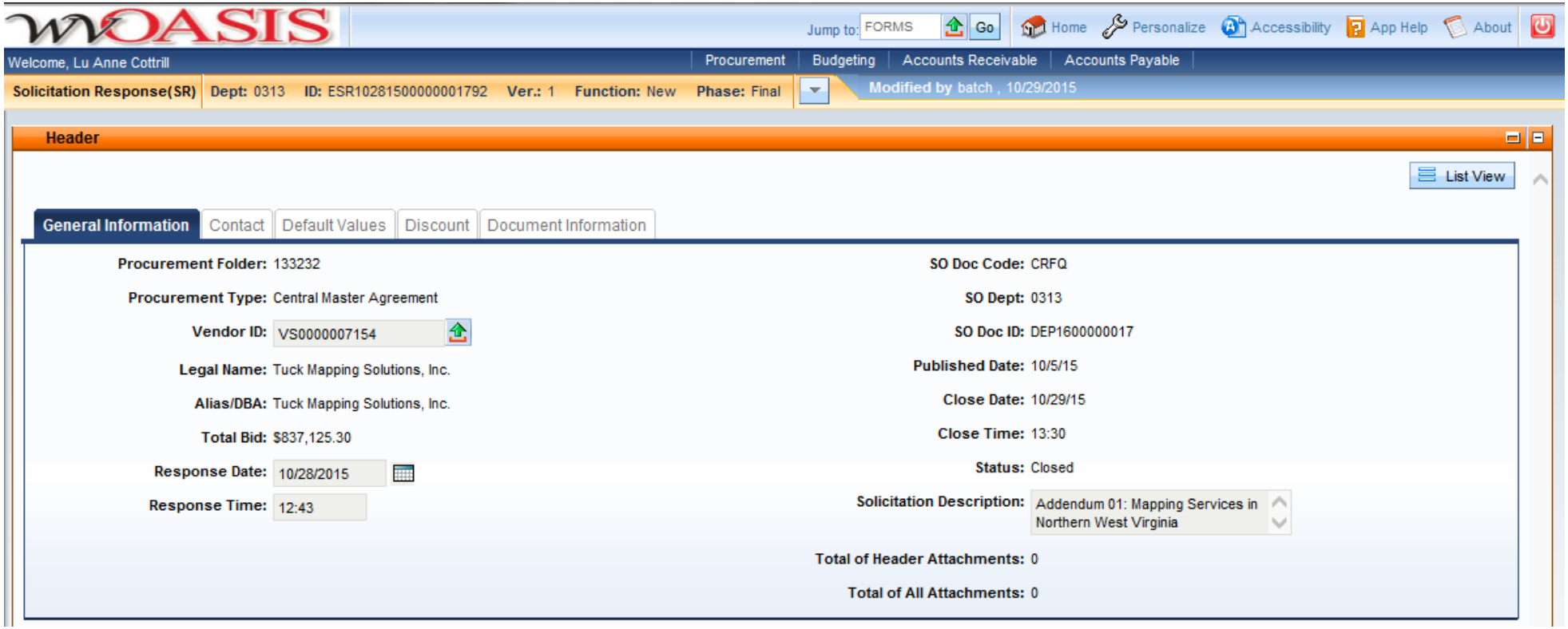
The following documentation is an electronically-submitted vendor response to an advertised solicitation from the *West Virginia Purchasing Bulletin* within the Vendor Self-Service portal at ***wvOASIS.gov***. As part of the State of West Virginia's procurement process, and to maintain the transparency of the bid-opening process, this documentation submitted online is publicly posted by the West Virginia Purchasing Division at ***WVPurchasing.gov*** with any other vendor responses to this solicitation submitted to the Purchasing Division in hard copy format.


wvOASIS
Jump to: FORMS Go
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Welcome, Lu Anne Cottrill
Procurement
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Accounts Payable
Solicitation Response(SR) Dept: 0313 ID: ESR10281500000001792 Ver.: 1 Function: New Phase: Final
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Header
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Contact
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Document Information
Procurement Folder: 133232
Procurement Type: Central Master Agreement
Vendor ID: VS0000007154
Legal Name: Tuck Mapping Solutions, Inc.
Alias/DBA: Tuck Mapping Solutions, Inc.
Total Bid: $837,125.30
Response Date: 10/28/2015
Response Time: 12:43
SO Doc Code: CRFQ
SO Dept: 0313
SO Doc ID: DEP1600000017
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Close Date: 10/29/15
Close Time: 13:30
Status: Closed
Solicitation Description: Addendum 01: Mapping Services in Northern West Virginia
Total of Header Attachments: 0
Total of All Attachments: 0

Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Solicitation Response

Proc Folder : 133232

Solicitation Description : Addendum 01: Mapping Services in Northern West Virginia

Proc Type : Central Master Agreement

Date issued	Solicitation Closes	Solicitation No	Version
	2015-10-29 13:30:00	SR 0313 ESR10281500000001792	1

VENDOR

VS0000007154

Tuck Mapping Solutions, Inc.

Tuck Mapping Solutions, Inc.

FOR INFORMATION CONTACT THE BUYER

Beth Collins

(304) 558-2157
beth.a.collins@wv.gov

Signature X **FEIN #** **DATE**

All offers subject to all terms and conditions contained in this solicitation

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	Control Surveying	600.00000	HOUR	$115.000000	$69,000.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description : Control Surveying

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
2	Topographic, Planimetric and Check Surveying	1800.00000	HOUR	$115.000000	$207,000.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description : Topographic, Planimetric and Check Surveying

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
3	Terrestrial LIDAR Collection	600.00000	HOUR	$125.000000	$75,000.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description : Terrestrial LIDAR Collection

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
5	Topographic Mapping - Aerial Photography (0-25 Acres)	15.00000	ACRE	$533.330000	$7,999.95

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description : (including LIDAR Collections)

List only one rate for each category.

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
6	Topographic Mapping - Aerial Photography (25-50 Acres)	30.00000	ACRE	$266.670000	$8,000.10

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description : (including LIDAR Collections)

List only one rate for each category.

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
7	Topographic Mapping - Aerial Photography (50-100 Acres)	75.00000	ACRE	$106.670000	$8,000.25

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description : (including LIDAR Collections)

List only one rate for each category.

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
8	Topographic Mapping - Aerial Photography (Over 100 Acres)	125.00000	ACRE	$68.000000	$8,500.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description : (including LIDAR Collections)

List only one rate for each category.

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
9	Licensed Land Surveyor	600.00000	HOUR	$140.000000	$84,000.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description : Professional Rates (Listed Disciplines Only)

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
10	Survey Manager	1200.00000	HOUR	$125.000000	$150,000.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description : Professional Rates (Listed Disciplines Only)

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
11	Mapping/CAD Technician	2400.00000	HOUR	$85.000000	$204,000.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description : Professional Rates (Listed Disciplines Only)

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
12	Travel Per Diem (Rate/Person)Day)	125.00000	EA	$125.000000	$15,625.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description : Applicable to Survey Crews Only

Mapping Services in Northern West Virginia –

Solicitation Number - DEP1600000017

Prepared for: DEPARTMENT OF ENVIRONMENTAL PROTECTION

October 28, 2015

Tuck Mapping Solutions, Inc.
Point of Contact: Robert H. Tuck, PE RLS CP
Email: BTuck@TuckMapping.com

4632 Aerial Way
P. O. Box 760
Big Stone Gap, VA 24219

Office: 276-523-4669
Fax: 276-523-4673
www.TuckMapping.com

tuck MAPPING SOLUTIONS, INC.

October 28, 2015

Ms. Beth Collins, Senior Buyer
Department of Administration, Purchasing Division
2019 Washington Street East
Charleston, WV 25305-0130

Mapping Services in Northern West Virginia (Open-End)

Ms. Collins:

Tuck Mapping Solutions, Inc. is pleased to provide the Purchasing Division of the West Virginia Department of Administration with a letter of interest for the Mapping Services in Northern West Virginia Open-End contract. Tuck Mapping Solutions, Inc. is an aerial surveying and mapping firm located in Big Stone Gap, Virginia that is the North American leader in producing high accuracy LiDAR and photogrammetric data by means of helicopters and aircraft typically used for the development of engineering plans. Its staff of 21 professionals has successfully completed thousands of projects since the company's formation in 1985. The team epitomizes their Appalachian heritage through hard work and an unwavering focus on quality and customer satisfaction. Tuck Mapping Solutions, Inc. professionals are trained to anticipate client needs, to offer valuable advice, and to provide solutions. Our company culture fosters an environment of innovation and individual success. Tuck Mapping Solutions, Inc. is a **Small HUBZone Business** with a big capacity due to our level of technical experience and our teaming arrangements.

