. (2006/09)
- **Pamlico County, NC:** Tax parcel maintenance by COGO methods within an Arc Geodatabase format. (2005/09)
- **Tyrrell County, NC:** GIS operator for cadastral map updates. Edit and format E- 911 database comprised of planimetry, centerlines and address ranges.

CAREER HISTORY:

July 2005 to present: GIS mapper for **Atlas Geographic Data**. Responsibilities include field verification of addresses, database processing and reconciliation of Telco ALI with address points and road centerlines with



JOHN K. MCMORRAN, PLS GISP
GIS Development Director

EDUCATION:

BA, Architecture, Case Western University (1968)
University Arizona: Computer Graphics (1972)
University Colorado: Remote Sensing & Spatial Analysis (1978)

YEARS EXPERIENCE: 40

PROFESSIONAL AFFILIATIONS:

Professional Land Surveyor NC (PLS) (1999)
GISP Geographic Information Systems Professional (2009)

GENERAL QUALIFICATIONS:

2000 to Present: GIS Consultant and programmer to local governments and Atlas Geographic Data, Inc. ArcGIS Geodatabase and ArcServer programming and database designs for tax parcel, E-911 and utility mapping applications.

1995 to 2000: GIS Director at American Geographic Data (later 3DI), Wilmington, NC. Client GIS support, implementation of ArcInfo, OASIS, AutoCAD, and Microstation application programs for staff and clients. Client training with ArcInfo AML and applications for cadastral COGO interactive mapping, E-911 addressing & data processing and utility mapping. ArcInfo database designs for tax parcel, utility and plan-topo applications.

1991 to 1995: Vice President, Westinghouse Landmark GIS, R&D for digital orthophotography, raster to vector conversions and interactive, on-line COGO data entry for cadastral mapping applications. Internal support of Landmark departments for GDS, ArcInfo, Genasys and Intergraph Helava digital photogrammetry system and company DEC NET and Novell network for Landmark. ArcInfo database designs for cadastral, utility and photogrammetric applications for local government projects.

1986 to 1991: GIS Division Manager at Landmark responsible for development and management of digital conversion and GIS programming departments. Implemented GDS, ESRI ArcInfo and Genasys systems at Landmark. GIS data translations for Ultimap and Prime System 9 projects. Implemented company-wide digital mapping systems for Landmark to include ArcInfo, GPS, Genasys, Geobased, AutoCAD, and Microstation.

1986 to 1987: GIS program development and technical support at Landmark. Implemented AutoCAD, GeoBased, KORK, photogrammetry and Intergraph digital conversions system at Landmark. Hardware installations included DEC MicroVAX file servers networked to PC-AT workstations.

1979 to 1986: Director of Product Development for GeoBased Systems in Raleigh, North Carolina to design, code, develop and deliver to marketplace a full function GIS product operating under DOS and VAX VMS operating systems. GeoBased STRINGS was completed for VMS in 1984 and for PC-DOS in 1985.

1972 to 1979: Manager of computer operations, programming, product development and CADD and GIS implementations at GeoMines, Inc. GIS product development, including software design, coding and quality control at Autotrol Technology and COMARC Design during the very early years of GIS product conception and design.

1968 to 1972: Woodward Clyde Consultants. Decision analysis using computer modeling and statistical analysis procedures.

RELEVANT EXPERIENCE:

Relevant projects worked on by Mr. McMorran include:

Cadastral - GIS database designs for Digital Mapping and/or Conversion:

- Pamlico County, NC 14,000 parcels (ArcInfo)
- Perquimans County, NC 2,000 parcel splits (ArcInfo)
- Warren County, NC 20,000 parcels (ArcInfo)
- Anderson County, SC 88,000 parcels (ArcInfo)
- Charles City County, VA 5,400 parcels (ArcView)
- Pender County, NC 35,000 parcels (ArcInfo)
- Jones County, NC 7,500 parcels (ArcInfo)
- Macon County, NC 33,000 parcels (ArcInfo)
- Chatham County, NC 26,000 parcels (ArcInfo)
- Jackson County, NC 28,000 parcels (ArcInfo)
- Columbus County, NC 20,000 parcels (AutoCAD, ArcInfo)
- Hyde County, NC 7,000 parcels (ArcView)
- Harnett County, NC 35,000 parcels (ArcInfo)
- Wilson County, NC 30,000 parcels (ArcInfo from Genasys data)
- Franklin County, NC 25,000 parcels
- Wilkes County, NC 30,000 parcels (Geobased)
- Granville County, NC 16,000 parcels (Geobased)
- Transylvania County, NC 25,000 parcels (ArcInfo)
- Fauquier County, VA 25,000 parcels (Geobased/OASIS)
- Wake County, NC 175,000 parcels (GDS)
- Gwinnett County, GA 135,000 parcels (GDS & Intergraph)
- Bibb County, GA 55,000 parcels (Genasys)
- Harford County, MD 50,000 parcels (Genasys, Intergraph)
- Fauquier County, VA 25,000 parcels (Geobased)
- Pitt County, NC 40,000 parcels (ARC INFO)
- Carteret County, NC 42,000 parcels (ARC INFO)
- Johnston County, NC 40,000 parcels (Genasys/Ultimap)
- Chesterfield County, VA 89,000 parcels (ARC INFO)
- Lynchburg, VA 27,000 parcels (GDS)
- Alleghany County, NC 27,000 parcels (Genasys)
- Granville County, NC 17,000 parcels
- Edgecombe County, NC 25,000 parcels
- New Hanover County, NC 80,000 parcels (ARC INFO, Geovision)
- White Plains, NY 12,000 parcels
- Lee County, NC 25,000 parcels (Geobased, ARC INFO)
- Onslow County, NC 45,000 parcels (ARC INFO, Genasys, System 9)

SYSTEMS EXPERIENCE:

- **ESRI ArcInfo** since 1986 on VAX-VMS, PRIME, Windows, Sun, Unix, IBM RS6000, Hewlett Packard & Data General Avion Platforms. Latest version of 9x. with Geodatabase and SDE database design, development and consulting.
- **ESRI ArcServer** implementation and training to include ArcIMS, ArcSDE, and Arc Geodatabase modules. Includes ArcGIS Web Server development.

- **ArcIMS** website development.
- **Autodesk MapGuide** website development.
- **Genasys Genamap** since 1990 on Unix (Sun and IBM) and DOS platforms.
- **GDS** since 1988 on VAX VMS workstations.
- **Intergraph** on DOS, Unix and VAX VMS platforms.
- **Bentley & Microstation**
- **AutoCAD** on various workstations and operating systems.
- **GeoBased STRINGS** and **Understanding Systems OASIS** under Windows, and previously on VAX VMS and DOS operating systems.
- **KORK** photogrammetry software on VAX VMX and DOS platforms.
- **INGRES, ORACLE, INFORMIX, ACCESS, Dbase** and **Dbase III** in a variety of DOS, Unix and VMS environments.
- **Ultimap** and **Prime/Wild System 9** on at least three major projects involving data translations from Intergraph, GeoBased and KORK formats.
- **Geovision** data translations for one major project within a VAX VMS environment.



