



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.

Header

List View

General Information Contact Default Values Discount Document Information

Procurement Folder: 184203

SO Doc Code: CEOI

Procurement Type: Central Contract - Fixed Amt

SO Dept: 0606

Vendor ID: 00000206513

SO Doc ID: HSE1600000002

Legal Name: TERRADON CORPORATION

Published Date: 2/26/16

Alias/DBA:

Close Date: 3/9/16

Total Bid: \$0.00

Close Time: 13:30

Response Date: 03/09/2016

Status: Closed

Response Time: 8:59

Solicitation Description: Addendum No. 3-Responses attached and extend the bid opening

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 : 184203

Solicitation Description : Addendum No. 3-Responses attached and extend the bid opening

Proc Type : Central Contract - Fixed Amt

Date issued	Solicitation Closes	Solicitation No	Version
	2016-03-09 13:30:00	SR 0606 ESR03091600000004167	1

VENDOR

000000206513
 TERRADON CORPORATION

FOR INFORMATION CONTACT THE BUYER

Tara Lyle
 (304) 558-2544
 tara.l.lyle@wv.gov

Signature X	FEIN #	DATE
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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	Professional engineering services				

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description :	Professional engineering services
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Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

State of West Virginia
 Centralized Expression of Interest
 02 – Architect/Engr

Proc Folder: 184203

Doc Description: Addendum No. 3-Responses attached and extend the bid opening

Proc Type: Central Contract - Fixed Amt

Date Issued	Solicitation Closes	Solicitation No	Version
2016-02-26	2016-03-09 13:30:00	CEOI 0606 HSE1600000002	4

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:

FOR INFORMATION CONTACT THE BUYER

Tara Lyle
 (304) 558-2544
 tara.l.yle@wv.gov

Signature X

FEIN #

55-0687626

DATE

3/9/16

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

ADDITIONAL INFORMATION:

Addendum No. 3 - Responses to vendor questions attached. See attached pages. The bid opening has been moved from 03/01/2016 to 03/09/2016.

INVOICE TO	SHIP TO
ACCOUNTING TECHNICIAN 304-558-5380 HOMELAND SECURITY & EMERGENCY MANAGEMENT BLDG 1 RM EB80 1900 KANAWHA BLVD E CHARLESTON WV25305-0360 US	ACCOUNTING TECHNICIAN 304-558-5380 HOMELAND SECURITY & EMERGENCY MANAGEMENT BLDG 1 RM EB80 1900 KANAWHA BLVD E CHARLESTON WV 25305-0360 US

Line	Comm Ln Desc	Qty	Unit Issue
1	Professional engineering services		

Comm Code	Manufacturer	Specification	Model #
81100000			

Extended Description :

Professional engineering services

SCHEDULE OF EVENTS

<u>Line</u>	<u>Event</u>	<u>Event Date</u>
1	Technical questions due by 4:00 pm	2016-02-04

HSE1600000002	Document Phase Final	Document Description Addendum No. 3-Responses attached and extend the bid opening	Page 3 of 3
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ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

SOLICITATION NUMBER: CEOI– HSE1600000002

Addendum Number: 3

The purpose of this addendum is to modify the solicitation identified as CEOI HSE1600000002 (“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:

1. Responses to vendor questions attached.
2. The bid opening has moved from 03/01/2016 to 03/09/2016.

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
CEOI HSE160000002 - ADDENDUM NO. 3

Questions:

- Q1: As stated in Section 3.2, would you expand on “best available digital aerial photography”, i.e. minimum quality standards?
- A2: 1 foot pixels or smaller.
- Q2: How many projects do you anticipate awarding or issuing for the Expression of Interest during the applicable period?
- A2: We anticipate having 6 – 10 counties advisory flood heights done by the end of the contract.
- Q3: Is the Vendor required to have West Virginia Licensed Professional Engineers on staff? Does proof need to be submitted as part of the Expression of Interest (this appears to be what is indicated in the CEOI)?
- A3: See Section Three: Project Specifications, Item No. 3 – Qualification and Experience. Proof should be provided with the proposal, however, this information must be provided prior to contract award.
- Q4: How would Vendor Preference points theoretically be factored into the 100 available points as described in Section 3.4 Vendor Ranking?
- A4: The vendor ranking points (100 points possible) as stated in Section 3.4 of the CEOI HSE160000002 is not considered vendor preference points. This section is the evaluation criteria for the evaluation committee. Vendor preference does not apply to Expressions of Interest.
- Q5: Section 2.5.7 of AIA Document B101-2007 requests states that certified copies of the insurance policies may be required. Our company generally will not provide certified copies of policies, only certification of overall coverages and limits. Can this requirement be removed?
- A5: No, this requirement cannot be removed. Please see Section 8 – Required Documents in the General Terms and Conditions. Under the Insurance tab in this section states in part, “the apparent successful vendor shall furnish proof of the following insurance prior to contract award and shall list the state as a certificate holder.

- Q6: As noted in the CEOI, 50 points are possible based on a vendor's 'Approach and methodology for meeting Goals and Objectives'. The project goals and objectives include the development of enhanced approximate 1% annual chance (zone A) floodplains and additional comprehensive, but not specific, Risk MAP services. For the sake of remaining concise, should proposed technical approach focus predominantly on the development on enhanced approximate floodplains rather than the full suite of potential comprehensive services?
- A6: According to WV Code §5G-1-1 states in part, "to procure architectural or engineering services or both on the basis of demonstrated competence and qualification for the type of professional services required".
- Q7: Do you want key staff qualifications and experience submitted in resume form?
- A7: See Section Three: Project Specifications, Item No. 3 – Qualification and Experience.
- Q8: Are you requesting actual copies of staff certifications and degrees, such as diplomas, or is a listing of what degrees and certifications each key staff has sufficient?
- A8: See Section Three: Project Specifications, Item No. 3 – Qualification and Experience. Proof should be provided with the proposal, however, this information must be provided prior to contract award.
- Q9: Please clarify what is meant by "enhanced." Does this simply refer to updating and providing more accurate floodplains than Zone A floodplains that currently exist for some West Virginia counties?
- A9: The project goals and objectives are outlined in Section Three: Project Specifications, Subsection 4.
- Q10: Can you provide more specifics on what data management services are requested, such as only those related to data developed for flood studies?
- A10: See response to Question 6 above.

Other Information:

1. The bid opening has moved from 03/01/2016 to 03/09/2016.
2. In the event that Vendor is submitting a paper response, the Vendor shall submit one (1) original response plus three (3) convenience copies of each to the Purchasing Division at the address provided in Section 6 of the Instructions to Vendors. Vendors may choose to submit the response via wvOASIS.
3. No additional questions will be accepted on this CEOI.

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CEOI HSE160000002

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 checked="" type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input checked="" type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input checked="" 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.

TERRADON Corporation, Inc.

Company

Thomas J. Kettredge

Authorized Signature

3/9/16

Date

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



Solicitation Number: CEOI 0606 HSE1600000002
Department of Administration
Purchasing Division
2019 Washington Street, East
Charleston, WV 25305-0130

March 9, 2016

TERRADON Corporation is pleased to submit this Expression of Interest in response to your above referenced advertisement. This project shall consist of hydraulic and hydrologic modeling, floodplain identification and mapping, DFIRM development, data management, topographic data development, hazard mitigation planning, and community outreach.