Tuck Mapping Solutions, Inc. has reviewed the Scope of Work and is able to provide the required services from in-house resources or with sub-contracting assistance from ESP Associates, P.A. The team has worked together on several projects in the past. Neither Tuck Mapping Solutions, Inc. nor ESP Associates, P.A. has a known conflict of interest for the work described.

This contract effort will be managed by Mr. Robert Tuck, PE, RLS, CP and he will be assisted by Mr. Matt Doty, CP, GISP and Mr. Michael Hobbs, PS. The professional staff of ESP Associates, P.A. is committed to supporting this contracting effort by supplementing the staff of Tuck Mapping Solutions, Inc. in both technical expertise and in manpower requirements. All personnel mentioned in this proposal produce the highest quality products and are available for this contract.

Tuck Mapping Solutions, Inc. and ESP Associates, P.A. have been involved in control surveying, topographic surveying, planimetric surveying and check surveying, and land surveying for nearly 31 years. Tuck Mapping Solutions, Inc. and ESP Associates, P.A. have been involved on the ground floor of innovation for terrestrial LiDAR, mobile scanning, aerial photography, and aerial LiDAR.

Tuck Mapping Solutions, Inc. has had a difficult time pricing this project scope with such a large acreage variation. We have provided a general unit price for each commodity, but if we are awarded a contract, we will take each site and price accordingly. We will also give credit for doing multiple sites at a time.

In summary, the Tuck Mapping Solutions, Inc. team has the experience and expertise to provide the Department of Administration – Purchasing Division with the highest quality mapping services that will meet West Virginia Mapping Standards. We are grateful for this opportunity and we look forward to the possibilities this contract will bring to both us and provide the Department of Administration – Purchasing Division.

Sincerely yours,

Robert H. Tuck

Robert H. Tuck, PE RLS CP

TABLE OF CONTENTS:

TEAM QUALIFICATIONS

The Tuck Mapping Solutions, Inc. (TMSI) team is capable of providing full mapping services, including control surveying, topographic surveying, planimetric and check surveying, terrestrial LiDAR collection, mobile scanning, topographic mapping – aerial photography, topographic mapping – aerial LiDAR, and land surveying. The TMSI team has generated over 40,000mi^2 of orthophotography and high-resolution topographic products. Their most notable clients include WVDOT, NCDOT, VDOT, TXDOT, 17 other Departments of Transportation, TVA, USACE, and a host of private firms. TMSI has been completed hundreds of mapping projects for coal companies in West Virginia, including Arch Coal, Inc., Massey Energy, and Pittston Coal. TMSI completed the first reclamation permit in the state of Virginia and has completed permitting work in VA and WV for over 30 years. TMSI has completed several pre- and post-mining mapping projects for coal companies throughout WV and VA and hollow-fill mapping in WV. TMSI has extensive experience with reclamation mapping and their aircraft average 1 trip per week to West Virginia for some type of mapping update or stockpile analysis for coal companies. The following information demonstrates our knowledge and expertise related to mapping services.

TOPOGRAPHICAL SURVEYS

The TMSI team has provided topographical survey collection for over 30 years. The team combines the strength of capacity with a staff of highly-trained professionals to provide quality surveying services to their clients. The TMSI team maintains one of the largest surveying groups in the region, handling multiple, large-scale projects without compromising attention to detail. ESP has provided on the ground supervision of surveys, with quick response and mobilization for private and government clients. They have the experience, personnel, and equipment to meet the needs of their clients for surveys in northern West Virginia and the surrounding areas. They have the ability and equipment to mobilize over 4 complete field crews, all equipped with experienced personnel and the latest surveying technology. Tuck Mapping will plan all surveys, but ESP Associates, P.A. will take the lead in the field surveying due to their multi-state presence and their vast survey resources.

The TMSI teams' survey services include:

Conventional Surveys

- Property/Boundary Surveys
- Topographic/Tree Surveys
- Base Mapping
- Easement surveys
- Engineering design surveys
- Right-of-way surveys/plans
- Utility/infrastructure surveys
- Wetlands surveys
- Access road layout and design
- Preliminary and final plats
- Land title (ALTA) surveys
- Construction staking
- Cadastral surveys
- Title work/deed investigations
- Land descriptions

Global Positioning System (GPS)

- RTK GPS for topographic surveys, local control networks
- Control for aerial mapping
- Statewide LiDAR QC
- eRTK network (wide area RTK)

Our experience performing horizontal and vertical control surveys is far-reaching. The following paragraphs describe in brief our overall approach in providing survey control.

Identification of Existing Monuments and New Control Points

Based on the control requirements identified in the project planning phase, existing permanent monuments are recovered and serve as the mapping reference network. New control points are referenced to the client specified coordinate system. Temporary control points will be established such that they can be attended should it become necessary.

Field Data Capture of Control Points

The points will be located by survey personnel and final placement of these points will be confirmed and approved by the project PLS; they will mark each point by semi-permanent monumentation, and a complete point description will be made. A sufficient number of National Geodetic/Spatial Reference System (NGRS/NSRS) monuments will be included in the network to assure that the specified horizontal and vertical accuracies will be achieved.

Boundary Surveys

The TMSI team is experienced in all aspects of boundary and ownership surveys. They have performed courthouse research, monument research, and boundary surveys. For any boundary mapping project, they would use the Esri suite of software to compile the features from aerial imagery or hard copy maps. They can also scan and rectify existing hardcopy maps and convert them into a GIS database. The TMSI team has performed many survey boundary projects for federal, local governments and utility companies with most projects requiring them to input the survey data into a GIS database to attribute and to deliver as a GIS package or in CAD format. They have also completed GIS boundary projects that entailed the conversion from hardcopy maps to digital format.

The basis for surveys of this type is an understanding of the following: Field procedures to attain specified accuracies, mathematical and statistical base for substantiation of the work, and suitable monumentation to hold positional tolerance and repeat the monitoring sequence.

There are six generally recognized industry standards used for specifying spatial mapping products and resultant accuracy compliance criteria:

- Office of Management and Budget (OMB) United States National Map Accuracy Standards (NMAS)
- American Society of Photogrammetry (ASP) Specifications for Aerial Surveys and Mapping by Photogrammetric Methods
- U.S. Department of Transportation (DOT) Surveying and Mapping Manual Map Standards
- American Society of Photogrammetry and Remote Sensing (ASPRS) Accuracy Standards for Large Scale Maps
- American Society of Civil Engineers (ASCE) Surveying and Mapping Division Standards
- U.S. National Cartographic Standards for Spatial Accuracy
- USDOC National Geodetic Survey (NGS) National Spatial Reference System (NSRS) Federal Geodetic Control Subcommittee (FGCS) Standards and Specifications

Depending on the type of survey conducted and data used, the TMSI team will follow the appropriate guidelines and specifications. Upon completion of this phase, the locations will be plotted and a network vector diagram will be designed in accordance with FGDC guidelines concerning redundancy and repeat baseline measurements. Mission Planning Software is used to design the optimum GPS observation sessions. A minimum of four Trimble Surveyor Geodetic GPS Receivers are deployed for measurements. Each observer is given descriptions of the points to be surveyed each day, including log sheets indicating start and stop times for each session and point designations. The observers will also be given local maps and specific instructions relevant for the day's work. The team uses Static GPS technology on a routine basis for establishing and verifying survey control. We have experience in both single and dual frequency observations, vector processing, and network adjustments.

To ensure proper and accurate data collection, the field personnel of the TMSI team have been trained by certified Leica and Trimble representatives in proper field data collection procedures for Static and Real Time Kinematic (RTK) and GPS procedures. The course focused on error analysis. Specifically addressed were conditions, which adversely affect the quality of GPS data including Multi-path, Position Dilution of Precision (PDOP) and RMSE solutions were extensively covered. This training allows our personnel to understand the capabilities as well as the limitations of this technology. The training extended to the post-processing phase of GPS surveying. The course provided the means to identify and eliminate data that falls outside of project specifications.