Teresa M. Kirkpatrick

Cadastral Map Compilation and Deed Document Preparation
QA/QC for E-911 Address Data and Ranges

EDUCATION:

BS, Science Education
North Carolina State University, 1973

RELEVANT PROJECT EXPERIENCE:

Responsibilities include QA/QC of structure address points, address range development, and reconciliation to MSAG using ArcGIS. Cadastral mapping responsibilities have included parcel mapping by COGO methods within ArcMap and deed/plat document compilation and organization for a number of county digital mapping and/or conversion projects. This has involved scanning, indexing, and organizing hardcopy plats, surveys, and deeds.

- Hyde County, NC:** Tax parcel compilation to digital Orthophoto base using legal conveyances of deeds and plats. Parcel assembly accomplished using an ArcGIS Geodatabase format. QA/QC of field verified structure address points. Road centerline address ranges and ESN boundaries developed from existing sources to reconcile with MSAG and ANI/ALI data for CAD application. Reconstruct MSAG and road centerline file on basis of revised fire and emergency district boundaries. (2008/09)
- Queen Anne's Co., MD:** Tax parcel compilation to orthophotos using COGO methods within ArcMAP. Address range development with ESN boundaries and reconciliation to MSAG. QA/QC of field verified structure point addresses. (2005/06)
- Queen Anne's Co., MD:
Sanitary District** Digital conversion of water and sewer systems from paper design and as-built drawings into an ArcGIS format. Responsibility includes engineering interpretation of features for compliance to a structured GIS database. (2007/09)
- Northampton Co., NC:** Road centerline address ranges and ESN boundaries developed from existing sources to reconcile with MSAG and ANI/ALI data for CAD application. Reconstruct MSAG and road centerline file on basis of revised fire and emergency district boundaries. (2010)
- Bertie County, NC:** Road centerline address ranges and ESN boundaries developed from existing sources to reconcile with MSAG and ANI/ALI data for CAD application. Reconstruct MSAG and road centerline file on basis of revised fire and emergency district boundaries. (2004/09)
- Gates County, NC:** Scanning, indexing, and organizing deeds, plats, and surveys for COGO map compilation of 7,500 parcels. ArcGIS (2003/2004)
- Cecil County, MD:** Address range development with ESN boundaries and reconciliation to MSAG. **GIS operator for in-the-field verification of addressed structures.** QA/QC of field verified structure point addresses. (2005). ArcGIS and Plant Equipment Orion CAD.

- Tyrrell County, NC:** Road centerline address ranges and ESN boundaries developed from existing sources to reconcile with MSAG and ANI/ALI data for CAD application. Reconstruct MSAG and road centerline file on basis of revised fire and emergency district boundaries. (2010)
- Pamlico County, NC:** Copying, indexing, and organizing deeds, plats, and surveys for 14,000 parcels using optically scanned images of source documents. Deed research using Grantee/Grantor indexes, deed descriptions, and existing maps for more than 1,000 parcels that did not include deed/plat references in the County's tax parcel database. (2002). ArcInfo.
- Warren County, NC:** Copying, indexing, and organizing deeds, plats, and surveys for 20,000 parcels using optically scanned images of source documents. Deed research for more than 10,000 parcels that did not include deed/plat references in the County's Bormith system tax parcel database.
- Anderson County, SC:** Copying, indexing, and organizing deeds, plats, and surveys for two townships totaling nearly 20,000 parcels using optically scanned images of source documents.
- Pender County, NC:** Optically scanning and indexing existing maps, plats, and surveys deed research for more than 5,000 parcels that did not include deed/plat references in the County's Bormith system tax parcel database.
- New Hanover Co., NC:** Retrieval and on-site optical scanning and/or copying of more than 5,000 plats from the Register of Deeds office for digital conversion for the County's tax parcel based GIS.

CAREER HISTORY:

August 2005 to Present: Atlas Geographic Data, Inc. Address range development and QA/QC for E-911 projects to include MSAG reconciliation and structure address point attribution within ArcGIS.

2002 to July 2005: Deed document preparation and Address range development for county projects for Mapping Resource Group, Inc.

1998 to 2001: Deed document preparation for American Geographic Data (later 3Di) for cadastral mapping projects using optically scanned, indexed deeds and plats and relational tax parcel database from existing county real property/appraisal systems. Responsibilities included on-site retrieval and copying of documents whenever required.

1996-1998: Classroom instructor at Topsail High School, Hampstead, NC.

1993-1996: Technical proposal editing and compilation for engineering documents for Westinghouse Environmental Services, Raleigh, NC.

1974 to 1991: Classroom instructor at high schools in Wake and Durham Counties, NC.

Technical Approach

Introduction

Atlas Geographic Data (AGD) staff has previously provided every service and product that is required by Mingo County for this contract to numerous prior county digital mapping projects. Of particular note, we have recently completed tax parcel conversion for Greenbrier County, WV (October 2009) and Hampshire County, WV (February 2012). These projects involved these exact same specifications. Further, the source documents for Greenbrier and Hampshire Counties were nearly identical to the Mingo County sources to be used for this project.

Tax parcel map development is accomplished by Atlas Geographic Data by using “the best sources first”. The “initial” source materials to be used for map compilation will likely be road Rights of Ways from WVDOT plans, and parcels from subdivision plats that can be COGO mapped from survey and design metes and bounds information. Mingo County has approximately quite a number of subdivisions; however, most are shown on older plats that incorporate only parcel line dimensions without reliable bearings. Our “*base*” proposal has been prepared on the assumption that we will re-map the majority of whichever subdivisions can be located on plats that are sufficiently complete and reliable to use COGO methods.

All Tax Parcels are to be digitally converted from existing raster scans by a process that repositions and reconstructs the parcels to logically “fit” the occupation, and land use lines as interpreted from the 2003 WVSAMB Mingo County digital orthophotography. This process must still retain the geometric and positional integrity of the existing maps. The parcels and road Rights-of-Ways are to be digitally converted as topologically structured polygons that are attributed with the existing tax parcel number and selected data fields from the State Integrated Assessment System (IAS) database.

