

August 23, 2010

Mr. Frank Whittaker
West Virginia Department of Finance and Administration
Purchasing Division
2019 Washington Street East
Charleston, WV 25305-0130

**RE: Expression of Interest for Professional Engineering Services
RFQ # DNR 211007**

Dear Mr. Whittaker:

As West Virginia's leading engineering firm, Thrasher Engineering, Inc. offers the Division of Natural Resources, Parks and Recreation the technical expertise, personnel and experience to provide the quality of engineering services you require. Our team will provide the Division of Natural Resources, Parks and Recreation with all of the services necessary for the contract under single corporate management. If geotechnical services are required, we will work with the firm most qualified for the project needs.

In addition to our reputation for quality service and technical expertise, Thrasher Engineering offers the following reasons why we would be a good choice to provide the services you need:

- **Previous experience with conducting safety analysis and developing plans of improvements for dams:** Our staff has successfully completed dam safety assessments and has developed construction documents and specifications to allow for the necessary repairs to bring the structures into compliance. The assessments included reviewing/performing a hydrology and hydraulics analysis, coordinating with the WVDEP to determine hazard classifications, performing structure stability analyses, development of dam rehabilitation proposal, and developing construction plans and specifications for the project.
- **Personnel:** The team Thrasher Engineering brings to the Division of Natural Resources, Parks and Recreation consists of engineers and environmental specialists, along with survey personnel highly qualified to provide the services you need. Jeff Gola, P.E., who will serve as Project Manager and structural engineer, conducted the Buffalo Lake Dam Assessment included in our representative experience. Wes Morrow, who will serve as a Project Engineer on the team joined Thrasher Engineering, Inc. after 30 years of service as a civil engineer with the Natural Resources Conservation Service (NRCS). During his tenure with NRCS, Wes planned, designed, and led the NRCS Aging Dam

Division of Natural Resources
EOI # DNR 21007

rehabilitation dam assessment team, all of which will prove to be an asset to the working relationship between Thrasher Engineering and the Division of Natural Resources. Because of our range of experience and the number of personnel we offer, you can be assured that your work will be completed in time to meet your deadlines.

Per the requirements of your solicitation, we submit the following identification numbers:

FEIN: 55-0633596-6

WEST VIRGINIA VENDOR IDENTIFICATION #: 709052544

One (1) original and three (3) convenience copies of our Expression of Interest (EOI) are enclosed per the specifications.

We look forward to the opportunity to work with the Division of Natural Resources, Parks and Recreation.

Sincerely,

THRASHER ENGINEERING, INC.



CHAD BILLER, PE
PRINCIPAL-IN-CHARGE

/enc.



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

Request for Quotation

RFQ NUMBER
 DNRB11007

PAGE
 1

ADDRESS CORRESPONDENCE TO ATTENTION OF
 FRANK WHITTAKER
 304-558-2316

RFQ COPY
 TYPE NAME/ADDRESS HERE
 Thrasher Engineering, Inc.
 30 Columbia Blvd.
 Clarksburg, WV 26301