The team has experience providing geodetic control services using dual frequency receivers for such organizations as the U.S. Army Corps of Engineers, all branches of the military, Tennessee Valley Authority (TVA), Department of Transportation and numerous other governmental and private concerns. The team maintains the highest standard of accuracy by using precision GPS receivers. All antenna models are approved by the NGS, to conduct any order geodetic survey.

Specific steps utilized by the team to ensure an accurate network for the intended proposes include the following:

1. Reconnaissance and Planning
2. Submittal and Approval of a GPS Project Control Plan
3. Monumentation per NGS specifications
4. Instrumentation Field Calibration - Determine Systematic errors
5. Field Observation in accordance with the Federal Geodetic Control Committee
6. Analysis and Adjustments using Trimble Geomatics or NGS software
7. Final Report, Data Submittal and Acceptance by District of Network

For locating and/or verifying planimetrics as well as LiDAR validation surveys the team utilizes OTF (Real-Time Kinematic, RTK) GPS technology extensively for this type of data collection. OTF (RTK) GPS technology provides an effective tool for mapping large areas with high degrees of horizontal and vertical accuracy. When RTK is utilized for topographic mapping the geoidal-ellipsoidal modeling shall be conducted in and around the proposed mapping area. These modeling procedures described in this the Corps of Engineers Technical Manual and are mandatory if elevations are obtained through the use of RTK GPS techniques.

The TMSI team has conducted numerous large-scale photogrammetric and LiDAR support control and topographic surveys for agencies such as U.S. Army Corps of Engineers and Departments of Transportation, and Water Management Districts. The TMSI team extensive inventory of equipment ensures that all our field survey crews are quite capable of performing any item tasked under this contract. Each crew is outfitted with Real Time Kinematic (RTK) GPS, electronic total stations and conventional differential level equipment. This assortment of equipment allows the crews to collect data in any environment. The crew's transportation is either a four-wheel drive pickup truck or SUV, which has been modified to store the necessary survey equipment, tools, and other supplies needed to effectively collect survey data. Each vehicle is stocked with the proper safety equipment including but not limited to hard hats, safety vests, traffic cones and signs and a first aid kit. Field crews are equipped with cell phones for immediate communication to office support personnel or clientele as well as notebook computers with wireless internet connections to upload and download data from remote locations. Additionally, field crews are equipped with digital cameras to capture project images of terrain conditions, equipment setup and monumentation.

Surveying and Associated Equipment Inventory		
Firm	**Equipment**	**Quantity**
TMSI	TRIMBLE R6&R8 GPS Receivers	6
TMSI	Leica GS Receivers	5
TMSI	Topcon DL-101 Digital Electronic Level with Bar Code Rod	2
TMSI	Topcon GTS Series - 2 and 5 Second	4
ESP	Dual-frequency GPS Receivers (various make/model)	68
ESP	Conventional total stations (various make/model)	50
ESP	Data collectors (TSC# and TSC2)	66
ESP	Leveling instruments (various make/model)	25

Specific to GPS control surveys in support of LiDAR and photogrammetric projects, the team brings experienced, qualified personnel who are familiar with all aspects and procedures specified by the Federal Geodetic Control Committee's (FGCC) manual "Geometric Geodetic Accuracy Standards and Specification for using GPS relative positioning techniques" for high order geodetic surveys. This includes specific input formats and standards that allow data to be entered into the National Spatial Reference System (NSRS) and become part of the National Geodetic Survey NGS database. These standards are strictly adhered to in order to achieve the level of accuracy desired.

TMSI will provide the survey control planning for the acquisition of both photogrammetric and LiDAR data sets. Once we plan the missions and detail the requirements of the project, we will assign the surveying to team members that have the resources to complete the survey in the most cost effective and time sensitive manner. Some projects may require the use of multiple team members and this effort will be directed by the Tuck survey management team.

TOPOGRAPHIC MAPPING – AERIAL PHOTOGRAPHY

TMSI has been acquiring aerial imagery for over 25 years and specializes in executing all aspects of aerial imagery acquisition for large and small scale photogrammetric mapping. Aerial photography would be collected by one of the four TMSI team aircraft. All aircraft and helicopters are equipped with a precisely surveyed Global Positioning System (GPS) antenna capable of receiving highly accurate positional signals. Additionally, each aircraft is equipped with a flight management system, which provides precision navigation guidance to flight crews during data collection, as well as functionality for project management and data logging. Sensor platforms are supplemented with a combination of additional equipment including stabilized mounts, dual frequency GPS receivers, and inertial measurement units (IMU). TMSI has two fixed-wing aircraft and two helicopter stationed in southwest Virginia that can be mobilized on short notice.

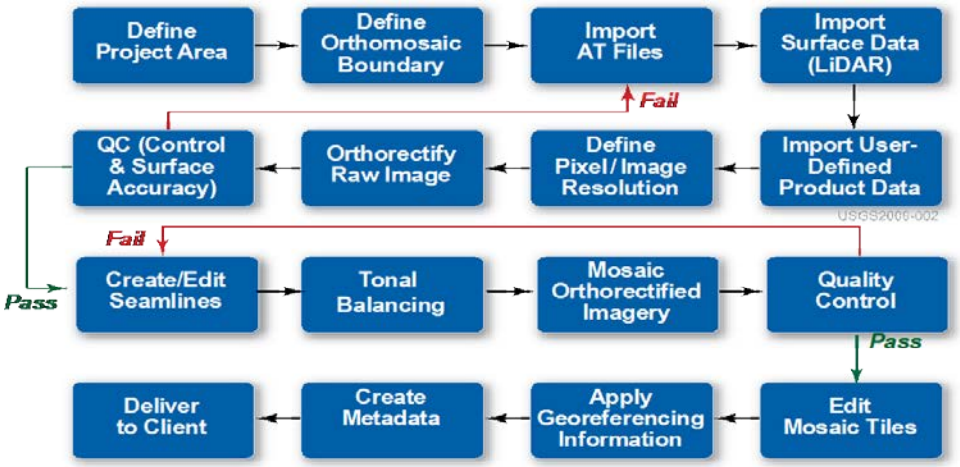
Owned Aircraft Inventory		
Make/Model	**Registration No.**	**Operating Ceiling**
Piper Navajo Panther 310	N190TA	24,000' MSL
Cessna 206 Stationair II	N193TA	15,000' MSL
Bell JetRanger 206 BIII Helicopter	N192TA	13,000' MSL
Bell LongRanger LIII Helicopter	N194TA	13,000' MSL

Owned High-Precision Aerial Photogrammetric Sensors				
Sensor	**Manufacturer**	**Spectral Range**	**Calibrated?**	**Quantity**
Leica	RCD30	RGB, NIR	Yes	1
Leica	RC30	RGB, NIR	Yes	2

POSTrack collects and stores the raw data from the onboard GPS and the IMU systems. TMSI always uses one CORS, multiple CORS, or multiple base stations to produce highly accurate positional readings. The observation data from the GPS unit in the aircraft is used to perform post-processing with the data from the dual frequency ground units to determine the coordinates of the center of the photograph and the orientation of the photograph at the instant the photo was taken. At the end of each mission this data is post processed with the base station data to establish a baseline from the known National Geodetic Survey (NGS) station to the aircraft at

one second epochs. The one second epochs establish the trajectory of the aircraft or helicopter during the flight. The IMU is initialized on the ground and it then records the movement of the aircraft in all axes and it also records the acceleration in each axis. The resultant vector analysis produces the center of each photo. The resultant EO files provides for the Exterior Orientation of the imagery so the imagery can be set up in the stereo plotters or used for the creation of digital ortho photography.

TMSI has been involved in photogrammetric mapping, aerotriangulation, and orthophotography for nearly 31 years. TMSIs' stereo compilers have extensive mapping experience with photogrammetric mapping involving projects at mapping scales ranging from 1:240 to 1:20,000, and photogrammetric mapping for design, construction, development, operation, and maintenance of various engineering projects.