The Mingo County orthophoto land base is a precisely scaling digital map at a scale of 1”=400’ County-wide with a two foot digital image pixel. The aerial photography for this WVSAMB funded base map was conducted as “leaf off” imagery in 2003 at a flight negative scale of 1”=2400’. We have also located and purchased 2009 digital orthophoto imagery, that is apparently processed as one meter pixels from a late spring (leaf on) 1”=3333’ negative scale. AGD will utilize the 2003 WVSAMB imagery for all initial mapping based upon the better scaling and leaf off conditions of this imagery. However, the 2009 imagery will be used as supplemental background for those areas that have had significant development activity since 2003. Mingo County also has available Pictometry aerial imagery that was flown in 2011 and sponsored by the West Virginia sheriff’s association. This will be an important source for evaluation of parcel splits and road construction that has occurred since 2003.

This project will develop a tax parcel dataset in an ArcGIS Geodatabase format fully in compliance with all aspects of the West Virginia State specifications as outlined in WV 189CSR4 (9/27/1990) as well as the latest “digital” (Draft) revision (1/11/2007). In

addition the standards and specifications provided by the publication by IAAO entitled "Standard on Digital Cadastral Maps and Parcel Identifiers" also provides supplemental guidelines to be adhered to for this project. The existing map grid will be essentially retained with 1"=400' scale maps Countywide (~260), and 1"=100', 1"=50' and 1"=200' scale maps within incorporated towns, selected subdivisions and more densely developed villages and unincorporated towns and mine towns within the County. This currently provides for 84 existing "sub" or "inset" maps at a scale of 1"=100', 18 at 1"=50' and 7 at 1"=200'. However, the final ArcGIS data will be geospatially continuous county-wide; therefore, maps and projects can be extracted with any boundaries and used at any scale defined by the user, taking into consideration that the source data has actually been compiled using a 1"=400' scale accuracy orthophoto basemap. Based on the IAS data, we estimate that approximately 13,800 of the County's parcels are mapped onto inset maps. Approximately 12,500 parcels are mapped onto the 1"=400' base set.

The original base map for the existing tax maps was probably photo paper or mylar black and white aerial photo enlargements that had been rectified to photo interpreted features from USGS Quadrangle maps (1"=2000'). This original mapping was conducted as a State supported project in the 1961/1962 by the PA based consultant Michael Baker Corporation. It is probable that many of the 1"=100' scale sub maps have been developed by direct overlay drafting (using re-scaling as necessary) from plats. On the basis of our past experience of digitally converting county tax maps from these types of sources, we anticipate a wide range of initial fit from the existing maps to the new digital orthophoto land base. *It is not uncommon to find entire blocks of parcels and road Rights of Ways that are as much as 50 to 100 feet displaced from their apparent correct location.* Therefore, we have included both Coordinate Geometry COGO mapping as well as "Best Fit" rectification procedures within our tax parcel conversion/reposition process to achieve a suitable and logical "fit" of the final digital parcel data to the digital orthophoto basemap.

Mingo County has approximately quite a number of older mine town type subdivisions, located generally along rivers (Tug Fork) and streams. The vast majority are represented as recorded plats within the County Clerk's Office. However most only include parcel line dimensions and not lot line bearings. This AGD "**base**" proposal has been prepared on the assumption that we will re-map some selected portion of these subdivisions by COGO methods; being the ones that incorporate reliable bearings and are susceptible to COGO file development. Platted subdivisions will be the first parcels mapped into the file by COGO from the metes and bounds survey and design information of the recorded plats. This process will retain the parcel line dimensions as annotation from the COGO file. Then the remaining tax parcel boundaries will be digitally converted from the existing raster digital scans, with *each* parcel evaluated and adjusted to "fit" the land occupation lines interpreted from the Orthoimagery, all the while keeping the location, geometry and configuration as represented on the existing maps. The "best fit" procedure will first incorporate the map rectification procedure precisely as described by RFQ TAX12007 in section 10 on pages 0027 and 0028.

A proper fit of parcel linework to orthophoto imagery and land use occupation features will be achieved by ArcGIS experienced cadastral mappers using ArcGIS version 10 within a Geodatabase format. Adherence to a strict ArcGIS Geodatabase design, such as the one anticipated for this project, will ensure that all final data has the integrity and topology for the full GIS capability of queries, sorts and applications anticipated for the Tax, E-911 and Planning offices of Mingo County.

All mapping and digital conversion of tax parcels by Atlas Geographic Data will be accomplished by experienced cadastral mapping staff. In this manner, Mingo County can expect that the *quality of the tax maps will be significantly improved by our processes*, and the digital data will have highest quality spatial topology, attribution, annotation and mathematical integrity.

Existing Source Materials. AGD technical staff have visited Mingo County Tax Assessor and Clerk's offices twice in the past month to examine and inventory source materials. In addition RFQ TAX12007 provides a detailed description of tax maps and parcel count to be used for digital conversion and processing of tax parcels and maps. Mingo County has approximately 25, 986 surface parcels within 12 Tax districts. Based on the IAS data, we estimate that approximately 13,800 of the County's parcels are mapped onto inset maps. Approximately 12,500 parcels are mapped onto the 1"=400' base set.

The entire State of West Virginia was aerially photographed in 2003 (with color film) at an Above Mean Terrain (AMT) altitude of about 14,400 feet (average photo scale of 1"=2400'). This film was scanned and processed to produce State-wide 1"=400' Scale full color digital orthophotography with a two foot pixel resolution (Accuracy standard using National Map Accuracy Standards of 1/40th of map scale). This is the base upon which all tax map conversion will be conducted for this project in both rural areas (currently mapped at 1"=400') as well as developed areas (currently mapped as sub maps at 1"=100', 1"=50' and 1"=200' scales).

The Statewide digital orthophotography was sponsored by the West Virginia Statewide Addressing and Mapping Board (WV SAMB). Since completion of digital orthophotography, this agency has also completed digital compilation of a Statewide hydrographic data layer (combination of digitizing from orthoimagery as well as using USGS digital line graph data), as well as a State and Federal road centerline and railroad file. County, municipal and local private roads are generally not yet included within this dataset. Mingo County probably has a reasonably accurate and up to date road centerline file as a consequence of the on-going E-911 re-addressing and CAD database development for the County.