TERRADON Corporation (**TERRADON**) and **DECOTA** Consulting Company (**DECOTA**) have decided to team for this interesting project. Each of these firms is based in West Virginia and is a Woman-Owned Small Business. The experience of **TERRADON**'s engineers in performing complex hydrology and hydraulic modeling compiled with the GIS expertise of **DECOTA** has poised this team to be an efficient and centrally located contender for this solicitation. Recently this same team was asked to provide a proposal to analyze the Keystone Drive Area for Kanawha County, West Virginia. This area was impacted by the Yeager Airport Slip and subsequent channel realignment. The scope of that work is similar in nature to this solicitation, with some added complexities due to the sensitive nature of the problem.

TERRADON offers detailed experience in hydraulic and hydrologic modeling, and the staff is proud to have worked on many successful flood analysis projects for both state and federally funded projects. The detailed analyses that is required of a bridge replacement project or a new site development far exceeds the working standards that is expected for this level of modeling. Consistency and accuracy will drive our efforts. **TERRADON** will manage the project with current in-house staff, while **DECOTA** will provide GIS skills and knowledge as well as quality assurance oversight. A perfect check and balance to ensure the data meets the FEMA Risk MAP standards.

Working from the Charleston/Nitro, WV office, Jennifer W. Casey, PE will direct engineering activities as Project Manager, while Robert Thaw, PS, will coordinate the base mapping data identification and collection efforts. Mr. Brad Cochran with **DECOTA**, located in Nitro, WV, will head up the GIS efforts. Mr. Cochran worked with the West Virginia Conservation Agency in 2002 where he served as the Geographic Information Systems Manager and Database Administrator. His expertise is key in the successful management and data assimilation required for this complex project. A number of qualified engineering professionals from **TERRADON** and **DECOTA** who are all familiar with FEMA requirements will provide support throughout the project. Our deep bench of highly skilled West Virginia residents stand ready to complete this project quickly and efficiently.

The primary points of contact for this work will be the individuals responsible for the successful completion of the work. These same individuals will be reporting to the Department and also

providing information for the associated community outreach events. **TERRADON** and **DECOTA** understand the sensitive nature of defining the flood insurance boundary. This simple line can be a huge economic impact on a typical family. The public outreach needs to be done with care and with accuracy. The involved professionals require tact and skill at conveying the information.

TERRADON brings the unique expertise of spinning off a web and community relations company with Fortune 500 corporate experience. In 1997, Thomas Kittredge (co-owner of **TERRADON** and current President) began **TERRADON** Corporation's Communications Department, focused on community advisory panel (CAP) facilitation and web development services. Community Advisory Panels gather on a regular basis to provide a forum for active chemical manufacturing plants to discuss environmental, safety, and operational concerns with their neighbors. **TERRADON** has facilitated CAP meetings for FMC Corporation, Union Carbide/Dow, Lyondell, and Clearon Corporation. **TERRADON** Corporation also formed West Virginia's first Public Advisory Group (PAG), a group that still meets today to address environmental remediation issues and action plans for the former FMC East Plant site in South Charleston, WV. The FMC PAG still meets to this day, facilitated by **TERRADON** Corporation staff.

In January 2001, the Communications Department was incorporated into a sister company, **TERRADON** Communications Group. To this day no other firm in West Virginia has built and hosted the same number of Fortune 500 corporate web sites. These include the corporate sites of home appliance manufacturer Whirlpool Corporation (corporate web site, MBA recruiting site, & Mexico-optimized corporate site), retail giant JC Penney (corporate web site and intranet), FMC Corporation (corporate site, global branding strategy), Kellogg's Cereal City (featured on cereal boxes and Sunday newspaper sectionals across the United States), United Bank intranet, as well as versions of the state of West Virginia Tourism & Commerce web sites.

While **TERRADON** Communications Group (TCG) was sold in 2012, Tom Kittredge and other TCG staff (e.g. marketing director, CAP/PAG coordinator) remain on staff and will manage the community communications portion of this scope of work. Should the community outreach portion of this contract require such skilled applications, **TERRADON** is able to provide high-tech, budget conscience options.

The **TERRADON/DECOTA** team is eager to explain our unique project approach and detailed quality assurance methods in more detail.

Engineering . Planning . Surveying . Inspection . Environmental



TERRADON and DECOTA

STATEMENT OF QUALIFICATIONS for Engineering Services for the Flood Hazard Analysis

February 16, 2016

Corporate Office
409 Jacobson Dr.
Poca, WV 25159
304-755-8291

Greenbrier Valley
425 North Jefferson St.
Lewisburg, WV 24901
304-645-4636

Jackson County
101 North Court Street
Ripley WV, 25271
304.532.4909

Fayette County
P.O. Box 307
Charlton Heights, WV 25040
304-541-7655

ALL LOCATIONS Phone: 1-800-755-8291 Fax: 304.755.2636

www.terraddon.com

TECHNICAL APPROACH

Base Map and Data Acquisition

Base map information will be acquired from a variety of sources to ensure accurate analysis. Geospatial data clearinghouses such as the West Virginia GIS Technical Center, the USDA/NRCS Geospatial Data Gateway, and the West Virginia DEP TAGIS unit will be utilized to compile the most current and detailed data available. Additionally, other relevant state and county agencies will be contacted to determine if more detailed data exists for the study areas. All base mapping will be stored in ESRI's ArcGIS file geodatabase format. Data will be clipped to the pertinent areas of study, checked for topological accuracy, and projected to the appropriate West Virginia State Plane (NAD 1983) coordinate system (ESRI:102750, ESRI:102751). All base map data will be available upon request.

Base map datasets will include but are not limited to the National Flood Hazard Layer (NFHL), the 2003 3m State Address and Mapping Board (SAMB) Digital Elevation Model (DEM), the 2003 SAMB local resolution hydrology, 2003 SAMB planimetrics, the National Hydrography Dataset (NHD), the Local / Advisory Flood Height (AFH) dataset, current Census TIGER/Line data, the National Land Cover Dataset (NLCD), the Soil Survey Geographic Database (SSURGO), 2003 SAMB 2-ft color orthophotos, 2014 USDA National Agriculture Imagery Program (NAIP) 1m color orthophotos, and private sources of aerial photography that include imagery from Google, Microsoft, and ESRI. Higher quality data such as the 2008 6 inch color orthophotos for Kanawha County will be included when available. Additionally, existing LiDAR data will be acquired from WVDEP, individual counties, or other government agencies. LiDAR data will be ground classified and processed into a seamless 1 ft. DEM to be included in the base map dataset.

Hydrologic Analyses

To support hydrologic modeling and floodplain development all elevation data gathered will be stored in seamless countywide or larger DEMs in ESRI raster format with a resolution of 3m or lower. Approximate streamlines to investigate for study will be generated using a combination of the best available aerial photography and elevation data. ArcGIS will be used to develop the necessary flow direction and flow accumulation raster datasets to produce updated stream networks and drainage points. This data will be checked for topological accuracy, projected to the appropriate West Virginia State Plane (NAD 1983) coordinate system (ESRI:102750, ESRI:102751), and stored in an ESRI file geodatabase or shapefile that will be available for delivery upon request.