Orthophotos are put through several quality checks prior to delivery. Control points visually identifiable within the imagery are occupied in a heads-up manner. The accuracy of these points relative to the field collected data is verified to be within ASPRS, National Map Accuracy Standards (NMAS), and National Standards for Spatial Data Accuracy (NSSDA) as required by the project. Root mean square error (RMSE) values of the survey control points relative to their coordinates, as measured in the orthophoto imagery, are computed and checked to be within the horizontal accuracy specifications for the project's orthophoto imagery delivery scale. Final images are carefully inspected for successful processing in raster viewing software to examine the images visually and using histograms. Imagery that does not pass this exam is rejected and returned to data processing.

Scale, contour interval, flight height, mapping specifications, and standard mapping guidelines are all taken into account when determining the method of mapping. The data collection procedure is designed to meet the combined requirements of National Map Accuracy Standards (90% of all contours will be within 1/2 contour interval except where obscured, and 90% of horizontal positions shall be within 1/30 of one inch at the specified map scale). If TMSI is mapping for highway design, we will be mapping all portions of a house such as porches and overhangs, hydrologic structures such as water valves, fire hydrants, electrical boxes, manholes, drop inlets, curb and gutter, sidewalks, steps, highway and street paint stripping, power poles, signs, billboards, and bridge details. The amount of detail that is specified for a project is determined by the final use of the mapping.

Digital stereo pairs are used to compile 3D planimetric and topographic data, such as transportation networks, hydrography, electrical transmission structures, building footprints, breaklines, and spot heights. Planimetric

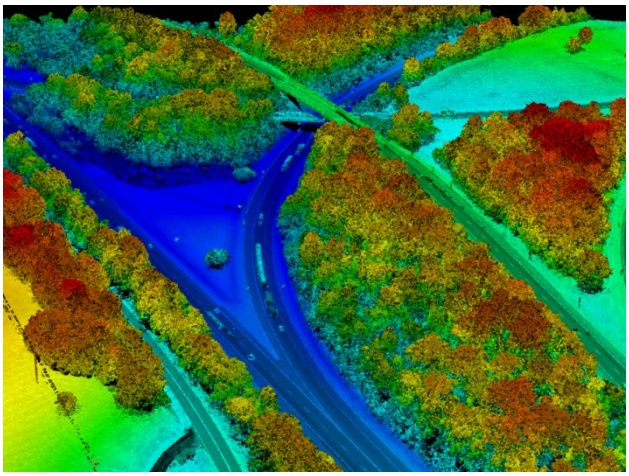
features are given to the client and also used in the contour generation process because these are 3D points that will hold the feature in its correct position especially in the creation of digital orthos. The 3D feature of the planimetrics assists in the definition of the terrain by showing breaks in terrains such as at the edge of a road or the banks of a stream or drainage ditch. For locating and/or verifying planimetrics as well as LiDAR validation surveys, the team utilizes OTF (Real-Time Kinematic, RTK) GPS technology extensively for this type of data collection. OTF (RTK) GPS technology provides an effective tool for mapping large areas with high degrees of horizontal and vertical accuracy.

When an area has been mapped with high definition LiDAR, such as with the helicopters, TMSI can utilize automatic feature extraction of features. The classification process for LiDAR will separate the houses from the other features and are easily identified with automatic feature extraction software. Features such as sidewalks where there is little to no difference in elevation of the surrounding area, do not work well with the feature extraction software. All mapping and base plan sheet digital data shall be delivered in MicroStation design files that conform to the WV Photogrammetry Unit level structure and symbology specifications.

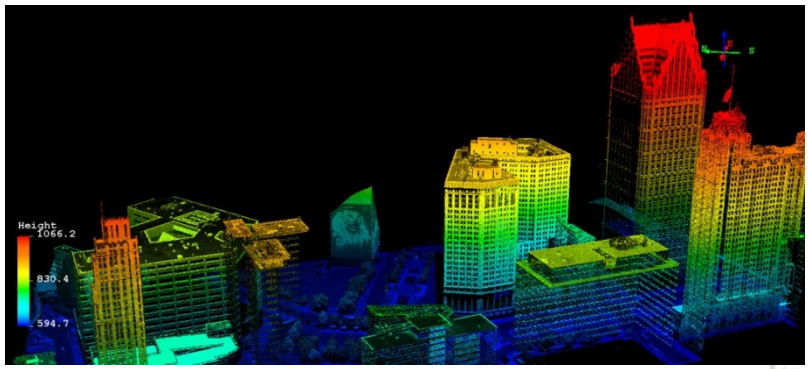
TOPOGRAPHIC MAPPING – AIRBORNE LiDAR

TMSI is a North American leader in producing high accuracy LiDAR from helicopters and airplanes for use in engineering design and planning. We use careful project planning, proven data collection procedures, and strict processing workflows ensure each phase of an airborne LiDAR mapping project meets the accuracy and quality specifications for the project. The project is broken down into three phases, collection, post processing, and deliverable creation.

The accuracy of the final products for any project depends heavily on the accuracy of the processed airborne solution. The improved accuracy of airborne GPS systems typically found in aerial mapping airplanes or helicopters continue to provide better accuracy results for the trajectory tracking of the aircraft. Each team member uses one CORS, multiple base stations or multiple CORS to product highly accurate positional readings. Virtual base station technology is also being utilized as an additional source of trajectory information. Virtual base stations allow the surveyor to use multiple CORS or other sources of GPS collection to process a virtual base station that follows the trajectory of the helicopter.



When the data arrives in the office it immediately goes into production. Following an initial data backup final airborne processing begins. Base station files and CORS station files are imported into Applanix's POSPAC MMS software. This software will processes the airborne GPS data and the IMU data at the same time in a tightly coupled solution resulting in a trajectory file called a Smoothed Best Estimated Trajectory (SBET). The SBET file is incorporated into RiProcess software of Riegl to output a calibrated point cloud. This software merges the trajectory file with the laser data from the collection and then solves for any ambiguities between the flight line swaths by



identifying planar surfaces in the overlap between swaths so the output point cloud is seamless and free of any calibration errors between swaths.

Once the calibrated point cloud is complete the data is loaded into GEOCUE. This product breaks the project into manageable sized units for processing and editing. The software provides a logical sequence of data processing and editing to ensure all data is properly reviewed and archived. From its stored location, different processes and manual classification are dispatched and tracked. An automated macro process determines which points are ground (Class 2) and unclassified (Class 1) throughout the point cloud. This is followed by two manual QC steps to check for points that were removed or brought into ground that shouldn't be present. Following this step for the project and special class such as bridges (Class 13) and water features (Class 9) are classified as specified in the solicitation. The point cloud is now in 4 classes, Class 1, 2, 9 and 13. Any points determined to be "noise" are sent from the original classes to Class 7. With the point cloud properly classified the accuracy are tested against collected ground control check points using a surface generated from Class 2 (ground points).

Following accuracy verification product generation begins. Each product, such as contours, DEMs, or intensity images is generated from the point cloud and quality controlled by manual inspection to ensure they meet the specifications of the project. The Digital Elevation Model (DEM) filtered to the required file size for use by the St. Louis District, and contour maps to represent the LiDAR point cloud, are then generated and delivered.

The TMSI team will review the LiDAR requirements of the St. Louis District and determine the system that will best provide the product that is needed for the project. We have multiple systems to choose from that will meet the specifications. The TMSI team is fully capable of providing LiDAR in ASPRS LAS file format, and adheres to the standards presented by ASPRS in regards to file formatting, classifications, headers, data types, encoding, etc. The LAS file format is a public file format for the interchange of LiDAR data between vendors and customers. This binary file format is an alternative to proprietary systems or a generic ASCII file interchange system.

Owned Airborne LiDAR Systems, Software, and Relevant Equipment				
Make/Model	**Quantity**		**Make / Model**	**Quantity**
Riegl VQ-680i	1		RiProcess Riegl Post Processing Software	5
Riegl LMS-Q560	1		TerraMatch	2
Riegl VQ480	1		TerraPhoto	3
QCoherent LP360	1		TerraScan	12
Applanix 410 IMU	6		GeoCue Management	11
ESRI ArcGIS	3		Bentley Microstation	9

TOPOGRAPHIC MAPPING – TERRESTRIAL LiDAR COLLECTION

ESP is committed to consistently meeting the client's needs the first time. This commitment starts with clear and concise communication. ESP will propose a kickoff meeting to discuss the objectives, scope, and budgetary requirements of the project, as well as investigate the existing conditions at each site, as each will have its own unique circumstances. It is imperative that ESP define the level of detail required during the planning stages to maximize the efficiency and thoroughness of the collection and extraction phases of these projects.