Tax Parcel attribute data is to be derived from the State Integrated Assessment Systems (IAS) database. The main "links" between the new digital GIS tax parcel data and this comprehensive Oracle based system will be the Tax Parcel Identification Number and the sixteen digit PARID number. This is a map number based, sequential numbering system, which has been maintained in the same basic format and schema within the

existing tax maps as within the records of the IAS data. It is been our experience with this database that parcels are sometimes not fully “combined” under one tax ID number on tax maps for single or common ownership (except where land hooked across road and rail rights-of-ways). This rule is even applied in mapping of parcels that are combined by purchase of adjacent properties and are physically contiguous. However, multiple parcels may be reflected within single records of the IAS database. Further, the mapping procedures within West Virginia and the IAS database development have oftentimes maintained and/or recorded the original tract lines and boundaries for parcels from which splits have been mapped. Therefore, we anticipate instances of “many-to-one and one-to-many” in linking Parcel IDs of mapped tax parcels to the records of the IAS database. This has not been an uncommon issue in many of our past projects. AGD cadastral mapping staff are generally able to research and reconcile these types of issues; however, please note that errata reports to the State Property Tax division and County Assessor’s office *will include* all such instances that are encountered in order that State and County staff can verify that we have properly interpreted the maps and digital records. Errata reports will also include all parcels which are found on the maps, but cannot readily be confirmed within the IAS database. Likewise, AGD errata reporting will also include all records of real property from the IAS database for which a mapped parcel is not found. It is our understanding that County staff will assist with research into these issues; however, it is the responsibility of AGD to provide errata reports that are clear and precise, *and* to provide these reports on a regular basis with each delivered block of maps (i.e. do not wait until the project end to report and research these issues, rather perform this task during the full extent of the contract production period).

West Virginia Department of Transportation (WVDOT) documents will be used to the most reasonable extent to accurately map and digitize selected road Rights of Ways. Our proposal is based imaging and digitally mapping rights-of-ways from the most current of these documents for at least the major roadways of US Highways 119 (Corridor G) and 52 and WV State Road 49. Highway design and ROW plans are generally developed around a *local* project survey baseline using stations and offset distances. Quite often the survey baseline is the centerline of the new roadway. AGD has recently completed tax parcel mapping projects for Greenbrier and Hampshire Counties, West Virginia. These are large mountainous Counties with 20,000+ parcels that are quite similar to Mingo; in that, major US and State highways crosses through the County, and a significant number of parcels are located along roadways that wind along river and stream floodplains. Atlas re-compiled all parcels for both Greenbrier and Hampshire by COGO for which reliable plats could be located, and mapped the remainder of parcels by “Best Fit” to an orthophoto base. Roads and street rights of ways were mapped from scanned copies of WV DOT Rights-of-Way and roadway design plans in conjunction with ROWs depicted on private property and development plats. Town street ROWs were mapped from a combination of private survey plats and text annotation from older town plats. This included most major US highways and selected state maintained County roads. Atlas mapped the Rights-of-Ways by measuring the offsets from road centerlines as depicted on the plans. As noted earlier, many of the ROWs within these mountainous Counties are quite irregular due to frequent cut and fill banks. The centerline lateral distances (actual location) were continuously calibrated against orthophoto visual features such as

streams, bridges, drainage features (and even structures and property lines) that were shown within the plans and could also be located within the orthophoto imagery or from the cadastral map. Because the WVDOT plans for Mingo County also do not include State Plane or Lat/Long coordinates, then we envision this same process to map road ROWs for Mingo County. Our proposal is based upon mapping selected road ROWs in this manner, being for all major roads and streets for which these sources provide reliable information. It is critical for any cadastral mapping project to accurately map road Rights-of-Ways, as this is one of primary features around which parcels are placed. This rule is applicable to parcels that are mapped by COGO methods as well as “Best Fit”. AGD cadastral mappers develop rights-of-ways fully within ArcGIS software; therefore, parallel line functions and geometric curve functions are used to construct precise widths and true two point smooth curves.

Mingo County recorded plats are bound within four plat cabinets within the County Clerk of Court’s document room. The plats are generally paper copies enclosed within zip lock type plastic sleeves. A great many of the older plat copies were damaged in a 1977 flood that brought about 5 to 6 feet of water into the first floor (where the clerk’s office is located) of the courthouse. Many plat copies are microfiche “blow-backs”; hence, the original scale has been distorted or changed. As a part of our proposal preparation, we inventoried the Mingo County plats from the Clerk’s Office as:

<u>Cabinet</u>	<u>Plastic Slides</u>	<u>Time Interval</u>
A	197	1902 to 1979 (indexing is very erratic)
B	800	1896 to 1958 (indexing is not chronologically consistent)
C	800	1947 to 1982 note: the quality of plats and documents improves significantly after about slide number C-400, or about 1957.
D	602	1983 to present (indexing is not chronologically consistent)

On the basis of the above statistics, it appears this AGD “*base*” proposal may include mapping by COGO of less than 20% of Mingo County’s parcels. In general only some minor percentage of plats since the mid 1950s seem to incorporate sufficient bearings and distances to develop COGO plots. Further, the flood water damage has made many of the finer and smaller text of many plats unreadable. We have not yet made an effort to locate microfilm or microfiche of these plats to find out if a readable source still exists.

Tax Parcel mapping by COGO

COGO mapping represents the most precise and comprehensive method to develop new tax maps. A significant majority of existing issues with tax parcel mapping for Mingo County will be resolved by this procedure. ArcGIS provides the ability to treat a COGO file of single or multiple parcels as an “entity”. This means that AGD cadastral mapping staff can move and rotate the “entity” around in space anywhere above the raster and vector images of the orthophoto base map. This freedom of movement provides the ability to place the entity (COGO file) anywhere that the operator selects. Experienced cadastral mappers first align and evaluate the fit of the COGO entity to the measured Rights-of-Ways relative to the street centerline. Other features, such as hydrographic features, adjacent parcels, land occupation features, etc. are “clues” as to the correct placement of the COGO entity. Many plats include a traverse of bearings and distances from a sometimes obvious and permanent origin point back to a “point of beginning” within the COGO boundary. These traverse origin points are sometimes features such as street Point of Intersection (PI), corner points of Rights of Way at intersections, geodetic or property corner monuments, etc. Wherever these can be precisely located within the orthophotography, then, this traverse is used to precisely locate and place the COGO file. After placement, the COGO file is edited to precisely ad-join adjacent parcels, features, etc. All such minor edits are accomplished taking into full account the source from which each parcel has been mapped. For example, if there is an issue of a minor gap, overlap, line extension or line rotation between a parcel that has been placed by COGO (from a COGO file that closed suitably) next to a parcel that was mapped by “Best Fit”, or a GOGO file that had issues with closure, then the final parcel lines will generally be developed by snapping and coincidence with the closed COGO parcel (unless there is compelling evidence to the contrary). These judgmental decisions on the part of experienced AGD cadastral mappers generally go back to the original statement of *“map the best information first”*.

Tax Parcel Conversion using a “Best Fit” methodology

This represents the most efficient method to achieve spatially continuous and topologically structured GIS cadastral data that is rectified to fit to the County’s digital orthophotography. By this procedure, parcel lines will be re-constructed by AGD staff to fit the orthophoto base map imagery on an individual parcel basis. This will be accomplished strictly by AGD cadastral mapping staff that are also experienced with parcel compilation from deeds and plats. Parcel lines will be placed using the following criteria:

map rectification process described by RFQ TAX12007 in section 10 on pages 0027 and 0028.