S H I P T O

DIVISION OF NATURAL RESOURCES
 PARKS & RECREATION SECTION
 324 4TH AVENUE
 SOUTH CHARLESTON, WV
 25303-1228 304-558-3397

PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
23/2010				

DATE: 08/24/2010 BID OPENING TIME 01:30PM

QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
1	LS		906-00-00-001	N/A	N/A
<p>AE SERVICES</p> <p>EXPRESSION OF INTEREST (EOI)</p> <p>THE WEST VIRGINIA STATE PURCHASING DIVISION FOR THE AGENCY, THE WEST VIRGINIA DIVISION OF NATURAL RESOURCES IS SOLICITING EXPRESSIONS OF INTEREST FOR ENGINEERING SERVICES TO PREPARE CONSTRUCTION DOCUMENTS AND SPECIFICATIONS TO BRING CACAPON UPPER AND LOWER DAMS, AT CACAPON STATE PARK, INTO COMPLIANCE WITH DAM SAFETY REGULATIONS PER THE ATTACHED.</p> <p>TECHNICAL QUESTIONS CONCERNING THIS PROJECT MUST BE SUBMITTED IN WRITING TO FRANK WHITTAKER IN THE WV STATE PURCHASING DIVISION VIA MAIL AT THE ADDRESS SHOWN IN THE BODY OF THIS EOI, VIA FAX AT 304-558-4115, OR VIA EMAIL AT FRANK.M.WHITTAKER@WV.GOV. DEADLINE FOR ALL TECHNICAL QUESTIONS IS 08/03/2010 AT THE CLOSE OF BUSINESS. ALL TECHNICAL QUESTIONS RECEIVED WILL BE ANSWERED BY ADDENDUM AFTER THE DEADLINE HAS LAPSED.</p> <p>QUESTIONS CONCERNING THE ACTUAL PROCESS BY WHICH A FIRM MAY SUBMIT AN EXPRESSION OF INTEREST TO THE STATE OF WEST VIRGINIA ARE NOT CONSIDERED TO BE TECHNICAL QUESTIONS AND MAY BE SUBMITTED AT ANY TIME PRIOR TO THE BID OPENING AND IN ANY FORMAT.</p>					

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

NER	FEIN 5500633596 6	TELEPHONE 304-624-4108	DATE AUGUST 23, 2010
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ADDRESS CHANGES TO BE NOTED ABOVE

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



State of West Virginia
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7/23/2010				

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QTY	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
	EXHIBIT 10			REQUISITION NO.: DNR 11007...		
	ADDENDUM ACKNOWLEDGEMENT					
	I HEREBY ACKNOWLEDGE RECEIPT OF THE FOLLOWING CHECKED ADDENDUM(S) AND HAVE MADE THE NECESSARY REVISIONS TO MY PROPOSAL, PLANS AND/OR SPECIFICATION, ETC.					
	ADDENDUM NO.'S:					
	NO. 1	X				
	NO. 2					
	NO. 3					
	NO. 4					
	NO. 5					
	I UNDERSTAND THAT FAILURE TO CONFIRM THE RECEIPT OF THE ADDENDUM(S) MAY BE CAUSE FOR REJECTION OF PROPOASLS.					
	VENDOR MUST CLEARLY 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.					
 SIGNATURE					

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

TELEPHONE 304-624-4108		DATE 8-23-2010
PARTNER 550633596 6		ADDRESS CHANGES TO BE NOTED ABOVE

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DATE PRINTED	TERMS OF SALE	SHIP VIA	FOB	FREIGHT TERMS
7/23/2010				

ISSUE DATE: 08/24/2010 BID OPENING TIME 01:30PM

E	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
				<p>.. THRASHER ENGINEERING, INC. .. COMPANY AUGUST 23, 2010 DATE</p> <p>NOTE: THIS ADDENDUM ACKNOWLEDGEMENT SHOULD BE SUBMITTED WITH THE PROPOSAL.</p> <p>REV. 09/21/2009</p> <p>BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES FOR BANKRUPTCY PROTECTION, THE STATE MAY DEEM THE CONTRACT NULL AND VOID, AND TERMINATE SUCH CONTRACT WITHOUT FURTHER ORDER.</p> <p>NOTICE</p> <p>A SIGNED EOI MUST BE SUBMITTED TO:</p> <p>DEPARTMENT OF ADMINISTRATION PURCHASING DIVISION BUILDING 15 2019 WASHINGTON STREET, EAST CHARLESTON, WV 25305-0130</p> <p>THE EOI SHOULD CONTAIN THIS INFORMATION ON THE FACE OF THE ENVELOPE OR THE EOI MAY NOT BE CONSIDERED:</p> <p>SEALED EOI</p>		

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

 Walker	TELEPHONE	DATE
	304-624-4108	8-23-2010
FEIN	ADDRESS CHANGES TO BE NOTED ABOVE	
55 06335986 6		

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



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4

ADDRESS CORRESPONDENCE TO ATTENTION OF
FRANK WHITTAKER
304-558-2316

RFQ COPY
 TYPE NAME/ADDRESS HERE
 THRASHER ENGINEERING, INC.
 30 COLUMBIA BLVD.
 CLARKSBURG, WV 26301

SHIP TO

DIVISION OF NATURAL RESOURCES
 PARKS & RECREATION SECTION
 324 4TH AVENUE
 SOUTH CHARLESTON, WV
 25303-1228 304-558-3397

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OPENING DATE: 08/24/2010 BID OPENING TIME 01:30PM