HEC-RAS version 4.0 or later will be utilized for floodplain analysis and delineation. The program standards and working standards will all be followed in accordance with the Flood Risk Analysis and Mapping Procedures. Additionally, the most recent USGS regression equations for West Virginia will be utilized when appropriate. Individual HEC-RAS models will be delivered electronically in a zip directory organized by stream and include all necessary input files. All file naming, data attributes, and database schema will be prepared based on the most current technical reference provided by FEMA to support the West Virginia Flood Hazard Determination Tool. All HEC-RAS models and the associated hydraulic floodplain datasets will be checked for topological accuracy, projected to the appropriate West Virginia State Plane (NAD 1983)

coordinate system (ESRI:102750, ESRI:102751), and stored in an ESRI file geodatabase or shapefile that will be available for delivery upon request.

Enhanced Floodplain Development

Floodplains will be delineated based on the results of HEC-RAS modeling on the best available topographic mapping produced from the most current and detailed elevation models, planimetric data, hydrology, and geographic names. Floodplain boundaries, buffers, and cross section lines will be stored using the appropriate ESRI feature type and contain the associated attribute information from the HEC-RAS models including water surface elevations, station identifiers, and stream names. The table schema used for these feature classes will follow the most current technical reference provided by FEMA. In addition to a 3m DEM that encompasses these features, a depth raster and water-surface elevation raster will be developed for incorporation into the West Virginia Flood Hazard Determination Tool. This data will be checked for topological accuracy, projected to the appropriate West Virginia State Plane (NAD 1983) coordinate system (ESRI:102750, ESRI:102751), and stored in an ESRI file geodatabase or shapefile that will be available for delivery upon request.

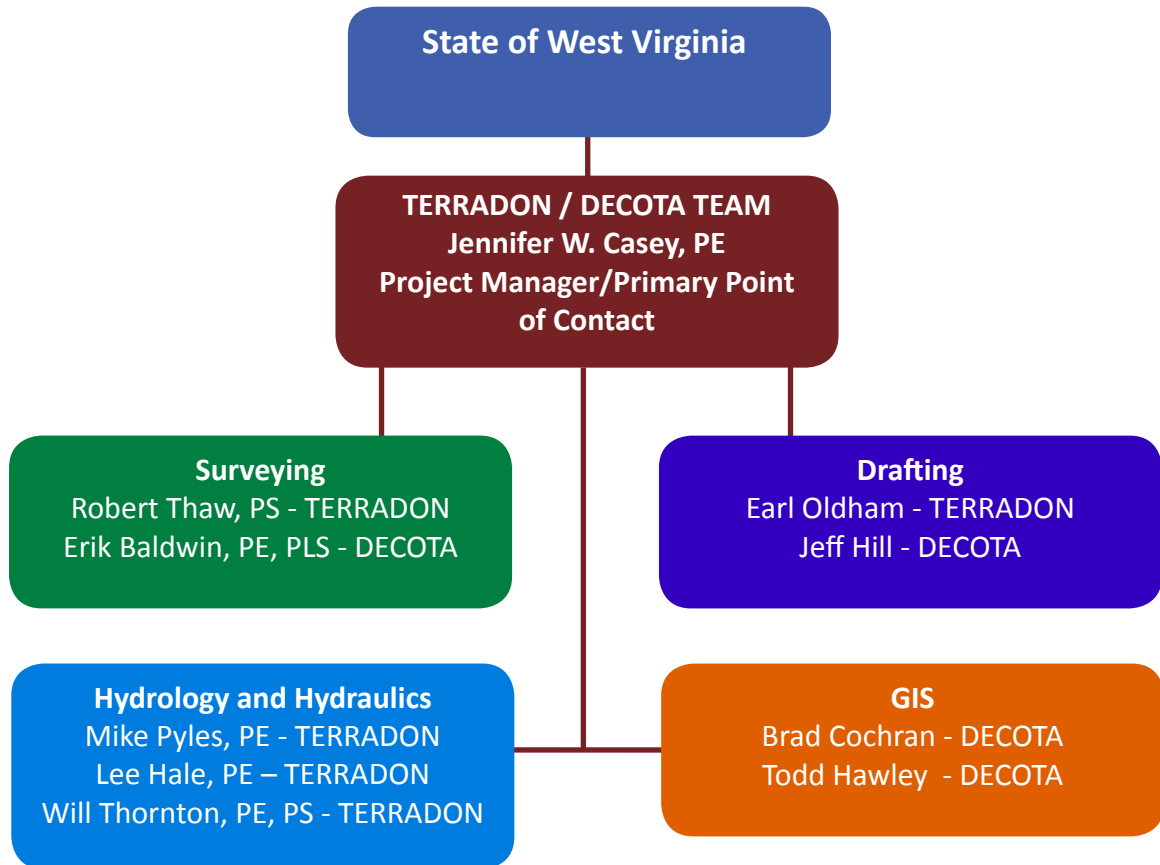
Update DFIRM Database

FEMA data and product development will be completed in accordance with the most current FEMA guidelines and standards available. Digital Flood Insurance Rate Map (DFIRM) Panel mapping standards, DFIRM database schema, and other deliverables will be prepared based on the most current technical references provided by FEMA. ESRI's ArcGIS software will be utilized to prepare the necessary mapping and the associated attribute data to ensure compliance with established FEMA conventions.

Coordinating and Reporting

Proper coordination with FEMA, the West Virginia GIS Technical Center, the West Virginia Division of Homeland Security & Emergency Management, and other state, county, or local organizations will be utilized to facilitate ongoing communication. Additionally, a Technical Support Data Notebook (TSDN) will be maintained in accordance with Appendix M of FEMA's Guidelines and Specification for Flood Hazard Mapping Partners to record the various technical details of the floodplain development process.

TERRADON presents the Proposed Team in the following organizational chart:



TERRADON Corporation currently maintains capacity for multiple full-time survey crews. For this project, TERRADON anticipates the use of up to seven full-time crews working out of its Charleston-area office. TERRADON has the ability to dispatch additional crews on an as needed basis from its Ripley, Charlton Heights and Lewisburg offices.

Jennifer W. Casey, PE

Civil Engineer

Jennifer W. Casey, PE has more than 22 years of design and construction experience. Her unique experience was gained as an engineer, contractor, and employer. She has been responsible for the complete oversight of complex projects from field to finish. Her experience with FEMA related studies stretches from MAP Modification projects to detailed bridge hydraulic analysis. She has provided the “Professional Accreditation” for Levees (PAL Certification) and provides oversight to city and county FEMA flood coordinators.