- The tax map rectification process described by RFQ TAX12007 in section 10 on pages 0027 and 0028 will be accomplished for each map. This will include recording accuracies and statistics and delivery of reports as described.
- The existing tax maps incorporate a significant relationship of parcel line locations to aerial photography visually interpreted features. AGD “Best-Fit”

methodology will utilize aerial photo and any available parcel line dimensions to recreate geometry and transfer parcel lines from the newly rectified existing maps to the new orthophoto base.

- Mingo County has 2003 high quality 1"=400' scale color digital orthophotography. Parcel line locations may be easily interpreted for a great many parcels through a combination of occupation and land use lines from the imagery in conjunction with the existing mapped parcel line locations as currently mapped. Having road Rights-of-Ways precisely mapped will greatly aid in best fitting parcels in an accurate manner. Further, having all parcels that have been mapped by COGO already in the file prior to "Best Fitting" parcels will be a tremendous asset towards getting the parcel boundaries for even "Best Fit" parcels mapped accurately. As described above, we anticipate that on the order of about 20% of the County's total may be mapped by COGO in our "*base*" proposal. This indicates that at least 20,000 parcels may be placed by "Best Fit".
- Another source that can enhance the quality and precision of the "Best Fit" method of parcel mapping is represented by older Town plats that have been compiled over the years for a variety of reasons, such as street paving, utility construction, mine development, planning, annexations, etc. For those towns (most are unincorporated) which have available older "town plat" maps, we will initially construct a grid or "*base*" of original lot lines by scaling and fitting these old plats onto the fabric of the land, streams and rivers. Of particular note, these old town plats sometimes even include annotated street right of way widths. The older towns do not seem to have a great many property survey plats (most parcels are described by deeds, not plats), so this "*base*" of original lot lines can sometimes be an invaluable source to "Best Fit" (in conjunction with land occupation features) many town parcels. Parcels configurations are now sometimes quite different after many years of splits and combinations as shown on the current maps. The major town within Mingo County for which we have seen such an original town plat is Williamson. Some of the other unincorporated villages/towns within the County also have similar Town plats.
- AGD cadastral mapping staff does *not* use trace digitizing and wholesale data rubber-sheeting for direct digitizing of tax parcel maps. Rather, our GIS cadastral mapping staff interactively transfer parcel lines and use the geometry information from the original document to "fit" parcels individually, or in small blocks that have a ready and apparent acceptable "fit". It has been our experience that wholesale rubber sheeting methods are *not* appropriate for digital conversion of tax parcels. One major goal for a county tax parcel conversion project is to actually *improve* the accuracy and precision of the tax parcel linework as a function of the conversion task. For example, rectilinear parcels should be converted as rectilinear polygons, parallel lines should be converted parallel, etc. Rubber sheeting algorithms do *not* retain these geometric relationships and often create significant internal problems as a consequence of *pulling* perimeter

boundary points to a specific location. The “Best Fit” method used by AGD staff will *significantly improve* the precision and spatial fit of parcels as a consequence of the conversion process.

The digital mapping and conversion procedures by AGD will involve a digital linkage of all mapped parcels to the tabular IAS tax database. Thus, a one-to-one relationship will be achieved, thereby accessing all of the tax database and attribute data that may “keyed” upon the tax parcel ID. As previously discussed, AGD staff will provide clear and concise errata reports for all instances of “one-to-many” in linking tax parcel map data to IAS records. The errata reports will also include all records from the maps and the IAS database that do not have an apparent “link”.

A generalized digital database design within ArcGIS GeoDatabase already exists at AGD for projects of this nature. This was used for both Greenbrier and Hampshire counties and is being used currently for our contract in Preston County. This has evolved within our organization from the thousands of tax maps, hundreds of county cadastral mapping/conversion projects and millions of parcels earlier completed by our senior staff. This database design has been developed to meet all the expected criteria of the West Virginia cadastral mapping specifications and standards. AGD will prepare a custom detailed database design specifically for the needs of Mingo County using these existing documents as an initial draft. Digital data will be structured such that all unique features will be uniquely coded. Our database design will incorporate appropriate polygon, line, point, and annotation feature classes for tax parcel data. Data capture techniques will be used to ensure that road name text is separately coded from parcel numbers and parcel line dimensions, etc. Road Rights-of-Ways must be feature coded as both property line and Right-of-Way lines. Select property lines may also be jurisdictional lines and need to be extracted and separately feature coded, etc. Proper feature coding of all data is crucial for the long term operation of the data sets within GIS to have the flexibility to accomplish the many queries, sorts and applications that will likely be asked of the data set. This database design will be based upon the most recent and available version of ArcGIS Geodatabase also formatted to operate within an ArcServer environment.

Digital conversion by AGD will be accomplished such that all features on the source maps will be captured. Our procedures at this time will be to duplicate all features exactly as shown on the source maps. Cartographic presentation will be greatly improved by this digitizing process due to consistent centering of text, parcel number placement, text rotations, etc. AGD conversion operators will evaluate parcel line placement and any changes that need to be accomplished as an integral part of the digital conversion process, using “occupation and land use” features interpreted from the new digital orthophoto imagery. This will generally be accomplished on a parcel by parcel basis, rather than using rubber sheeting or elastic body algorithms. En-masse data shifts may be used where a minor linear shift is apparent for a correct fit of parcels to orthophoto imagery. AGD conversion staff are all experienced tax mappers from prior deed/plat mapping projects. Thus, AGD staff members have the background and experience with land records issues to properly evaluate parcel line placement relative to adjacent parcels

and land use/occupation lines that are apparent from the orthophotos. AGD QA/QC processes will include detailed review of all final data by separate cadastral mappers before checkplots and data are prepared and sent to the County for review.

A **Pilot project** will be conducted (one tax district inclusive of rural 1"=400' mapping and both town and subdivision areas from 1"=100' scale mapping) before production digitizing is initiated. This Pilot will test our procedures and the project database design, and incorporate the State and County staff's input and expectations. We anticipate that some changes will be required after the Pilot experience and evaluation of a detailed database design.

A color checkplot (parcel data only) is prepared after extensive QC checks and sent to the client for review. This submittal includes initial ArcGIS data that is structured according to the project database design and tiled according to the hardcopy tax map index. AGD staff will work with County staff to set up digital review processes using existing ArcGIS systems. This will enable County staff to overlay the new GIS parcel data to the orthophotography for a more efficient and extensive on-site review. Reports of parcel numbers, acreages, etc., are also included within the data delivery. Hardcopy checkplot maps are sent in full batches of the "Blocks" determined from project layout and planning and are shipped on a monthly basis. Corresponding digital data is generally transferred via ftp through a secure project website that we will implement for this project. The State and County are asked to review the maps, data and errata and mark any changes onto the checkplots and/or insert point file notes within the digital data. This is also an excellent opportunity for the County to portray any recent splits, or attach documents for splits in order that AGD staff may incorporate these most recent parcels into the final edit process.