A site visit should then be scheduled to ascertain the existing conditions on and around each site. This will help to develop a plan of action regarding the number and density of scans, type of scanner(s), scan vantage points available, target needs and placement, etc. that will be required to effectively collect quality 3D LiDAR data sets and imagery and also enhance the extraction process. Each field collected 3D data set will be validated for quality and completeness prior to leaving the site. Once we thoroughly understands the geospatial, accuracy, and asset collection needs, we will begin planning the establishment of the site-specific ground control network. ESP will establish ground control reference points, consisting of 5/8 inch rebar and caps set flush with the ground surface, at the required absolute and relative positional accuracies using a combination of GNSS and conventional/robotic/leveling survey methodologies. These control points will be the basis for the location of the existing towers and artifacts on site and will be tied directly to the local coordinate system (if provided). The ESP scan team will establish targets on the ground control points via tripods or bipods that will be used, along with common objects within the point clouds, to register the various scan worlds (point clouds) together. We will also collect 360-degree imagery with the scanner, if required, at each setup that will be used to colorize and bring more detail to the point clouds. A conventional crew may work in tandem with the scan crew in obtaining on-site measurements and/or details required to provide a more robust deliverable data set using various techniques. Scan data will be downloaded and reviewed daily to ensure that data voids are avoided or limited to established acceptable standards within the deliverable requirements. This data will then be forwarded to the project LiDAR manager at the end of each week for post processing, registration, QC and extraction/modeling as required within the specifications. Collection and extraction will be performed simultaneously by different team members to ensure timely scheduled deliverables throughout the project duration.

As assets and features are extracted in Leica Cyclone and/or TopoDOT, they will be exported to the clients' CAD standard requirements for typical drawing deliverables. In addition the information will be formatted into a geo-database that is compatible with the clients' GIS system. ESP will utilize current ESRI technology to convert, process, and import the final LiDAR data and extracted features into a master enterprise geo-database. The final master enterprise geo-database will be made available to multiple client applications through the use of available data interoperability services as determined by the required client applications.

Owned Mobile and Static LiDAR Systems and Relevant Equipment				
Make/Model	**Quantity**		**Make / Model**	**Quantity**
Cardinal VrLiDAR	2		Trimble MX8 Mobile Spatial Imaging System	2
TopoDOT	3		Leica C10 Scan Station	2
Bentley Microstation	11		Leica HDS7000 3D Laser Scanning System	1
ESP Pavement System	1		Leica ScanStation P20 Laser Scanning System	2
Leica MS550 Multistation	3		Optech Lynx V200 Mobile LiDAR System	1

DIGITAL FILE DELIVERY

Our team works with State highway departments, Federal agencies and private engineering firms that require us to deliver digital products in many different formats. These products are delivered in 2D and/or 3D formats depending on the requirements of the clients. We have completed many location surveys using the Department of Transportation graphic standards in both English and Metric systems.

The mapping products delivered by the TMSI team are ready for full functionality without conversion or reformatting. The team is experienced in the production and delivery of standard CADD/GIS data formats such as MicroStation v8*.dgn, AutoCAD *.dwg, ESRI GIS databases and geodatabases, and InRoads formats. Digital orthophotos are produced in accordance with the Task Order specified formats such as raster format, GeoTiff, MrSID, and digital raster scan files. All mapping products will adhere to WV standards capable of being directly loaded into MicroStation, AutoCAD and ESRI Systems for GIS. The team maintains a comprehensive library of data translator and application programs that allow the information acquired through field survey, LiDAR and digital photogrammetry to be migrated into the required formats compatible with the computer systems. These include but are not limited to Bentley MicroStation, Intergraph InRoads, Intergraph

MGE, Intergraph Iras C, AutoCAD, ESRI Arc/GIS, and ERDAS Imagine. The TMSI team has a competitive advantage in the market place, due to their extensive services lines, including GPS data collection/ management, surveying, 3-D laser scanning, engineering, landscape architecture, and planning. Because of the expertise of the TMSI team, we are able to offer all mapping services firmly based on proven engineering, surveying, and GIS principles. The TMSI team has experience delivering all products listed in the solicitation in digital and hard copy form. All mapping and base plan sheet digital data shall be delivered in MicroStation design files that conform to the WV Photogrammetry Unit level structure and symbology specifications.

RECENT SIMILAR PROJECTS

The TMSI team is currently providing photogrammetric surveys, LiDAR surveys, location surveys, mobile mapping and SUE services for the design of various highway projects on an as-needed basis to several DOTs throughout the country. TMSI has worked with the Virginia Department of Transportation for over 25 years. ESP has had a 25-year uninterrupted contractual relationship with NCDOT, supporting aerial and photogrammetry projects through their mobile, conventional, and GPS surveys. Their 2011-2013 contracts were for an amount of $5,600,000. This contract is a single prime contract where NCDOT handles oversight between disciplines. ESP has completed more than 350 DOT projects in North and South Carolina in the past 12 years with fees in excess of $17 million for surveying and SUE services.

The TMSI team currently holds the West Virginia Department of Transportation Surveying and Mapping Contract.

Virginia Department of Transportation (Ongoing) – TMSI has worked with VDOT since 1987 completing approximately 30 jobs per year. During that time period, TMSI has provided planimetrics, DTMs, orthophotography, and topographic maps. TMSI mapped 22 miles of I-81 near Roanoke, VA and provided planimetrics and orthophotography. Point-of-Contact: Michael Zmuda, L.S., P.E. at (804) 267-1258.

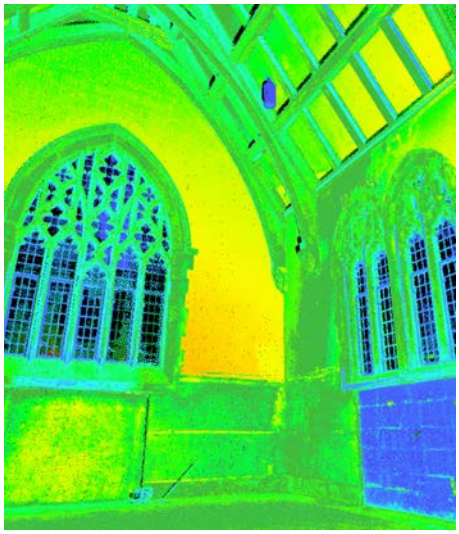
Vulcan Materials Stockpiles (Ongoing) – TMSI has been mapping over 100 stockpiles for Vulcan Materials for the past 15 years. There are 23 stockpiles in NC, 13 in SC, 30 in VA, 25 in GA, 3 in DE, 2 in PA, and 10 in MD. This project involves planimetrics, DTMs, orthophotography, and topographic mapping. TMSI also generates a "Blast Map" for each stockpile. These maps encompass 1mi^2 around each stockpile and all planimetric features, including homes, roads, fire hydrants, etc. Point-of-Contact: Chris Scott at (800) 477-7625.

Tennessee Valley Authority Open End Photogrammetry Contract (Ongoing) – TMSI recently mapped every power plant owned by TVA as part of their ongoing contract. TMSI is currently in the process of collecting and processing 3,700 miles of right-of-way vegetation plots and transmission lines throughout Tennessee. This project will be completed within three months. Since 1998, TMSI has held an open end contract with the Tennessee Valley Authority (TVA). TMSI has captured B&W, Color, CIR film and digital imagery in seven states within the TVA service boundary. They have completed photogrammetric mapping and collected LiDAR data for use in DTMs. TMSI has provided mapping projects from a scale of 1"=25' with ½ ft. contours through 1"=400' with 10' contour mapping specifications. TMSI has provided TVA with orthophotography of areas as small as a few acres to areas as large as several square miles. Point-of-Contact: Pat Hamlett, GISP at (423) 751-2870.