ITEM	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
BUYER: 44						
EOI. NO.: DNRB11007						
BID OPENING DATE: 08/24/2010						
EOI OPENING TIME: 1:30 PM						
PLEASE PROVIDE A FAX NUMBER IN CASE IT IS NECESSARY TO CONTACT YOU REGARDING YOUR PROPOSAL:						
304-624-7831						
CONTACT PERSON (PLEASE PRINT CLEARLY):						
CHAD BILLER, PE						
***** THIS IS THE END OF RFQ DNRB11007 ***** TOTAL:						N/A

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

	TELEPHONE	DATE
	304-624-4108	8-23-2010
PARTNER	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE
	550633596 6	

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RFQ No. DNRB11007

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

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

DEFINITIONS:

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

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

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

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

WITNESS THE FOLLOWING SIGNATURE

Vendor's Name: THRASHER ENGINEERING, INC.

Authorized Signature: *[Signature]* Date: 8-23-2010

State of WEST VIRGINIA

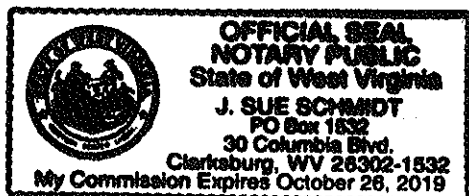
County of HARRISON, to-wit:

Taken, subscribed, and sworn to before me this 23 day of AUGUST, 2010

My Commission expires October 26, 2019.

AFFIX SEAL HERE

NOTARY PUBLIC *[Signature]*



STATEMENT OF QUALIFICATIONS

THRASHER ENGINEERING FAST FACTS

Corporation: Thrasher Engineering, Incorporated – A Resource Engineering Group, Inc. Company

Incorporated: 1983 West Virginia

Parent Company: Resource Engineering Group, Incorporated

West Virginia Owned and Operated

Principal Officers and Partners – Thrasher Engineering, Inc.

H. Wood Thrasher, PE – President	Kenneth P. Moran, PE, PS – Vice President
Wm. Randy Watson – Secretary / Treasurer	Chad M. Riley, PE - Partner
Daniel E. Ferrell, PE – Partner	

Principal Officers and Partners – Resource Engineering Group, Inc.

H. Wood Thrasher, PE – President / CEO	Kenneth P. Moran, PE, PS – Vice President/COO
Chad M. Riley, PE –Secretary / Treasurer	Wm. Randy Watson – Partner
Clay P. Riley, PE – Partner	Chadwick Biller, PE – Partner
Jonathan Carpenter, PE – Partner	Aaron Denham – Partner
John Tuggle, PE, PS – Partner	Robert Hazelwood, PE, PS – Partner

Office Locations and Employees – 5 Locations / 168 Employees

Locations	Employees
Clarksburg, West Virginia	107
Charleston, West Virginia	14
Beckley, West Virginia	3
Oakland, Maryland	8
Princeton, WV (Pentree, Inc. -Affiliate Resource Eng. Group Company)	31

CORPORATE PHILOSOPHY:

Successful Projects...Repeat Clientele

Designing Practical Solutions With Exceptional Service

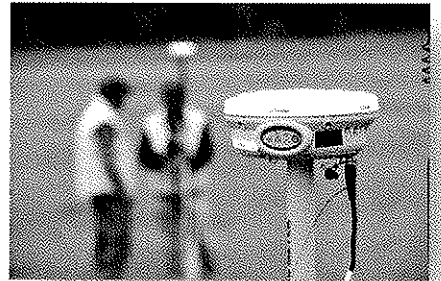
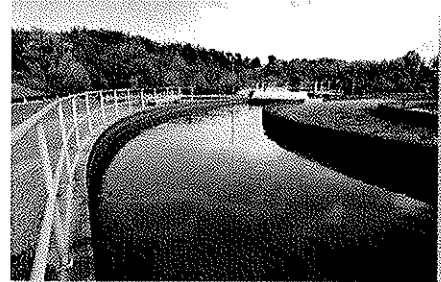
From engineering to architecture to construction monitoring and materials testing, the mission of Thrasher Engineering, Inc. is to provide innovative solutions to our clients' challenges and offer every client the highest level of service possible while adhering to principled business practices. Since 1983, that has meant a hands-on approach to each and every project. Whether it is a multi-million dollar engineering or architectural project, or a site survey for a private individual – we utilize our talent and expertise, resulting in our ongoing track record of success.