Upon receipt of the County's review, AGD operators will digitally insert the edits and any new parcel splits indicated. Final data will be processed and prepared for delivery. Shipments of final data and maps will also be made on the basis of the original "Block" boundaries established for management of the project and product flow. These are generally full tax districts for West Virginia Counties.

One other aspect of tax parcel digital conversion for Mingo County warrants discussion. An assessed acreage is shown for acreage parcels on the maps and in the IAS tax system data. AGD will prepare an acreage divergence report for all parcels that are digitized. This will include the "assessed" acreage (that will be extracted from the IAS data), the acreage calculated by ArcGIS (polygon acreage), and any acreage currently shown on the existing source map. These acreage reports will be delivered on a regular basis along with delivery of checkplots and initial data, as well as a delivery with final data. The County Assessor can then evaluate how best to utilize this acreage reporting.

Railroads

A right of way width for all rail and rail trails will be reviewed with State and County staff prior to digital conversion of this feature on any map. It is our understanding that the WVSAMB project has digitized the centerlines of most railroads. Railroad Rights-of-

Waterways

The WV SAMB program has previously developed a State-wide hydrographic digital layer. It is our understanding that most of this was developed by interpretation and digitizing (2D) from the 2003 digital orthophoto imagery. However, the USGS quads (1"=2000') and subsequent digital line graph (dlg) data files include many intermediate and smaller drainage features that are not easily interpreted from two dimensional imagery. Thus, it is our understanding that the WVSAMB project included merging some portions of USGS dlg files with the more recently digitized files to create a "complete" hydrographic dataset.

Water features are a major component of the existing tax maps both for areas where water features represent property lines as well as for areas where water features cross through individual parcels. AGD will utilize the latest hydrographic layer data as a "base" for parcel compilation and conversion, much in the same manner that roads, railroads and visible occupation features from the orthoimagery will be used as a "base". That is, parcel boundaries will be conflated to precisely "fit" the WVSAMB data as depicted on the existing tax maps.

Subdivisions

Subdivisions will be mapped by COGO as much as practical by our proposal. Subdivision boundaries will be developed as a "regional type" ArcGIS structure. This means that subdivision boundaries will coincide mathematically to parcel lines and each subdivision will be an independent polygon that can be retrieved through attributes such as name, number, parcel IDs, etc.

Cemeteries

Cemeteries will be mapped as parcels referencing the responsible parties as described by the WVSAMB program.

Attributes

The tax parcel ID and PARID linkage between the new ArcGIS tax parcels (polygons with attributed centroid) and the IAS datafile will represent the primary means to populate each tax parcel polygon with the County desired attribute data. Each parcel shall be populated within the ArcGIS data with at least the following specific attribute fields:

- Full parcel ID number (to be used for the IAS link)
- PARID
- Tax District
- Map

- Parcel
- Lot number
- Subdivision Name
- Parent parcel if applicable
- Source – survey or not as identified by color of lines on TIFF files provided
- Initial of person editing
- Date of change

Some portion of these fields for certain parcels will no doubt require additional research to fully populate all records and fields. These will be noted within AGD errata reports and AGD staff will work with State and County staff to resolve these instances of missing or conflicting data.

Annotation/Labeling

The State of West Virginia has already established procedures and guidelines for text annotation which are presented within 189CRS4 (September 27, 1990) as well as the draft digital revision dated January 2007. AGD digital conversion will be accomplished to comply with these regulations. It is our understanding that the County wishes for AGD staff to handle all text annotation for tax parcels. The general rule for inclusion of text annotation for this project shall be to include as a minimum all of the text that is depicted on the existing maps.

A major task for this project will be to populate the tax parcel data with complete and accurate text annotation. Text annotation will be fully inclusive of all text from the existing maps. This will include parcel numbers, road names, parcel line dimensions, acreages, feature and place names, etc. Text placement must follow basic and accepted rules of traditional cartography such as angle of rotation, read from left to right, line offset, size to map scale, font and line style for uniqueness, not to cross or obscure other features, frequency of placement, etc. Many of these criteria are spelled out within the previously referenced State specifications. The existing tax map scales within Mingo County include 1"=400' to 1"=50' maps. The County will be well served to have the ability within the GIS data to change and choose scales for plotting, viewing, etc., depending upon the specific application at hand. Text must therefore be readable at multiple scales in given regions of similar scales. One alternative may be to insert selected text within the Geodatabase as an annotation feature class that is *feature-linked*. However, within an ArcGIS GeoDatabase format this can get quite involved with rules and overhead. Another alternative might be to select several most common scales for which text is easily read at similar scales. These text issues will be one of many topics that are extensively reviewed and discussed within the Pilot Area mapping and database design. AGD custom developed text placement "tools" and text entry rules will be demonstrated and discussed extensively in the Project Kickoff meetings as well as within the Pilot Area meetings to ensure that this critical task is being handled by AGD to the full satisfaction and expectation of Mingo County and WV Property Tax Division staff.

Training & Technical Support

Client training by Atlas Geographic Data will be accomplished throughout the entire duration of the contract. Basically three types of training are accomplished:

1. It will be necessary for AGD technical staff to spend considerable time on-site at the County due to the nature of a tax parcel mapping, digital conversion project. Significant on-site time is required to retrieve and research documents and databases, attend Project Kickoff, Pilot Area and Project wrap-up meetings, etc. AGD staff nearly always utilize these on-site visits as an opportunity to spend time with County staff with informal training sessions.
2. Four to six full days of more on-site formalized training will be accomplished by AGD. This on-site training will be conducted by our project manager, Hays Lambert, PLS-GIS assisted by ArcGIS programmer Mark Bratcher. Hays and Mark have previously provided formal training sessions with Arc products in a cadastral environment for numerous North Carolina Counties that include Pamlico, Bertie, Perquimans, Tyrrell, Jones and Gates. Maryland Counties for Parcel, ArcServer implementation, E-911 and tax parcel training have included Talbot, Cecil, Queen Anne's and Caroline. Greenbrier and Hampshire Counties, WV staff have also received training by Hays and Mark during the course of these tax parcel mapping/conversion projects.
3. County mapping projects that extend over many months invariably involve a significant amount of communication between AGD staff and the staff at the County. Site visits to our facilities (Wilmington, NC), or by our staff to County sites are generally accomplished on a periodic basis for meetings, reviews, approvals, etc. These visits almost always involve informal training and problem solving by our staff.