Relevant Project Experience

- **FEMA Coordinator Consultant.** The FEMA system requires local agents to oversee permit activities within their area of jurisdiction. Often these appointed officials rely on the expertise of professionals to review permit applications for FEMA compliance. Ms. Casey has been providing this oversight for over 13 years to various officials.
- **PAL Certification -** Part of the fall out from Hurricane Katrina and the levee break of New Orleans was to re-evaluate the existing levees and certify them against current standards and regulations. This review process must be conducted by a registered professional engineer who is able to certify that the levee has been “Professionally Accredited”. Once this PAL certification is received, the flood insurance rates can be re-established for the protected areas within these levees. Failure to achieve PAL certification results in the requirement of all protected properties to secure flood insurance. Ms. Casey has overseen and applied these concepts to provide this certification.
- **Municipal Engineering Services –** Provided engineering services such as preliminary and final design, construction inspection and management, assistance with funding applications, development of construction cost estimates, and utility coordination. Representative clients include:
 - Alpine Theatre Restoration Chairman, Subcommittee of Main Street Ripley; Ripley, WV
 - City of Ravenswood Downtown Beautification; Ravenswood, WV
 - Jackson County Commission; Ripley, WV
 - Main Street Ripley; Ripley, WV
 - Greenbrier Resort; White Sulphur Springs, WV
- **Bridge Design and Rehabilitation –** Project engineer responsible for management, design, review, and coordination of different areas and phases of bridge projects. The types of bridges include steel plate girders, both straight and horizontally curved, prestressed concrete I-beams, and timber bridges. The bridges range in length from 150 to 2,300 feet. Substructure design includes conventional, semi-integral and integral abutments, mechanically stabilized earth retaining walls, as well as single and multicolumn piers. Representative projects include:
 - Corridor H – Bismark to Forman; Grant County, WV
 - Cotton Hill Bridge; West Virginia Route 16, Fayette County, WV
 - Earling Bridge; West Virginia Route 10, Logan County, WV
 - East River Bridge; Interstate 77, Mercer County, WV
 - Elkins Bypass – U.S. Route 219 to Canfield; Randolph County, WV
 - Man Bridge; West Virginia Route 10, Logan County, WV
 - Mercury Boulevard Interchange; Hampton, VA
 - Millville Quarry Access Bridge; West Virginia Route 9, Jefferson County, WV
 - Milton Covered Bridge Historic Restoration; Pumpkin Festival Grounds,



Education

B.S. Civil Engineering
West Virginia University

Work Experience

2015 - Present
TERRADON Corporation

2001 -2015
FOX Engineering

1997-2001
Site Blauvelt Engineers

1994-2001
WVDOT

Registrations

Professional Engineer:
WV [REDACTED], OH (6 [REDACTED] SC
[REDACTED] IN [REDACTED] MD
[REDACTED])
Licensed Engineering Contractor
[REDACTED]

Certifications

Safety Inspection of In-Service
Bridges – NHI Course 130055A

Memberships, Affiliations

ACEC
ACEC/WV
AISC
ASCE
AEI
NSPE

Cabell County, WV

- **Moorefield Interchange Bridge; Hardy County, WV**
- **Rita Bridge; West Virginia Route 10, Logan County, WV**
- **Spring Valley Bridge; Wayne County, WV**
- **Three Forks Creek Bridge; Tyler County, WV**
- **Trace Fork Pony Truss Bridge Replacement; Route 32, Lincoln County, WV**
- **West 19th Street Overpass Bridge; Interstate 64, Cabell County, WV**

- **Box Culvert Design – Project engineer responsible for design, review, and coordination of different areas and phases of concrete box culvert projects. The culverts range in length from 70 to 250 feet. Representative projects include:**
 - **Elkins Bypass – U.S. Route 219 to Canfield; Randolph County, WV**
 - **Spring Valley Bridge; Spring Valley Drive, Wayne County, WV**

- **Retaining Wall Design – Project engineer responsible for design, review, and coordination of different areas and phases of retaining wall projects, including cast-in-place walls and mechanically stabilized earth (MSE) walls. Representative projects include:**
 - **Spring Valley Bridge; Spring Valley Drive, Wayne County, WV**
 - **West Virginia Route 10 Walls, West Virginia Route 10 – Man to Rita; Logan County, WV**

- **Structural Condition Inspections – Served as a Team Leader and assisted in the inspection of bridges ranging in length from 20 feet to 2,400 feet. Services included preparation of reports, load ratings, and stress analysis. Representative projects include:**
 - **Bigley Avenue Bridges; Charleston, WV**
 - **High Street Bridge; Morgantown, WV**
 - **Lee Avenue Bridge; Weirton, WV**
 - **Milton Covered Bridge; Milton, WV**
 - **West 19th Street Overpass Bridge; Huntington, WV**
 - **Wheeling Tunnel; Wheeling, WV**
 - **Richard “Dick” Henderson Memorial Bridge, St. Albans, WV**
 - **Bartow Jones Memorial Bridge, Point Pleasant, WV**

- **Bridge Rating and Analysis – Assisted in conducting stress analysis and load rating for a variety of bridges throughout West Virginia. Representative bridge projects include:**
 - **High Street Bridge; Morgantown, WV**
 - **West 19th Street Overpass Bridge; Huntington, WV**
 - **Bartow Jones Memorial Bridge, Point Pleasant, WV**

- **Residential / Private Inspections – Provided structural inspections and recommendations on repairs to deficiencies for private residences. This work is typically in cooperation with lending institutions. Professional opinions on foundations and all visual structural elements have been rendered. Many times the structural components are concealed from view and in this instance, assumptions are made based on professional experience.**

Robert Thaw, PS

VP - Survey and Mapping

With more than 22 years of experience in a wide range of surveying projects, Robert Thaw serves as head of TERRADON's Survey and Mapping department. He organizes and supervises survey crews, reviews project plans and creates base mapping for various projects including noise barriers, interchanges, connectors, bypasses, sidewalks, bike paths and bridges. Thaw oversees all TERRADON survey activities, including: preparation of Right-Of-Way plans; the development of GPS static networks for aerial mapping in the design of roadways; identification of existing utilities and property lines; base image development and control placement for construction projects; and drafting of legal descriptions for ROW parcels.

Thaw has been directly responsible for survey and mapping services, including Right-Of-Way, on a number of notable transportation projects including:

- **Laurel Fork Campground Bridge**
TERRADON provided surveying and design engineering on a USDA Forest Service project in Randolph County, West Virginia. Surveyors led by Thaw provided Right-Of-Way services, including courthouse research, construction easements, and location of alignments. Additionally, provided topographic mapping, project control for construction, hydraulic cross sections and stream profiles.
- **Sedalia Arch Bridge**
Thaw oversaw survey services for the replacement of an existing concrete arch bridge with a 72' single span bridge. The bridge consisted of adjacent concrete prestressed box beams with a cast-in-place concrete deck. Survey services consisted of a topographic survey, ROW plans, construction control and legal description creation. Roadway design consisted of new bridge approaches and a designed detour. Drainage, maintenance of traffic and right-of-way plans were included in the scope of work.
- **Sleeth's Run Bridge**
Thaw provided Right-Of-Way services during the design for the replacement of an existing truss bridge in Lewis County, WV. The project included the design of a new 200' structure and approaches. Survey services consisted of a topographic survey, ROW plans, construction control and legal description creation.
- **Grade Road**
Thaw oversaw Right-Of-Way services for the new construction of two lanes adjacent to an existing two-lane roadway. Right-Of-Way services included Right-Of-Way Plans, legal descriptions, and questionnaires for take parcels.
- **St. Mary's Bypass**
Working for the WVVDOT, Thaw led transportation survey services for the relocation of WV 16 in Pleasants County, from Pleasants County Route 18 to WV 2 in Saint Mary's, West Virginia for approximately two miles of highway. The project included topographic mapping, survey control mapping, right-of-way and utility cost estimates and inventories.