With multi-discipline capabilities, Thrasher Engineering covers all of the professional services needed to deliver successful projects to both public and private clientele. The firm's roots were planted in civil engineering and consulting services for public utility projects. Over the years, our success in that area allowed us to branch out, expanding our services to meet both the needs of our clients and the growing need for more responsive and effective solutions. Based on that success, in 2004, we added architectural design to the scope of services we provide in-house.

Disciplines practiced and areas of service include:

- **Civil Engineering**
 - *Water Treatment & Distribution*
 - *Wastewater Collection & Treatment*
 - *Land & Site Development*
 - *Roadways / Bridges / Streetscapes*
 - *Airports*
 - *Storm Water Systems*
- **Architecture**
- **Land Planning And Landscape Architecture**
- **Parks & Recreation**
- **Survey**
- **Construction Monitoring**
- **Materials Testing**
- **Environmental Services**
- **Pipeline Inspection**
- **GIS Mapping And Software Development**

By providing a full range of quality professional engineering, surveying, architectural, environmental and related field services, Thrasher has positioned itself as the leading firm in West Virginia and one of the leading firms in the Mid-Atlantic region.



FIRM PROFILE

The mission of Thrasher Engineering, Inc. is to provide innovative solutions to our clients' challenges and offer every client the highest level of service possible while adhering to principled business practices. Since 1983, that has meant a hands-on approach to each and every project. Whether it is a multi-million dollar utility or site development project, or a site survey for a private individual – we utilize our talent and expertise, resulting in our on-going track record of success.

Thrasher Engineering, Inc. provides you with the resources you need utilizing our **single source management approach**. By combining engineering, architectural, surveying, environmental, construction monitoring and materials testing staff, we have become the region's industry leader. We are able to pull together a wealth of experienced talent, bringing the best minds and proven methods to every job.

We believe in the value of cost effective and sustainable design. We also believe in responding to our clients in a timely fashion. We put these beliefs into practice on every project and with every client. That practice, and our value added service attitude is what makes Thrasher the right choice, project after project.

Professional experience from conception to completion

Successful projects require more from an engineering firm than just technical design expertise. At Thrasher, our project managers and engineers focus on all aspects of "getting the job done." Using a combination of technology and business acumen our personnel are involved in our projects to the extent requested by our clients.

- Planning
- Preliminary engineering
- Funding direction & application assistance
- Regulatory permitting
- Design and construction document preparation
- Bid documentation & process oversight
- Construction administration & monitoring
- Post construction service & on-going commitment

We understand you have a lot on the line. Thrasher has a lot on the line, as well. The success of your project is not only important to you and your community, its success is essential to us.

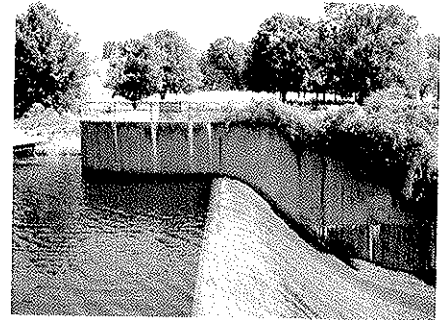
SERVICES TO MEET THE SCOPE OF THE CACAPON DAMS PROJECT

The expertise of our company is confirmed by the variety of projects successfully completed. Areas of expertise that we believe are most beneficial to the WV Division of Natural Resources, Parks and Recreation Section for the Cacapon Resort State Park Upper and Lower Dams project includes:

DAM SAFETY ENGINEERING INVESTIGATION

Thrasher's engineers have conducted dam safety (hazard classification / rehabilitation assessment) investigations on a total of 11 structures, for public and private clients. The dams investigated vary in function from single purpose structures (flood prevention or recreation) to multiple-purpose structures (flood prevention, water supply, and/or recreation).

Our objective in dam safety engineering investigation goes beyond the engineering aspects of the project; we work as a team with our clients to understand their present and future needs. With that information, we coordinate with the client to evaluate their dam and to offer the most effective solution that best suits their short and long-term goals.