We propose that the formal training sessions for Mingo County staff be divided into at least three separate sessions. The first will be conducted near the end of the Pilot project when we anticipate that some quantity of GIS tax parcel data will be implemented at the County. This session will be of an introductory level to get County staff functional and comfortable with ArcGIS technology, specifically for this project's digital tax parcel data, without having the "pressure" to immediately start maintaining data and systems. The second on-site formal training session is to be conducted in the mid stages of the project production schedule. This second formal session will concentrate on more advanced tax parcel maintenance procedures using the software tools provided by AGD. The third session will involve customization of Mingo GIS systems to include ArcGIS Geodatabase and/or ArcServer and will involve training in the management of these advanced systems.

AGD will *continue* to provide GIS technical support for Mingo County staff well after total project completion and delivery. We continue to provide on-going GIS support for all of the GIS and mapping projects that our staff have completed, or have underway, as evidenced by the attached references of county projects for which we have previously provided digital mapping services.

Quality Control

Quality Control is accomplished by Atlas Geographic Data as a multi step process, with QC incorporated at strategic steps within the workflow. Digital operators utilize a number of specially prepared programs to check for items such as feature coding, duplication of data, overshoots, undershoots, etc. as the data is captured. After initial capture, a separate ArcGIS operator reviews each map file and runs batch programs to check for data integrity, topological structure, proper attribution, overall cleanliness, etc. An on-line digital edit is then accomplished for each map to correct all data conflicts and problems shown by the ArcGIS QC and processing programs. This edit includes a complete edge match of all digital data on each map against all digital data on adjacent maps (and District to District) to ensure a clean and spatially continuous county-wide data set, without internal interruptions or mismatches along map file boundaries.

Total Quality Control for tedious database development, such as tax parcel datasets, *must* be an integral part of every task and step, and *must* be an attitude/expectation from company management for every employee and task in the loop of production. Senior members of Atlas have all had experiences with both larger, bottom-line-driven corporate structures, as well as smaller specialized companies wherein quality work and client service are the main emphasis. The senior staff and partners within Atlas have chosen the latter career path that involves investing time and effort into the assurance that every project is completed to the best of our ability, and within 100% of the project specifications and client expectation

Atlas has developed a considerable library of interactive cadastral mapping ArcGIS tools to check, analyze, flag and/or correct digital line work and attributes “on-the-fly” as digital conversion is conducted. These Quality Control programs ensure that topologically structured files are developed, with precise mathematical intersects, without undue internal data points, and totally devoid of undershoots, gaps, overshoots, dangles, etc. All of these programs will be delivered to Mingo County within the scope of our services.

Specific Quality control checks that are incorporated into our production flow include:

1. The line work digital capture described above is accomplished by Atlas in a manner that all adjacent map features are interactively edgematched as an integral part of the data capture. This is accomplished by displaying all surrounding finished map data, while each new map set is being compiled. In this manner, we are assured of achieving a spatially continuous, topologically structured data set, county-wide.
2. A separate QC step is accomplished for the “line work” and parcel number file developed in the preceding steps. This is accomplished by a separate GIS operator who displays each data set against the orthophoto backdrop, and checks off that all line work is included against a raster image of original source documents. This QC check includes checking for digital continuity and

“cleanliness” as well as ascertaining that the final line work is correctly positioned, curved lines are correctly splined, etc. This QC check also researches for parcel number link-ups to the tax parcel Integrated Assessment Systems database.

3. Finished and QC checked linework files are processed for text annotation data entry along with all of the required feature attributes. Text annotation is to be controlled by the project digital database design. In close-fit areas, leader lines are to be utilized to enter text, as necessary. This text placement is to be accomplished to achieve a cartographically pleasing and correct map. Atlas has developed a number of programs to interactively place text, which set seed points at the center of lines, specific distances from lines, always reading left to right, etc. These will be used for initial text annotation entry. Operators will then relocate, resize, or leader line text in crowded or overwritten areas to achieve the final result of a cartographic presentation map. The errata file for each map will be used to “flag” problems, questions and exceptions to the project design. Parcel line legal/survey dimensions will be shown fully where they currently exist from the available source of existing tax maps.
4. A separate QC is run against each file after text entry to check-off that all text has been correctly entered, is positioned correctly, is properly feature coded, etc. This QC check literally checks every piece of text and every attribute against the original source documents.
5. Color checkplots may be produced, based upon the digital skills of QA/QC editors and County staff with GIS systems.

Maintenance Plan

AGD will deliver to Mingo County a complete set of “tools” to update and maintain the ArcGIS tax parcel database developed from this project. This will include on-site training of County staff in the use of these custom software applications and programs.

AGD has developed a considerable library of interactive cadastral mapping ArcGIS tools to check, analyze, flag and /or correct digital line work and attributes “on-the-fly” as digital conversion is conducted. These Quality Control programs ensure that topologically structured files are developed, with precise mathematical intersects, without undue internal data points, and totally devoid of undershoots, gaps, overshoots, dangles, etc.

AGD senior staff and programmers have been involved with GIS tax parcel implementations for more than 75 County projects since 1985. This period has witnessed considerable change in software versions and capability by ESRI. Our technical staff has maintained a continual upgrade of programs and tools to make tax parcel mapping and maintenance as efficient and quality controlled as possible. Most of these prior programs have been developed by Mr. John McMorran, PLS and updated versions of these programs may literally be found in more than 50% of the County tax departments within

the State of North Carolina. AGD staff has converted the appropriate AMLs from earlier “workstation coverage format” to Versions 9.3 and 10 ArcGIS for Geodatabase construction. These include streamlined COGO mapping routines, State Plane Geocode PIN assignment, expedited text annotation tools, interactive data linkage to assessment programs, etc. *All of these well tested software tools will be provided to Mingo County within the scope of this project along with extensive training in their use.*

Map Book Creation

A major deliverable from AGD to Mingo County for this project will be a map book feature that will permit County staff to easily print updated tax maps and submaps in the final format with the standard map legend, collar, etc. as required by the State of West Virginia tax map specifications.

AGD will develop a digital Map Book to include all maps (all scales). Each page (map) will be fully inclusive of all legend and surround information as per requirements spelled out in WV 189CSR4. The Map Book will be created as an ArcGIS application and will be interactively linked to the main Geodatabase such that as edits, splits and updates are saved to the Geodatabase, then these changes will be reflected fully within the appropriate page of the Map Book. The Map Book will be developed in such a manner that an operator need only display the appropriate page for direct printing to any selected format of full size (E: 36” wide), Tabloid (11”x17”printer), etc. Further, all line styles and symbols will be created as per WV 189CSR4 such that plots or copies in either color or black & white will have individual features that are uniquely distinguishable.