Education

A.S., Survey Technology, 1981,
West Virginia Institute of
Technology

B.S., Surveying, 1985, West
Virginia Institute of Technology

Work Experience

TERRADON Corporation
1994-Present

Bowman Land Surveying
1992-1994

Dunn Engineers
1990-1992

Kelley Gidley Blair and Wolf
1988-1990

Pierson & Whitman
Architects and Engineers
1984-1986

Registration

Professional Surveyor,
West Virginia

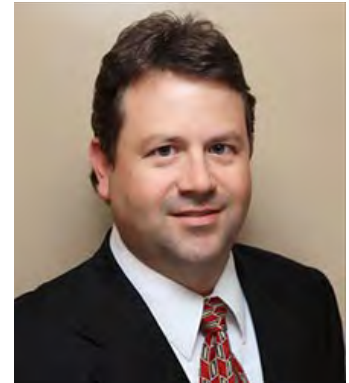
William S. Thornton, PE, PS

Project Manager

Thornton is an experienced project manager and design engineer for civil/transportation engineering design projects. He provides analysis and design on the construction and rehabilitation of a variety of infrastructure including streets, drainage, sidewalks, buildings, and traffic and other safety improvements. The major design projects with which Mr. Thornton has been involved included roadway design, drainage design, site design, mine land reclamation, permitting, property surveys, airport design, right-of-way services, maintenance of traffic and construction administration and oversight.

Relevant Project Experience

- **Central West Virginia Regional Airport Authority, Yeager Airport – Charleston, West Virginia, 1995**
General Aviation Apron Rehabilitation, Phase I and Phase II - Design, specification preparation, resident engineering and construction administration for the construction of a concrete fuel truck parking area, helicopter landing/parking pad, and aircraft de-ice/wash pad. The project also involved storm water drainage improvements and sanitary sewer line installation. Phase II included over 13,000 tons of asphalt, the installation of subsurface drainage improvements, application of a slurry seal coat and extensive pavement marking.
- **U.S. 52 Kermit Bypass, Mingo County, West Virginia, 2000**
Responsibilities included design and management of four miles of a new alignment four-lane expansion of U.S. 52 near Kermit, West Virginia. Design included over 10 million cubic yards of earthwork, two interchanges and 1500 LF of stream relocation.
- **Upshur County Airport Authority, Buckhannon-Upshur Airport – Buckhannon, West Virginia, 1998**
Runway 10-28 Slide Repair and Airfield Lighting Installation - Design and specification preparation of slide repair, pavement repair and miscellaneous drainage and electrical improvements.
- **Hawks Nest Dam Stabilization Project, Brookfield Renewable Energy, Ansted, WV, Ongoing**
Project Manager for the Site Management during the construction of the \$10 Million project to install 50 anchors through the dam into bedrock.
- **Clemtown Slide, Verizon Wireless, Taylor County, WV, Ongoing**
Project Manager for the remediation of a landslide along the access road and cell tower site in Taylor County, WV. Project design is in process.



Education

B.S. Civil Engineering
West Virginia University
Institute of Technology

Work Experience

TERRADON Corporation
2014

City Engineer, City of
Montgomery

City Engineer, City of Smithers

Registrations

Professional Engineer in WV, OH, VA

Professional Surveyor in WV

Mike Pyles, PE

Hydraulic Engineer

Senior Project Engineer for various civil and environmental engineering projects with emphasis on transportation, water, and sewer projects. He is responsible for engineering studies, design, contract documents, engineering analysis, computer modeling, regulatory compliance, and permitting with emphasis on public water and sewer systems.

Relevant Project Experience

- **Fairmont Gateway Connector, Fairmont, WV*** – Design Engineer for the storm water system on a WVDOH project for the relocation and upgrade of WV 273 to a four-lane divided highway and a new interchange with I-79.
- **Corridor H – Davis to Bismarck Section 3, Tucker County, WV** – Design Engineer for the revised storm water ditch design on a WVDOH project for Corridor H – Davis to Bismarck Section 3.
- **Corridor H – Davis to Bismarck Section 5, Tucker County, WV** – Design Engineer for the revised storm water ditch design on a WVDOH project for Corridor H – Davis to Bismarck Section 5.
- **Huntington Mall Road, Cabell County, WV*** – Design Engineer for the storm water system and culverts on a WVDOH project for the upgrade of US Rt. 60, Mall Road, and Ring Road, and the new road crossing over I-64 from US Rt. 60 to Ring Road to better accommodate Mall traffic.
- **Culloden I/C, Cabell & Putnam Counties, WV*** – Design Engineer of the storm water system on a WVDOH project for the I-64 interchange and modifications of Route 60/21.
- **North Mineral Wells Relocated WV 14, Mineral Wells, WV*** – Design Engineer for the storm water system and culverts on a WVDOH four lane divided highway project for the relocation and upgrade of approximately 1.5 miles of WV 14.
- **Pleasant Valley I/C to WV Route 310 I/C, Marion County, Fairmont, WV*** – Design Engineer for the storm water system on a WVDOH project for the widening of approximately 1.5 miles of I-79 from a 4-lane road to an 8-lane road.
- **Harsh Sugar Camp Bridge, WV*** – Design Engineer for a scour analysis of the piers and abutments on a replacement bridge for a WVDOH project.
- **Fort Seybert Bridge, WV*** – Design Engineer for a scour analysis of the piers and abutments on a replacement bridge for a WVDOH project.
- **US Route 35 Relocation, near Buffalo, WV*** – Design Engineer for a scour analysis of the piers and abutments on three new bridges for a WVDOH project. Design Engineer for the storm water system and culverts on a WVDOH four lane divided highway project for the relocation and upgrade of approximately 3 miles of US 35 to a four-lane divided highway.
- **New River Bridge, Hinton, WV*** – Design Engineer for a scour analysis of the piers and abutments on an existing bridge for a WVDOH project.
- **Greenbrier River Bridge, Hinton, WV*** – Design Engineer for a scour analysis of the piers and abutments on an existing bridge for a WVDOH project.
- **Forks of Cacapon Bridge, Forks of Cacapon, WV*** – Design Engineer for a scour analysis of the piers and abutments on a replacement bridge for a WVDOH project.

**These projects were completed by Mike Pyles, PE while working for another consultant.*



Education

A.S. Mining Engineering Technology,
West Virginia University Institute of Technology

B.S., Civil Engineering,
West Virginia University Institute of Technology

M.S. Engineering,
Marshall University

Work Experience

TERRADON Corporation
2009-Present

HNTB Consulting Engineers
1997-2009

Kelley Gidley Blair & Wolfe, Inc.,
Consulting Engineers
1986-1997

WV Department of
Natural Resources
1978-1986

WV Department of Highways
1973-1978

Registrations

Professional Engineer,
West Virginia

Lawrence E. "Lee" Hale, PE
 Environmental/Hydraulic Engineer

Lee Hale serves as a junior Project Engineer for TERRADON wastewater and water projects. Hale has provided design support on some of TERRADON's largest and most recent projects. Working under the direction of senior leadership, Hale has provided design engineering for The Summit Bechtel Reserve, a 10,600+-acre site with decentralized sewer and more than 100 miles of utilities.

Additionally, Hale has provided value engineering services for highway projects including design for the construction of multiple twin bridges on 1-77 near Tupper's Creek, WV. He is currently pursuing a Master of Science in Engineering with an emphasis in Environmental Engineering from Marshall University.