NAVFAC Naval Air Stations Facilities, Photogrammetric Services (Ongoing) – TMSI has collected and is currently processing imagery for twenty-three naval facilities throughout the southeastern United States. These sites are scattered from Jacksonville, FL to New Orleans, LA, and include the main base and Navy Off-Site Landing Facilities (NOLF) and Range Target Areas. Deliverables for this project include digital orthophotography, planimetrics, and DTMs. Point-of-Contact: Kristy M. Capobianco, GISP at (904) 542-6719.

FEMA Risk MAP Production and Technical Services (2009 – Present)
Beginning in FY09, ESP supported FEMA's Risk MAP program as part of the RAMPP Joint Venture serving FEMA Regions II, III and VI. ESP either managed or is currently managing 11 updates to county-wide flood studies. The management of these projects includes the direction of all associated data development tasks (field survey, topographic data development, hydrologic analysis, hydraulic analysis, floodplain mapping, and DFIRM database). Project scopes have included both regulatory and non-regulatory Risk MAP product development and adherence to FEMA quality standards and specifications.

Ingredion Rail Yard Capacity Improvement Project Survey (2013) – ESP used both terrestrial static 3D laser scanning and conventional survey methods to produce a topographic survey for approximately 7.5 acres at the Ingredion Rail Yard located near Winston Salem, Forsyth County in North Carolina for HNTB Corporation . The area contained approximately 1500 feet of a multi-rail railroad section where ESP collected all existing track locations including the points of switch, frogs and top-center of rails and rail elevations. ESP also surveyed all structure footprints, roadways and existing topographic conditions within the designated area to assist HNTB with their railroad design services. All rail, structural and planimetric information was extracted from the 3D scan data using Leica Cyclone software.



Duke University LSRC Mechanical Room and Steam Plant 3D Laser Scans (2012-2013) – ESP performed static 3D laser scanning to capture interior details of the Duke University LSRC Mechanical Room. ESP used our Leica P20 scanner to capture both point clouds and photos throughout the room. Deliverables included registered point clouds, with RGB, for import into Navisworks. ESP performed static 3D laser scanning to capture all interior details of the Duke University Steam Plant (first floor). ESP used a Leica 7000 to capture dense point clouds throughout the entire floor – approximately 25 scans were completed in 5 hours. The multiple scans were registered together using targets placed throughout the scan area. Deliverables included registered point clouds delivered in PTS format for import into Navisworks.

Statewide Aerial Orthophotography Project (2011) – In response to the needs of the State E-911 board for seamless imagery for emergency response and other uses, the State of NC embarked on a unique project to acquire orthophotography for the entire state in one flying season (2010). ESP served as prime contractor data acquisition and overall program managing the Statewide Orthophotography project. ESP team member Surdex played a major role in this orthophotography project providing acquisition, processing and final delivery support

The ESP team was in responsible for the acquisition and processing 27,530 square miles of orthophotography at a 6-inch pixel resolution covering 53 of the state's 100 counties. In addition to the delivery of 53 counties, ESP served as the overall Statewide Program Coordinator for the NCEM-GTM, managing all contractors with respect to schedule, scope and independent quality reviews. This role also included providing updates to stakeholder groups on project progress and deliverables. The client and stakeholders were updated via daily updates to a project SharePoint site for tracking for ground control, acquisition flight lines, orthophotography processing and independent quality control tasks. Point-of-Contact: John Dorman at (919) 825-2310.

Project Example: In 2012, TMSI collected LiDAR data for the Missouri Department of Transportation (DOT) on I-35 in Kearney, MO. TMSI collected approximately 80 points per meter using their eagleeye system achieving an accuracy of approximately 0.05ft. TMSI also collect 3 inch digital orthophotography which was used to develop planimetric mapping.

KEY PERSONNEL FOR TUCK MAPPING SOLUTIONS, INC.

Robert H. Tuck, PE RLS CP – President/ Program Manager

Mr. Tuck began Tuck Engineering, Inc. in 1985. He is published in Professional Surveyor and the ASPRS Handbook on Photogrammetry. He is a Registered Land Surveyor in NC, SC, VA, WV, TN, KY, and FL and is a registered commercial multi-engine and helicopter pilot. Mr. Tuck is a registered Professional Engineer in VA, WV, TN, and KY. Mr. Tuck is also an ASPRS Certified Photogrammetrist. Mr. Tuck is familiar with all photogrammetric processes and is constantly applying himself to learn the newest and latest technology. Mr. Tuck has obtained several clearances to fly over restricted areas, flight planned thousands of jobs, acquired ground control, and performed aerotriangulation.

Matt Doty, CP, GISP – LiDAR and Topographic Project Manager

Mr. Doty has 8 years of field survey experience in boundary, construction stake-out and topographic surveying. He has been trained to process LiDAR, ABGPS, and GPS baselines, CAD editing, flight planning and aerial camera operation. Mr. Doty has been involved in installing LiDAR systems in aircrafts, he accompanied Mr. Tuck to Guantanamo Cuba for the acquisition and processing of data of Guantanamo Base and Prison, and he has worked on many projects for the VDOT and the TXDOT. He has a B.S. in Surveying from East Tennessee State University and has a PLS-CADD Training Certificate. Mr. Doty is a licensed Certified Photogrammetrist and GIS Professional.

Michael Hobbs, PS – Photogrammetry Project Manager

Mr. Hobbs has over 27 years of experience working for TMSI within the practice of photogrammetry. He has worked extensively in edit/ QC of mapping products before becoming a project manager. His responsibilities include project management, estimating, flight planning and mapping execution. His main clients include the Virginia Department of Transportation (VDOT), the Tennessee Valley Authority (TVA), Vulcan Material, and National Gypsum. He has been involved in all mapping processes for these clients and has helped the technicians to find new and faster ways of processing while still producing high quality deliverables. He holds an A.A.S. in Drafting from Mountain Empire Community College and a B.A.A from King University. Mr. Hobbs is also a licensed Photogrammetric Surveyor.

Steven Smeltzer, PS – Stereo-Compiler/ Photogrammetrist

Mr. Smeltzer has been with TMSI for over 28 years. Mr. Smeltzer is a registered Virginia Surveyor Photogrammetrist and holds an A.A.S in Mapping Science from Ferris State University. He has served as a stereo-compiler and photogrammetric analyst. His mapping experience includes highway design mapping, coal mine sites, water and sewer design projects, and city and county mapping. He has experience in the layout of ground control, aerial triangulation, digital mapping, and digital ortho production.

KEY PERSONNEL FOR ESP ASSOCIATES, P.A.

Daniel B. Hill, PLS (NC, SC), CFS – GPS/HDS Department Manager

Mr. Hill has been with ESP Associates, P.A. for 19 years and has a strong background with applying emerging technologies (various GPS methods, 3D laser scanning) within the surveying, engineering and architectural professions. For the past 11 years, Mr. Hill has been responsible for managing several surveying crews, office technicians and project managers, as well as coordinating with subcontracting consultants in a nationwide effort to update the quality of our floodplain maps for FEMA.

Martin R. Stoughton, PLS (WV, NC, PA, CO), PSM (FL) – Survey Division Manager

Martin has over 38 years of land surveying experience and has been a Professional Licensed Surveyor for 20 years. Martin has been involved in all aspects of the Land Surveying profession and he has managed multiple Land Surveying offices. He has been in responsible charge of all aspects of large scale survey projects for the past 15 years and most recently has been involved in Mobile LiDAR Scanning projects across North America. He is a Professional Land Surveyor in the states of North Carolina, Pennsylvania, Colorado and Florida. Martin is based in ESP Associates Pittsburgh, Pennsylvania office and has a passion for technology associated with Land Surveying activities.