Data Management Plan

We have proposed a five month schedule for completion of all tasks after notification to proceed for this project. Mingo County will likely continue to perform all tax mapping and data processing tasks in the same manner during this contract period as have been conducted in the recent past. That is, an in-County conversion to the ArcGIS data and maps of this project will likely *not* be accomplished piecemeal as areas are completed and delivered during the contract period. Rather, the County will likely wait until all products have been delivered and County staff training has been completed to convert to this new digital map system. Therefore, we anticipate that parcel splits and updates may possibly have to be accomplished twice during the full extent of the contract period; once by County staff with the existing system, and once again by AGD within the new ArcGIS system data. The result *must* be a new ArcGIS map dataset that is current with parcels splits and other activity compliant with the final agreed upon delivery date. This will include AGD taking responsibility for any splits that are within the current backlog of Mapping. *County staff will have enough challenges to learn and convert to the new systems and technology without having to feel the added stress of having to go back and complete a significant backlog of parcel activity.*

AGD will assume full responsibility for maintaining parcel splits and keeping the tax parcel data current for the full duration of the contract period. This may be accomplished by having County staff post scans of updated portions of tax maps as

mapping is completed by staff in the usual manner. This may also involve County staff posting plats and deeds onto a project website ftp page for direct update mapping by AGD staff. Our past experience with this issue from numerous prior projects has been that *both* procedures are generally required to keep the workflow underway in compliance with the project schedule. We generally end up mapping as well as digitally converting most parcel splits for these type of projects in consideration that County staff have the *added* workload during the contract period of reviewing, researching, and approving the maps and data that we have interim delivered; this being in addition to their normal day-to-day mapping and data entry workload.

Please note that AGD also currently provides on-going GIS parcel and address database maintenance for a number of the counties for which we have previously completed GIS mapping and/or conversion.

Other Data features within tax maps required for conversion

The following data features are generally included on Mingo county tax maps and are to be logically included within the ArcGIS database design and converted by AGD as an integral part of the project:

- Map and submap grid reference layer.
- Tax district boundary layer.
- Consistent geospatial representation for parcels without exact boundaries as long as the parcel boundary has a parent parcel reference (floating splits).
- Clean right of way, easement, and waterway boundaries drawn as polygons cut at district boundaries.
- Labeling at least equivalent to the labeling on the current hard copy tax parcel maps; as required by State specifications.

ArcGIS Database Design for Geodatabase format

A generalized digital database design within ArcGIS GeoDatabase already exists at AGD for projects of this nature. This database design has been developed to meet all the expected criteria of the West Virginia cadastral mapping specifications and standards. AGD will prepare a custom detailed database design specifically for the needs of Mingo County using these existing documents as an initial draft. Digital data will be structured such that all unique features will be uniquely coded. Our database design will incorporate appropriate polygon, line, point, and annotation feature classes for tax parcel data. Data capture techniques will be used to ensure that road name text is separately coded from parcel numbers and parcel line dimensions, etc. Road right-of-ways must be feature coded as both property line and right-of-way lines. Select property lines may also be jurisdictional lines and need to be extracted and separately feature coded, etc. Proper

feature coding of all data is crucial for the long term operation of the data sets within GIS to have the flexibility to accomplish the many queries, sorts and applications that will likely be asked of the data set.

An example ArcGIS Geodatabase design schema is depicted as a plot and digital file within Section 8. of this proposal as a starting point for detailed discussion of this critical topic.

Progress Reports

Progress reporting is described in detail within the Project Management section to this proposal.

Potential Problem Discussion

The issues and challenges (as well as AGD solutions) with converting existing Mingo County tax maps to properly fit a horizontally controlled base are described in detail within the above sections to this AGD proposal, specifically:

3.1 Introduction

3.2 Existing Source Materials

3.3 Tax Parcel mapping by COGO

Tax Parcel Conversion using a “Best Fit” methodology

Warranties & Fixes

The contract between Atlas Geographic Data and the WV Property Tax division for this project will include the following language in regards to Warranties and Fixes:
For a period of not less than (12 months after the county’s acceptance of the final system deliverable, AGD at no additional cost to the County, shall correct any and all errors and flaws (those resulting from poor methodology, processing errors, data corruption, deficient QA/QC, etc.) in the data and software applications (developed by AGD), within (30) days after AGD is made aware of the issue; provided, however, that upon request of the State or County, AGD shall correct any error reasonably deemed important to the County’s continued use of the software applications (developed by AGD) within ten (10) days after the County has notified AGD in writing of the error. AGD shall provide warranties in writing to clarify specific terms for the contract preparation.

Contract and Bond

Please note that Cadastral mapping and GIS services as described by this State of West Virginia RFQ and AGD’s responding proposal are generally considered as “Professional services” as opposed to “Contractor Bid Services”. In this regard, Atlas Geographic Data is managed and financially controlled by two Registered Land Surveyors (Larry Kirkpatrick, PLS: VA, NC, SC and Hays Lambert, PLS: SC). Further, both PLS owners have been Certified as Geographic Information System Professionals (GISP) by the GIS Certification Institute. This is a national level organization and certification. Professional Service Organizations are generally not required to post project performance bonds. Rather, surety for project quality and performance of work for professional

organizations is provided by naming clients as additional insured onto Professional services Liability, errors and omissions type policies. AGD has continued to carry a one million dollar policy of this type (with a five thousand dollar deductible) since 2005. This policy will be guaranteed to be in full force for at least the full term of the contract period and guaranteed and available for any claims for at least one full year after contract completion.

Data Maintenance

As previously described, AGD is currently providing on-going tax parcel maintenance for a number of Counties for which we have previously provided cadastral mapping and GIS implementation. This current list includes Hyde, Tyrrell, Gates, Pamlico and Vance in NC, as well as Cecil and Talbot in MD. And Hampshire, Pendleton and Mineral within West Virginia. Please note that our Cost Quotation is inclusive of AGD providing parcel maintenance through the life of the contract. *This includes digitally mapping from deeds and plats the backlog of newest parcels that are in the files and work-cards in the Mapping Department (tax assessor's office) that have not yet been mapped to date.*

Subcontractors

AGD can provide all required services. Our proposed scope of work is based upon meeting and/or exceeding all project technical, administrative and schedule requirements. As such, we will not require any Subcontractors for any aspect of this project.

State of WV Property Tax Division and Mingo County's Responsibilities

As described within the Cover Letter and Technical Approach, this AGD proposal is a reasonably full service offer to provide tax parcel mapping and assist Mingo County with implementation of GIS. The only two defined requirements that we anticipate from the county are:

1. Allow access by our staff to the documents, databases, etc. that we require for performance of the work for scanning, copying, downloading, etc. without an additional County fee or charge.
2. Provide a technical lead at the County for communications with our technical and management staff. This will include performing Quality Control, responding to errata points and reviewing/editing/approval/acceptance of products and services on a timely basis to enable AGD to meet its contracted schedule requirements.

AGD's Responsibilities

The tasks, services and deliverables for this contract are well documented throughout RFQ TAX12007 and this AGD responding proposal.