Relevant Project Experience

- **The Summit Bechtel Family Reserve**
 Tasks performed included water distribution system design, wastewater collection and pumping design, storm-water management design, WVDEP environmental permitting, wetland mitigation design, AutoCAD Civil 3D design team management, initial utilities start up disinfection plan, and field inspection of utility installation.
- **Brown and Brown Law Firm**
 Tasks performed included field sampling and report writing for Phase II Environmental Site Assessment.
- **Goodwin & Goodwin, Attorneys at Law**
 Tasks performed included several Phase I Environmental Site Assessments.
- **T-Shirt International**
 Tasks performed included wastewater discharge sampling and permitting.
- **Matheny Motors**
 Task performed included Phase II Environmental Site Assessment monitor well installation and ground water sampling.
- **Catfish-Man-of-the-Woods Bridge, Cabell County, WV**
 Served as a design engineer for the design on the replacement of the bridge. Tasks included assisting with the layout of the new bridge and roadway alignment, design of cantilever wing walls, drilled shaft foundations, semi-integral abutments, reinforced elastomeric bearings, spread prestressed box beams and concrete deck reinforcement, design factor calculations, and drafting.
- **6th Avenue Pump Station Design, Montgomery, WV**
 Tasks performed included site layout, new pressure and gravity sewer line design, pump design, back-up pump design (Dri-prime system), drafting, and the redesign of existing infrastructure.
- **Portsmouth Bypass, Portsmouth, OH**
 Served as Design Engineer for D two bridge for the proposed Portsmouth Bypass Design Build project. Tasks included assisting with the layout of new bridges, driven pile foundations, integral abutments, reinforced and un-reinforced elastomeric bearings, prestressed bulb "T" beams, and a 35' tall cap and column pier.
- **City of Montgomery Wastewater Treatment Plant Improvements**
 Design of overhead crane and pulley system for pump repair and installations.
- **Corridor H Drainage Design**
 Drainage Design for four-lane highway, including culvert and inlet sizing, flow calculations.
- **Putnam County Commission**
 Field Survey and Public Outreach for utility extension projects.
- **Smithers PSD, Long-Term Control Plan**

Education

B.S., Civil Engineering,
 West Virginia University
 Institute of Technology, 2010

Pursuing a M.S.E.,
 Environmental Engineering,
 Marshall University

Work Experience

TERRADON Corporation
 May 2009—Present

Registrations

Professional Engineer: WV

Affiliations

ASCE Charleston Branch
 2014 President

Preparation a LTCP for the City of Smithers, WV, to address the requirements for the plan by the City's NPDES Permit.

- **I-77 Three Twin Bridge Replacement near Tupper's Creek, WV**
Performed value engineering design to construction bridges in two phase construction method in lie of cross-overs.
- **Young Life Camp**
Performed work on environmental assessment and geotechnical survey.
- **Charleston Area Medical Center**
Performed soil percolation tests for parking lot construction at CAMC.
- **Value Engineering for Sections 3 and 5 of Corridor "H", Tucker County, WV**
Aided in the design of roadway drainage, superelevations, and vertical geometry. I also provided assistance with plan and cross section review and quantities.



Brad Cochran

Division Manager

Position:

Manages staff involved with geographic information systems (GIS), mapping, software development, and technology. Responsible for watershed assessments, jurisdictional determinations, data management projects, software development projects, and provides technical support as needed to facilitate company projects.

Education:

- **Bachelor of Arts Degree in Multidisciplinary Studies**, West Virginia University

Experience/Skills:

- Over fifteen years of experience with ArcGIS and database management.
- Developed and implemented GIS and data management components of the Emergency Watershed Protection Program, the Multiflora Rose Program, and the Lime Incentive Program for the West Virginia Conservation Agency.
- Completed the Hardy County and Morgan County Water Resource Assessments for the West Virginia Conservation Agency.
- Designed and led various GIS training programs for State and County government.
- Experienced software developer, has shipped products on desktop and mobile platforms that include both enterprise and consumer applications.
- Has strong knowledge of Python, Objective-C, Swift, the iOS Software Development Kit (SDK), ArcGIS SDK, database administration, and many other supporting languages and frameworks.

Affiliations/Certifications:

- West Virginia Association of Geospatial Professionals
- Registered Apple Software Developer
- Various ESRI and Microsoft Certifications



Erik Baldwin, P.E., P.L.S.

Sr. Engineer / Survey Manager

Position:

Current job responsibilities include environmental permitting and design for surface mining operations including the design for sediment control structures, structural fills, transportation, and mine layout. In addition, typical duties also include conducting surface water runoff analyses for surface mining permits by building hydrologic models that analyze the runoff conditions expected for all phases of the mining operation. Surveying responsibilities include as-built and volumetric surveying, topographic surveying, boundary surveying, completing elevation certificates and floodplain studies.

Education:

- **Master of Science Degree in Environmental Engineering**, Marshall University
- **Bachelor of Science Degree in Civil Engineering**, Bluefield State College

Experience/Skills:

- Twenty years in mining and construction engineering, surveying, environmental engineering, and permitting and has held positions ranging from Project Engineer to Senior Permitting and Environmental Engineer.
- Mine development analysis, hydrologic analysis and design, structural fill design, environmental engineering management for large surface mining operations.
- Ten years in higher education, including eight years as full time faculty in School of Engineering Technology and Computer Science at Bluefield State College.

Affiliations/Certifications:

- Registered Professional Engineer, West Virginia, Virginia, Ohio
- Registered Professional Land Surveyor, West Virginia, Virginia
- West Virginia Society of Professional Surveyors
- America Society for Engineering Education
- ASFPM Certified Floodplain Manager



Todd Hawley

GIS Analyst / CAD Specialist

Position:

Facilitates company projects by providing support and analysis over a broad range of disciplines including geographic information systems (GIS), civil engineering, surveying, and hydrologic / hydraulic modeling and analysis.

Education:

- **Regents Bachelor of Arts**, West Virginia University

Experience/Skills:

- Over ten years of experience in all aspects of mining related permitting.
- Excellent knowledge in both ArcGIS and Carlson Civil Suite software packages.
- Has prepared and completed various permitting actions, including 401, 404, and NPDES applications.
- Experience in the area of Storm Water Runoff Analysis (SWROA), used to determine if proposed mining operations will result in a net increase in peak storm flow on a pre, during, and post mining basis.
- Experienced software developer with knowledge in Python, C#, Swift, Visual Basic, ArcGIS SDK, AutoCAD SDK, and other supporting frameworks.
- Has developed various applications that have extended the functionality of ArcGIS and AutoCAD.



CORPORATE OVERVIEW

TERRADON Corporation offers a multi-faceted approach to design engineering and consulting services. For more than 25 years TERRADON staff has provided a wealth of engineering solutions blanketing the Ohio Valley and the Appalachian Region with successful projects. The company built its reputation on expert personnel and quality, time-sensitive service. Those same founding principles hold true today.

Staff includes engineers, landscape architects, surveyors, planners, environmental scientists, designers, technicians and LEED Accredited Professionals. The company maintains approximately 50 leading-edge staff in four locations: Nitro/Poca, WV; Lewisburg, WV; Charlton Heights, WV; and Ripley, WV. TERRADON'S departments work cohesively to provide turn-key solutions that strive to exceed client expectations.

ABOUT TERRADON

The family-owned business has built a strong reputation by providing flexible, cost effective design solutions and maintaining the highest level of customer service. TERRADON is particularly suited to design engineering within the mountainous areas of the Ohio Valley and Appalachian Regions. The firm has been recognized through numerous awards from professional organizations and agencies including the several State Divisions of Highways, Departments of Environmental Protection and the American Institute of Architects state chapters.