Buffalo Lake Dam Spillway

Our Dam Safety Engineering Investigation Services Include:

DETERMINING EXISTING CONDITION OF DAM

By reviewing available design documentation; obtaining and recent Dam Safety Inspection (Operation and Maintenance) Reports and the current Monitoring and Emergency Action Plan (EAP); and by conducting an on-site inspection of the structure in order to establish the present condition of the dam including problems and deficiencies; and how it functions with respect to the original design purpose(s).

HAZARD CLASSIFICATION DETERMINATION

By reviewing the available structure (design) and downstream floodplain development information used to determine the present condition hazard classification, in accordance with State Dam Safety Regulations and other applicable state codes and/or regulations.

DETERMINING DAM REHABILITATION NEEDS

Using results of the hazard classification determination (above), findings and recommendations from recent State Dam Safety Inspection Reports, and on-site inspection(s) to determine rehabilitation requirements.

Our capabilities in dam safety engineering investigation and rehabilitation needs determination and recommendations include:

- Dam hydrology and hydraulic principles and procedures*
- Dam hazard classifications principles and procedures*
- Sedimentation storage requirements*
- Geologic investigations principles and procedures*
- Earth embankment and foundation design*
- Principal and auxiliary spillway design*

SITE DEVELOPMENT

Thrasher Engineering has planned, surveyed, designed and provided construction management services for over 30 site development projects for both public and private clients. Projects ranging from sites for residential housing to business and industrial parks to multi purpose "live, work and play" communities are included in our range of site development projects.

Our objective in site development engineering is to go beyond just the engineering aspect of the project; we work as a team with our clients to understand their present and future needs. With that information, we work with them to evaluate site locations that best suit their short and long- term goals.

Our Site Development Services Include:

PLANNING AND CONCEPTUAL DESIGN

Evaluation of potential sites; recommendation of most functional, most cost-effective alternative; layout of site reflecting the best use of land available; design of off-site and on-site (underground) utilities including water service, sanitary sewer service, storm drainage facilities, telephone services, electrical service, and television cable service; obtaining all permits necessary to allow construction including State Health Department for extension of water and sewer lines, WV Division of Environmental Protection Sediment and Erosion Control Permit, WV Division of Highways entrance permits, as well as any local permits required; roadway design; layout of industrial lighting; and construction management services to assure compliance with design.



GRADING PLANS

Includes development of cut and fill quantities and construction plans (showing existing and proposed contours, structures, and facilities on site) to allow for the best use of available land.

UTILITY LAYOUT/MAPPING

Includes design of utility extensions to serve existing and proposed facilities, as well as the complete mapping of existing utilities.

STORM WATER DRAINAGE / SEDIMENT AND EROSION CONTROL

Our experience includes development of Sediment and Erosion Control measures on all types of construction sites as required by the WV Division of Environmental Protection, design of drainage facilities including piping, intake structures, etc., for site stabilization and flood control.

Our staff members have considerable hydrologic and hydraulic design experience and have successfully obtained local, state, and federal erosion and sediment control permits and National Pollutant Discharge Elimination System (NPDES) permits for point source and storm water discharges.

Capabilities in the evaluation and design of storm water drainage include:

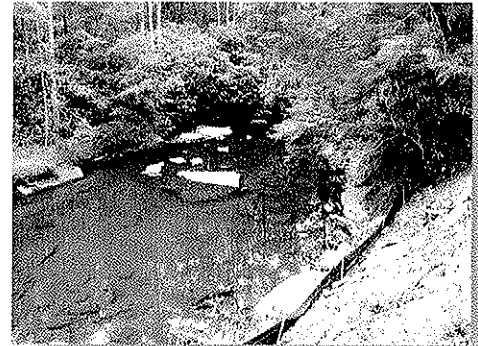
- ***Hydrology Studies / Hydrographic Mapping***
- ***Storm Water Collection Systems***
- ***Detention Ponds***
- ***Injection Wells***
- ***Underground Storage***
- ***Combined Sewer Overload (CSO) separation***

ENVIRONMENTAL REPORTING SERVICES

Thrasher Engineering offers full environmental assessment and clearance services. We have more than 18 years of experience conducting environmental/natural resource compliance consultation with West Virginia Division of Environmental Protection, (WVDEP), Federal Aviation Administration and Federal Highways Administration, US Department of Agriculture-Rural Development Utility Program, and the US Environmental Protection Agency (EPA).