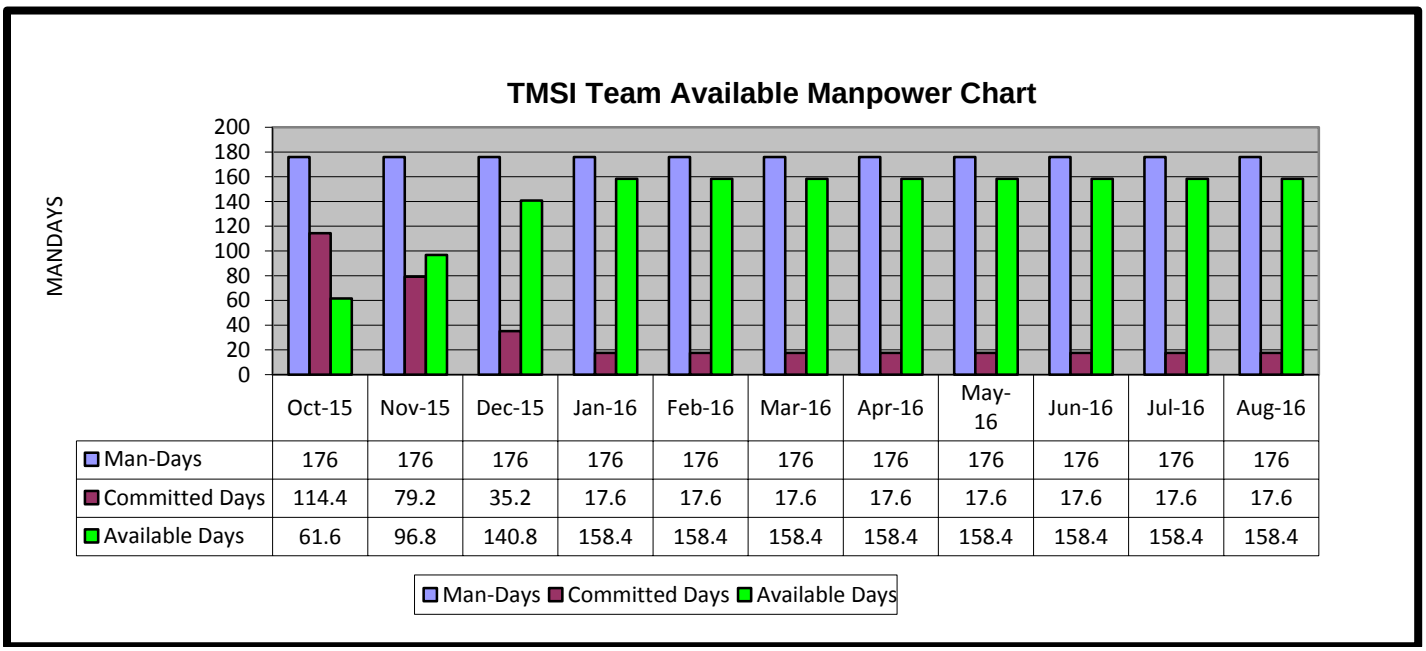
Randy W. Nance, PE, PLS, CFS – Surveying Department Manager
Mr. Nance has been in the engineering and land surveying field since 1988, and has been with ESP since 1997. He has nine years of prior experience as an assistant locating engineer with the North Carolina Department of Transportation. His experience includes boundary surveys, route surveys and topographic surveys. Mr. Nance is also proficient in utilizing the NC State Plane Coordinate System (localized or Grid). He has extensive experience using Microstation and Geopak software. Mr. Nance has a B.S in Civil Engineering.

Clayton B. Blount, PLS – Crew Chief
Mr. Blount has been with ESP for over ten years. He currently serves as ESP's project manager for various North Carolina Department of Transportation projects. Before joining ESP, Mr. Blount spent six years performing route location surveys on Virginia Department of Transportation projects. Mr. Blount has a B.S. in Civil Engineering Technology and an AAS in Land Surveying.

Pamela H. Petrucci – GIS/Survey Technician
Ms. Petrucci has been with ESP Associates since 1996. She has more than 26 years of extensive computer training in several engineering, surveying and GIS applications including Microstation V8i/GeoPak, InRoads, TopoDOT, AutoCAD 2011, ArcView 3.x and ArcGIS 9.2, (3D Analyst, Spatial Analyst). She has extensively worked in TopoDOT as well as Trimble Trident Analyst and Pointools. She is a key personnel in the final compilation mapping process for delivery in MicroStation V8i format. Ms. Petrucci has a BS in Civil Engineering.

TMSI Team Professional Qualifications		
Title	**TMSI**	**ESP**
Program/Project Manager	4	17
WV Professional Land Surveyor	1	1
Registered Professional Engineer	1	32
ASPRS Certified Photogrammetrist	2	1
GIS Professional	2	3
Project Management Professional	-	2
Stereo-Compiler	7	-
Photogrammetrist	7	-
CADD Technician	4	28
GIS Specialist	3	16
GIS Programmer	1	5
Survey Manager	2	25+
Survey Technician	2	18
LiDAR Technician	9	5

TMSI TEAM AVAILABLE MANPOWER CHART



	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16
Man-Days	176	176	176	176	176	176	176	176	176	176	176
Committed Days	114.4	79.2	35.2	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6
Available Days	61.6	96.8	140.8	158.4	158.4	158.4	158.4	158.4	158.4	158.4	158.4

AVAILABLE EQUIPMENT AND SOFTWARE

In addition to owning 4 aircraft, 1 digital camera, 2 film cameras, 3 airborne LiDAR sensors, 2 mobile LiDAR mappers, 80 total stations, and a host of bathymetric equipment, the TMSI team also owns and is familiar with the following software:

Digital Orthophoto, Photogrammetry, LiDAR, and GIS Software/ Licenses				
QTY.	**DESCRIPTION**		**QTY.**	**DESCRIPTION**
1	Autometric KORK stereo compilation licenses		9	BAE SocetSet digital stereoplotter licenses with VR-1 Feature Extraction
5	BAE NOAA Feature Extraction Software		81	AutoDesk AutoCAD
15	Bentley MicroStation network licenses		2	ERDAS Imagine license
4	OrthoVista OrthoMaster		6	Spectra Precision TerraModel Contour Module
2	OrthosVista Match AT		1	BAE BINGO aerotriangulation software
1	TerraPhoto LiDAR Processing Software		18	TerraScan LiDAR Processing Software
10	GeoCue LiDAR Management		2	TerraMatch LiDAR Processing Software
10	ArcGIS for Desktop Advanced		1	Q Coherent LP360 Software
27	ArcGIS for Desktop Basic		10	ArcGIS 3D Analyst
1	ArcGIS for Server Standard Enterprise		9	ArcGIS Spatial Analyst
1	ArcGIS Publisher		1	ESRI Developer Network

All equipment and software listed above will be available for use under this contract and is located in Virginia, North Carolina and West Virginia.

TECHNICAL MANAGEMENT AND TEAM EXPERIENCE

It is imperative for successful managers of these projects to implement refined workflows, task management, effective communication, and standardized quality control protocols throughout the duration of each project. Accelerated project schedules increase the importance of establishing a “one-pass” approach to successfully completing tasks and the overall project in a timely manner.

Robert H. Tuck, PE, PLS, CP from TMSI will be the Program Manager for this contract. Each assigned project begins with a scoping meeting between all necessary TMSI project manager(s) and an WV Purchasing Department Project Manager. The purpose of this meeting is to discuss all of the project details (i.e. limits, tasks, deliverables, formats, procedures, accuracies, control parameters, safety, due date, etc.) that will directly affect the cost and methods TMSI will use to perform the services requested. We consider the WV Project Manager as a member of our team to accomplish this project. We want to work with them to ensure we give the WV Purchasing Department exactly what it needs in a timely and cost effective manner. A Microsoft Project Management Chart or a similar management chart is developed for all large projects so both the project schedule and progress can be easily tracked. The status of each phase is shown on the diagram at the end of each shift or week. We will not have a defined schedule until the Task Order is received but TMSI and ESP have the staff to complete any Task Order assigned by the WV Purchasing Department. If a project begins to fall behind the predetermined schedule, more personnel are scheduled for the project. TMSI will keep the WV Purchasing Department updated on the project status with progress reports that reflect project task completion and inform WV of any project anomalies that may affect the deliverable due date(s).

TMSI will receive the task order from the WV Purchasing Department and determine how TMSI and ESP can work together to complete a task effectively. TMSI will be responsible for project management, aerial photography acquisition and processing, aerial LiDAR acquisition and processing, DTM data, planimetric data generation, and topographic data generation. ESP will work under TMSI and be responsible for control surveying, topographic surveying, planimetric and check surveying, terrestrial LiDAR collection, and mobile scanning.