TERRADON's corporate culture promotes innovation and progressive thinking. Project leaders strive to sustain customers through a wide-range of engineering offerings. TERRADON employees understand the purpose behind their services and work to cultivate lasting relationships with clients through honest, hard work.

SERVICE OFFERINGS

- Land Planning and Site Design
- Civil Engineering
- Surveying and Mapping
- Environmental
- Geotechnical Engineering
- Energy
- Water/Wastewater
- Transportation Engineering
- Structural Engineering
- Storm Water Management
- Construction Oversight and Monitoring
- Materials Testing





4984 Washington St. W., Cross Lanes, WV 25313
Phone: 304.776.3333 Fax: 304.776.3371

CORPORATE OVERVIEW

Decota Consulting Company, Inc. offers a broad range of engineering, environmental, and technology services.

Decota Consulting Company's expertise includes but is not limited to the following areas:

- Certified Engineer Services
- Concept and Feasibility Studies
- Mine Planning and Design
- Site Reclamation Design
- Natural Channel Design
- Mitigation Project Management
- Physical, Biological and Chemical Assessment
- Rosgen Stream Classification
- Surface Runoff Analysis
- Sediment Control Design
- Permitting (USACOE and WVDEP)
- Watershed Assessments
- Construction Management
- Alternatives Analysis
- Stability Analysis
- Stream Bank Stabilization
- Final Design Plan Packages
- Monitoring and Sampling
- Nutrient Management
- Pesticide Management
- Environmental Liability Assessment
- Educational Presentations
- Environmental Document Compilation
- Justification Reports

Our key technical staff include:

Linda Raines, President of Decota, is a licensed professional engineer in West Virginia. In addition to undergraduate degrees in Natural Science and Civil Engineering she holds a masters degree in Environmental Engineering. She has twenty-seven years experience in mine planning, budgeting, environmental engineering and permitting and has held positions within the mining industry ranging from Project Engineer to Senior Planning Engineer and Manager of Permitting and Environmental Affairs. Her experience includes mine development analysis and economic analysis on projects exceeding \$30,000,000 initial capital, spanning twenty years in duration as well as environmental liability assessment.

David Raines, Vice-President of Decota, is an American Society of Agronomy Certified Crop Advisor and a West Virginia certified Nutrient Management Planner. He has nearly 19 years of commercial agriculture experience including nutrient and pesticide management, site-specific precision agriculture, and conservation planning. David has completed all four levels of Natural Stream Restoration Training as presented by Mr. Dave Rosgen, Wildland Hydrology. Before joining Decota, David served as Water Quality Program Manager for the West Virginia Conservation Agency. While there his duties included supervision and implementation of the US EPA's Clean Water Act section 319 Grants for non-point source pollution in West Virginia. Additionally he is certified by the United States Department of Agriculture as a Technical Service Provider. He is a past president of the Virginia Crop Production Association and has served on many agricultural and environmental advisory boards.

PROJECT PERFORMANCE DATA

Summit Bechtel National Scout Reserve

From 2008 to July 2013, TERRADON provided a variety of services for the development of the Summit Bechtel National Scout Reserve near Mt. Hope, Fayette County, WV. The Summit is a 10,600+ acre outdoor adventure center near Mt. Hope, WV next to the New River Gorge National Park. The world-class facility serves as a venue for the Boy Scouts of America's fourth High Adventure Base, the permanent home to the National Jamboree, a summer camp and National Center for Scouting Excellence leadership center - all on the same contiguous property.

Services included:

- **Initial Site Selection/Conceptual Designs**
- **Site Planning/Grading**
- **Erosion and Sediment Control**
- **AML**
- **Survey/Mapping**
TERRADON assisted in incorporating design drawings from multiple sources and as-built features into an overall GIS for the project. This work consisted of organizing drawings in different phases (preliminary, final, as-built) from the various engineering and architectural firms working on the project to keep a current plan of the site at all times during construction. TERRADON collected as-built information, including x,y,z, locations of all underground utilities installed on the Summit Bechtel Reserve, which was incorporated into GIS. This information was collected by conventional survey method and by real-time GPS, utilizing the WVDOH VRS network. This information is invaluable for future development and conflict avoidance during construction. TERRADON coordinated and provided ground control for the LIDAR mapping, which was performed during leaf on conditions of the 10,600+ acre site.
- **All Environmental Permitting**
- **Geotechnical Engineering**
- **Materials Testing and Construction Monitoring**
- **Utility Design**
- **60+ miles of underground utilities**
- **550,000 tons of aggregate produced by on-site rock crushing 600 acres of clearing, grubbing and rough grade operations**
- **3 million cubic yards of excavation**
- **600 acres of fine grading and revegetation**
- **28 miles of drainage swales, including erosion and sediment control**
- **14 miles of new roads (grade and drain)**
- **4 earthen dams**
- **80,000 seat lawn amphitheater**
- **On site sanitary sewer system**



PROJECT PERFORMANCE DATA

Catfish Man of the Woods Bridge - Hydraulic Modeling

Hydraulic modeling for the floodplains upstream and downstream of an existing bridge over Spurlock Creek was prepared by Terradon Corporation based on survey data obtained from WVDOH and using the Army Corps of Engineer's HEC-RAS (Version 4.1.0) program for the design storm events. The project site is located immediately downstream to the confluence of Spurlock Creek and Left Fork of Spurlock Creek, which resulted in a higher complexity than normal. The two upstream drainage areas of the project are almost equal – 51.5% (Spurlock Creek) and 48.5% (Left Fork of Spurlock Creek) of the total drainage area (8.28 sq. mi.). The project site has relatively wide floodplains that are well vegetated with mostly grass and a narrow band of trees on the stream banks. The Manning n values were selected based on field observations and survey information obtained with the river cross sections.



Forks of Cacapon Bridge - Hydraulic Modeling*

Hydraulic modeling for the floodplains upstream and downstream of an existing bridge over Forks of Cacapon was prepared for WVDOH using the Army Corps of Engineer's HEC-RAS (Version 3.1.3) program for the design storm events. Forks of Cacapon at the project site has a drainage area of 441.80 sq. mi. The project site has a wide flood plain upstream of the existing bridge on the eastern side of the river channel. Downstream of the existing bridge, a wide flood plain is located on both sides of the river channel. A narrow band of brush and trees grow to near the edge of both banks and grass covers the majority of the flood plain. The eastern side bridge approach of the existing bridge was apparently constructed on fill that obstructs the eastern side of the floodplain. The Manning n values were selected based on field observations and survey information obtained with the river cross sections.



*Mike Pyles, PE performed this work for another consultant.

PROJECT PERFORMANCE DATA

Hammerstrait Bridge - Hydraulic Modeling

Hydraulic modeling for the floodplains upstream and downstream of an existing bridge over Trout Run was prepared by Terradon Corporation based on survey data obtained from WVDOH and using the Army Corps of Engineer's HEC-RAS (Version 4.1.0) program for the design storm events. The project site is located immediately downstream to the confluence of Trout Run and Paddy Run, which resulted in a higher complexity than normal. The two upstream drainage areas of the project are almost equal – 49.1% (Trout Run) and 50.9% (Paddy Run) of the total drainage area (6.42 sq. mi). The project site has floodplains downstream of the existing bridge that are well vegetated with mostly grass and a narrow band of trees on the stream banks. The Manning n values were selected based on field observations and survey information obtained with the river cross sections.