Experience includes:

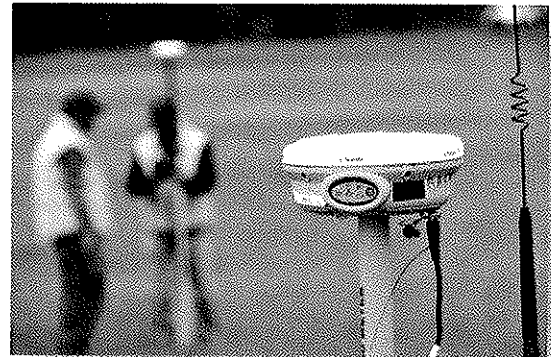
- ***Permitting Related Activities (401 and 404)***
- ***NEPA Environmental Document Preparation***
- ***Wetland Delineation and Mitigation***
- ***Rare, Threatened and Endangered Species Section 7 Informal Consultation***
- ***Rare, Threatened and Endangered Species Section 10 Habitat Conservation Plans***
- ***Water Use and Water Quality***
- ***Air and Noise Impacts, Assessments, and Controls***
- ***Soils and Geological Resources***
- ***Cultural Resources –(Sub contracted to a reputable and approved Cultural Resource Consultant)***
- ***Hazardous Materials***
- ***Sediment and Erosion Control***
- ***Consent Orders***
- ***Compliance Schedules***
- ***Site investigations***
- ***SPCC Plans, Contingency Plans, Ground Water Protection Plans and Storm Water Pollution Prevention Plans***
- ***Waste Treatment and Site Remediation***
- ***Waste Disposal***
- ***Channel Restoration***
- ***Stream Bank Stabilization***
- ***Enforcement Actions***



SURVEY

In addition to a full service professional engineering staff, Thrasher Engineering maintains a complete surveying department which includes four licensed professional land surveyors, ten full-time survey crews, CADD technicians, and office support staff.

We perform our work utilizing the most current methods and equipment available. Our survey work is accomplished using global positioning systems (GPS) and electronic distance measuring (EDM) survey stations with data gathering capabilities.



The type of surveys provided by Thrasher Engineering varies greatly as well and covers virtually all aspects of land surveying, such as:

PRE- AND POST-MINING SURVEYS

Vertical and horizontal control, inspector's report of protected structures, interior and exterior photographs, and videos. For Eastern Associated Coal Corporation, approximately 90 pre- and post-mining surveys were done in 1997. These surveys required photographs and videotaping of existing structures. Additional services performed for Eastern includes construction layout for impoundments, shaft site boundary and topographic surveys, map editing, and collection of well inventory data.

BOUNDARY SURVEYS

Verification of land owners, traverse and location of existing monuments, computations of closure, establishment of property corners, actual field stakeout, and preparation of plats and legal descriptions for property owners.

TOPOGRAPHIC SURVEYS

Location of existing features and determination of contours used in engineering layout of water distribution systems, sewer collection systems, and industrial park layouts, etc.

CONSTRUCTION LAYOUT

Providing horizontal and vertical control for contractor's use and using this information to establish construction controls.

GPS SURVEYS

Horizontal and vertical control networks

CONSTRUCTION MANAGEMENT AND INSPECTION

Thrasher Engineering knows how projects are built. We can provide the knowledgeable and experienced personnel necessary to manage the construction phase of your project. Our project managers and inspectors are experienced in all types of construction activities. From utilities, site development and storm water management to roads, bridges and airports, we apply our construction management and inspection expertise to ensure successful projects. Our construction managers and our inspectors have years of experience; many of our inspectors are certified by the West Virginia Department of Transportation / Division of Highways for roadwork and materials testing.