TMSI and ESP have worked together on over fifteen projects in the past, including highway mapping for TXDOT and slurry pond mapping for Duke Power in North Carolina, South Carolina, and Indiana. ESP has collected ground control while TMSI completed the aerial mission. We have merged airborne and mobile LiDAR datasets for in depth analyses for the Department of Transportation. In times of heavy workflow, ESP has processed TMSI’s airborne LiDAR data. TMSI has also been providing ESPs aerial mapping needs for over two years. TMSI is aware and confident in ESP’s quality control procedures. However, to ensure quality products are being provided, TMSI will complete the final quality control check on all products using a licensed surveyor and/or certified photogrammetrist.

The TMSI team understands that not only do our project deliverables need to meet specific criteria, standards, layering guidelines and formats, we must also be in the WV Purchasing Departments current version of MicroStation, GeoPak/ InRoads, and ESRI software. It is our goal to submit a product that can be effortlessly streamlined into the clients’ workflow. The final task of each project involves the submission of a specific set of associated documents to the client that is necessary for project closeout and procedural compliance. The TMSI team has a proven track record to meet WV‘s high standards. Lastly, our crews, managers, and office personnel all understand that personal and public safety is our top priority. At no time will safety be compromised for schedule or production.

The TMSI team has statewide knowledge of local ordinances, regulations, county registrars, and other statewide experience that minimizes setbacks and possible project delays. Employees have long-term working and personal relationships that provide an invaluable resource when it comes to sharing experiences and working knowledge throughout West Virginia.

The TMSI team also has vast experience with statewide GPS control and is aware of the “anomalies” occurring in various pockets throughout high-volume data/voice traffic areas/times. We are well-versed in using the appropriate methods to obtain accurate GPS survey control (static, fast-static, VRS, RTK, or OPUS) in mountainous, piedmont and coastal terrain, and are aware of the limitations of this technology in certain field conditions. Our utilization of emerging technologies ensures our field crews have the best tools available for the specific work area to maximize efficiency.

As shown above, the TMSI team has both the personnel and equipment capacity to complete any task order required by the WV Purchasing Department in a 2-year period.

Purchasing Divison
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Request for Quotation

—

Proc Folder: 133225

Doc Description: Addendum 01: Mapping Services in Southern West Virginia

Proc Type: Central Master Agreement

Date Issued	Solicitation Closes	Solicitation No	Version
2015-10-05	2015-10-29 13:30:00	CRFQ 0313 DEP1600000016	2

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Name, Address and Telephone Number:

Tuck Mapping Solutions, Inc.
P.O. Box 760
4632 Aerial Way
Big Stone Gap, VA 24219

Phone: 276-523-4669

FOR INFORMATION CONTACT THE BUYER

Beth Collins
(304) 558-2157
beth.a.collins@wv.gov

Signature X [signature] **FEIN #** 54-1568570 **DATE** 10/27/2015

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMAITON:

Addendum No. 01:
This addendum is issued to modify the solicitation per the attached documentation and the following:
1. To delete line 4 on the commodity lines for 'Mobile Scanner' this line was added in error.
No other changes.

CRFQ
THE WEST VIRGINIA STATE PURCHASING DIVISION FOR THE AGENCY, THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, IS SOLICITING BIDS FOR AN OPEN END CONTRACT FOR MAPPING SERVICES IN THE NORTHERN COUNTIES OF WEST VIRGINIA, PER THE ATTACHED SPECIFICATIONS AND DOCUMENTATION.

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	Control Surveying	600.00000	HOUR	$115.00	$69,000

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :
Control Surveying

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
2	Topographic, Planimetric and Check Surveying	1800.00000	HOUR	$115.00	$207,000

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :
Topographic, Planimetric and Check Surveying

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
3	Terrestrial LIDAR Collection	600.00000	HOUR	$125.00	$75,000.00

Comm Code	Manufacturer	Specification	Model #
81151601	Leica Scanstation	Terrestrial LiDAR	C10 or P20

Extended Description :

Terrestrial LIDAR Collection

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
4	Mobile Scanner	300.00000	HOUR	$150.00	$45,000.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :

Line is inactive, not a bidable line.
Mobile Scanner

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
5	Topographic Mapping - Aerial Photography (0-25 Acres)	15.00000	ACRE	$533.33	$8,000

Comm Code	Manufacturer	Specification	Model #
81151601	Intergraph Z/I	Digital Camera	DMC II-230
	Riegl	LiDAR Sensor	680i

Extended Description :

(including LIDAR Collections)

List only one rate for each category.

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
6	Topographic Mapping - Aerial Photography (25-50 Acres)	30.00000	ACRE	$266.67	$8,000

Comm Code	Manufacturer	Specification	Model #
81151601	Intergraph Z/I	Digital Camera	DMC II-230
	Riegl	LiDAR Sensor	680i

Extended Description :

(including LIDAR Collections)

List only one rate for each category.

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
7	Topographic Mapping - Aerial Photography (50-100 Acres)	75.00000	ACRE	$106.67	$8,000

Comm Code	Manufacturer	Specification	Model #
81151601	Intergraph Z/I	Digital Camera	DMC II-230
	Riegl	LiDAR Sensor	680i

Extended Description :

(including LIDAR Collections)

List only one rate for each category.

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
8	Topographic Mapping - Aerial Photography (Over 100 Acres)	125.00000	ACRE	$68.00	$8,500

Comm Code	Manufacturer	Specification	Model #
81151601	Intergraph Z/I Riegl	Digital Camera LiDAR Sensor	DMC II-230 680i

Extended Description :

(including LIDAR Collections)

List only one rate for each category.

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
9	Licensed Land Surveyor	600.00000	HOUR	$140.00	$84,000.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :

Professional Rates (Listed Disciplines Only)

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
10	Survey Manager	1200.00000	HOUR	$125.00	$150,000.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :

Professional Rates (Listed Disciplines Only)

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
11	Mapping/CAD Technician	2400.00000	HOUR	$85.00	$204,000.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :

Professional Rates (Listed Disciplines Only)

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
12	Travel Per Diem (Rate/Person)Day)	125.00000	EA	$125.00	$15,625.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :

Applicable to Survey Crews Only

SCHEDULE OF EVENTS

Line	Event	Event Date
1	Tech Question Deadline at 5:00PM, EST	2015-10-02

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

RFQ No. DEP1600000017

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

MANDATE: Under W. Va. Code §5A-3-10a, 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: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. 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.

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.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"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.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (*W. Va. Code* §61-5-3) that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: Tuck Mapping Solutions, Inc.

Authorized Signature: _____ Date: 10/26/2015

State of Virginia

County of Wise, to-wit:

Taken, subscribed, and sworn to before me this 26 day of October, 2015.

My Commission expires October 31, 2018.

AFFIX SEAL HERE

LINDA S FLANARY
Notary Public
Commonwealth of Virginia
175735
My Commission Expires Oct 31, 2018

NOTARY PUBLIC _____

Solicitation Number: DEP1600000017

Rev. 04/14

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 Vendor Preference, if applicable.

1. **Application is made for 2.5% 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% 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% 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% 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% 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% 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.

7. **Application is made for preference as a non-resident small, women- and minority-owned business, in accordance with *West Virginia Code* §5A-3-59 and *West Virginia Code of State Rules.***
____ Bidder has been or expects to be approved prior to contract award by the Purchasing Division as a certified small, women- and minority-owned business.

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: Tuck Mapping Solutions, Inc. **Signed:** [signature]

Date: 10/26/2015 **Title:** President

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.:

DEPW00000017

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)

[X]	Addendum No. 1	[ ]	Addendum No. 6
[ ]	Addendum No. 2	[ ]	Addendum No. 7
[ ]	Addendum No. 3	[ ]	Addendum No. 8
[ ]	Addendum No. 4	[ ]	Addendum No. 9
[ ]	Addendum No. 5	[ ]	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.

Tuck Mapping Solutions, Inc.
Company

Authorized Signature

10/26/2015
Date

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

Revised 08/01/2015

CERTIFICATIONAND SIGNATURE PAGE

By signing below, or submitting documentation through wvOASIS, 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, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

Tuck Mapping Solutions, Inc.

(Company)

Robert H. Tuck, Pres.

(Authorized Signature) (Representative Name, Title)

(276) 523-4669; (276) 523- 4673; 10/26/2015

(Phone Number) (Fax Number) (Date)