Waterloo Bridge - Hydraulic Modeling

Hydraulic modeling for the floodplains upstream and downstream of an existing bridge over Thirteenmile Creek was prepared by TERRADON Corporation based on survey data obtained from WVDOH and using the Army Corps of Engineer's HEC-RAS (Version 4.1.0) program for the design storm events. Thirteenmile Creek at the project site has a drainage area of 71.29 sq. mi. The upstream and downstream floodplains are narrow with steep stream banks. The flood plains are well vegetated with trees on the stream banks. The Manning n values were selected based on field observations and survey information obtained with the river cross sections.



SURVEY PROJECT PERFORMANCE DATA

The TERRADON team has provided engineering services to government and private industry for nearly 25 years. During this time, the company has implemented policies and standards to provide solid cost control, quality of work and compliance with performance schedules. The firm has a strong track record of meeting WVDOH performance schedules and consistently scoring above average on consultant evaluations.

TERRADON has many satisfied Government Agency, repeat customers including WVDEP Office of Abandoned Mine Lands and Reclamation, WVDNR Parks & Recreation Section, City of Fairmont, WV, City of Montgomery, WV, Kanawha County Commission, Tennessee Valley Authority, National Oceanic and Atmospheric Administration, Army Corps of Engineers, USGS, US Air Force, FEMA, & US Marine Corps.

Sleeth's Run Bridge

TERRADON provided design for the replacement of an existing truss bridge in Lewis County, WV. The project included the design of a new 200' structure and approaches. The project included roadway design, drainage, maintenance of traffic and right-of-way plans, and a topographic design study.

Sedalia Arch Bridge

TERRADON provided engineering services on the replacement of an existing single span concrete arch bridge with a 72' single span bridge. The bridge consisted of adjacent concrete prestressed box beams with a cast-in-place concrete deck. Roadway design consisted of new bridge approaches and a designed detour. Drainage, Maintenance of Traffic, Right of Way Plans and a Topographic Design Study with existing utilities were all part of the project.

Flowing Springs Road

TERRADON Corporation provided services on the Flowing Springs Road project in Jefferson County, WV. The project involved the design and preparation of construction contract plans and related documents for a segment of Jefferson County Route 17 (Flowing Springs Road). The project consisted of re-alignment and re-construction of the existing two-lane roadway. TERRADON provided field surveys, Right-of-Way Plans, Legal Descriptions and Questionnaires for take parcels, PDE & TCE, Aerial Photography, Panel Layout and Control Survey, and Digital Contour Mapping.

Grade Road

TERRADON provided services to study, design and prepare construction contract plans for Grade Road. The project consisted of the new construction of two lanes adjacent to an existing two-lane roadway in order to provide a four-lane facility. TERRADON provided Contour Mapping, field surveys, Right-of-Way Plans, Legal Descriptions and Questionnaires for take parcels, PDE & TCE.

Corridor L

TERRADON performed a GPS static network and placed aerial mapping target control for aerial mapping for the project in Nicholas County, WV. Additionally, TERRADON performed boundary ties, hydraulic cross sections, mapped existing underground and above ground utilities, and established reference points for the project.

Martinsburg Drainage Study

TERRADON was contracted to perform a drainage study for the City of Martinsburg, WV. The project involved the development of a comprehensive drainage study comparing pre and post development conditions. TERRADON performed aerial photography, mapping, right-of-way and survey services as part of this contract.

Pine Creek/OMAR LCAP

TERRADON performed a GPS static network and placed aerial mapping target control for aerial mapping for the project in Logan County, WV. Additionally, we mapped utilities for the design of the closing of an approximate 12 acre abandoned Municipal Solid Waste Landfill.

Black Diamond Ranch

TERRADON performed a GPS static network and placed aerial mapping target control for aerial mapping for the 1,700 acre residential subdivision project in Craig County, VA, which included roadway and utility design and construction layout. A dam failure inundation study was also performed, which included surveying hydraulic sections of the potential inundation area.

City of Point Pleasant Levee Review

Jennifer W. Casey, PE was selected by the City of Point Pleasant to perform the Professionally Accredited Levee Review Process and submit to FEMA for approval. This complicated process is driven by the Hurricane Katrina effects and subsequent levee breach in New Orleans, LA. While most of these complicated levee systems were originally designed and installed by the U.S.A.C.E., they have largely been turned over to the local authorities for maintenance and implementation. The design criterias have changed and as a result, many of these aging structures are presently being re-evaluated and re-certified. If a levee system does not meet the requirements set forth in the CFR, the results can be devastating to the protected citizens. Mandatory flood insurance would be implemented to these properties previously immune to this expense. The PAL certification is significant and important. There is a two year window that allows the local authority to continue in the FEMA compliance system until the PAL certification can be properly evaluated. There are no extensions. If the sponsoring authority does not get the PAL certification completed or fails in some technical area, the levee system is automatically decertified. Point Pleasant was required to come up with the funds to complete this costly review. Jennifer Casey worked with the City Floodwall manager and the staff who is responsible for the maintenance and implementation of the flood protection system, also known as the Local Protection Project or LPP. Part of the PAL review process is updating the operations manuals, trigger elevations, and notification systems to match the Map Modernization Project's updated flood elevations. Many levee systems sit adjacent to rivers which have had more flood control devices installed since their original construction. Point Pleasant's system was originally designed to protect against the highest flood on record which was the flood of 1939. The floodwall and levee system was installed in 19xx. The new levee system now provides almost 10-feet of freeboard protection from the 100-year flood of the mighty Ohio River. Nevertheless, the City was still faced with getting the proper certifications for their system to maintain the immunity of the flood insurance requirements. This project is underway and nearly complete and awaiting final approval.

Jackson County Floodplain Manager

Jennifer W. Casey, PE presently serves as the consultant to the Jackson County Floodplain Manager in Ripley, WV. When permit applications are submitted for any construction activity, the County does a quick cursory review to see if the property is in a floodplain. If the property is in a flood plain area then a request for Ms. Casey to do a review of the application is made. A review of the application and often a site visit to verify parameters is made. This has assisted the County in being consistent and applying the technical knowledge to the projects that are questionable. There is also an accountability for the permit application that is achieved by involving an outside consultant.

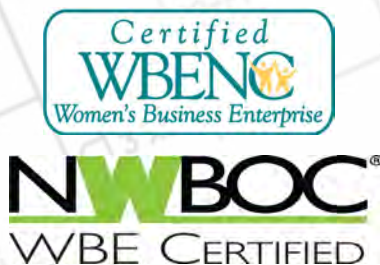
TERRADON CORPORATION

CORPORATE CULTURE

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CONTACTS

Project Opportunities
Ryan Wheeler
ryan.wheeler@terraddon.com

**Energy, Environmental, Geotechnical,
Testing & Inspection**
Bill Hunt, PG, LRS
bill.hunt@terraddon.com

Land Development
Greg Fox, ASLA, LEED AP
greg.fox@terraddon.com

Survey & Mapping
Robert Thaw, PS
robert.thaw@terraddon.com

Transportation, Abandoned Mine Lands
Joe Saunders, PE
joe.saunders@terraddon.com

Civil, Water, Wastewater & Stormwater
Will Thornton, PE, PS
will.thornton@terraddon.com

TERRADON is the largest woman-owned engineering firm in West Virginia.

TERRADON is also registered as a certified Women's Business Enterprise as defined by the Women's Business Enterprise National Council.

www.terraddon.com