MATERIALS TESTING

Thrasher Engineering's Materials Testing Department is capable of performing a wide range of field and laboratory tests. Our laboratory at our Clarksburg, WV office is one of only three nationally certified facilities in the State of West Virginia. Additionally, our engineers and technicians who perform tests both in the field and in the lab are also certified by the State. Services Include:

- *Concrete Testing and Inspection*
- *Soil Testing and Inspection*
- *Aggregate Testing and Inspection*
- *Mortar and Grout*
- *Asphalt*
- *Paint Coatings*
- *Sprayed-on Fireproofing*
- *Subsidence Inspecting*
- *Caisson and Piling Inspection*



EQUIPMENT AND SOFTWARE

Our staff uses state-of-the-art software for engineering dam safety investigations and for the design of dam modifications. Software includes the Natural Resources Conservation Service SITES computer program, which can be used to evaluate dam stability design (auxiliary spillway), and freeboard capacity (top of dam elevation), using precipitation and runoff input. In addition, our engineers use HEC-HMS 2.2.2 to perform dam break (breach failure) analyses and estimates of downstream discharges; HEC-RAS 3.1.3, which is used to determine water surface profile elevations in the flood inundated area downstream of the breached dam; Quickwall 5.4, a structural design program for use in retaining wall analysis and design; and the Intelisolve Hydraflow Hydrographs program, which is a derivative of the NRCS TR-55 program, for determining watershed hydrology and hydraulics.

We have one of the largest networks of computer aided design (CAD) equipment, software and trained personnel in the State of West Virginia.

AutoCAD Land Desktop 2008 and Microstation V8 software is utilized at 48 CAD stations within the Group. Additionally, our equipment includes 10 large format (size E) plotters and 5 large format plotter / scanners.

CAD plans are prepared by both dedicated CAD employees and by staff engineers and engineering technicians in each of the firm's offices. This equipment allows our design department to perform accurate work quickly and efficiently. All departments have the capability to electronically transmit data to clients requesting this service. This blend of experienced personnel utilizing modern equipment results in successful projects and satisfied clients

FIRM MANAGEMENT AND PROJECT STAFFING

Thrasher Engineering offers the largest engineering staff in the State of West Virginia. The expertise of the Thrasher Engineering staff is a combination of education and experience; it is reflected in all aspects of our services. The firm is led by a talented group of principals and partners who are dedicated to the success of our projects and the satisfaction of our clients.

FIRM OFFICERS AND PARTNERS

H. Wood Thrasher, P.E. - President	Administration
Kenneth P. Moran, P.E. - Vice-President	Chief Engineer
Wm. Randy Watson	Public Utilities
Chadwick Biller, P.E.	Site Development / Highways/Airports
Chad Riley, P.E.	Site Development
Clay P. Riley, P.E.	Public Utilities
Daniel E. Ferrell, P.E.	Public Utilities
Aaron Denham	Survey/Construction Monitoring /Materials Testing

H. Wood "Woody" Thrasher, P.E. President of Thrasher Engineering, Inc. graduated from West Virginia University in 1977 with a degree in Civil Engineering. Since that time, he has utilized his engineering skills and entrepreneurial spirit to build Thrasher Engineering, Inc. into West Virginia's largest civil and consulting engineering firm. Mr. Thrasher has extensive experience in all aspects of the engineering process, with emphasis on management and administration of multi-million dollar projects including funding and regulatory issues. Mr. Thrasher forms and supervises multi-project design teams and conducts client needs assessments.

Kenneth P. Moran, P.E. is Vice-President and Chief Engineer. Mr. Moran has 24 years of experience in civil engineering. He provides project management and technical review for both site development and public utilities projects. A graduate of Fairmont State University, Mr. Moran is a registered Professional Engineer (P.E.) in addition to a registered Professional Land Surveyor (P.S).

Public utilities system projects are the responsibility of **Wm. Randall Watson**. A graduate of Fairmont State University, Mr. Watson joined Thrasher Engineering in 1984 and is a firm partner.

Clay P. Riley, P.E., also a firm partner, is involved in both water and sanitary sewer utilities projects. He is a graduate of the West Virginia University College of Engineering.

Daniel E. Ferrell, P.E. is a graduate of West Virginia University and received his Master of Science Degree in Civil Engineering from Old Dominion University. He also is responsible for public utilities projects.

Chadwick Biller, P.E. and **Chad M. Riley P.E.** are senior managers of the company involved in site development projects. Mr. Riley is a graduate engineer from Fairmont State University and supervises site development projects. Mr. Biller received his engineering degree from West Virginia University. He is responsible for highways, roads, bridges and airport projects, in addition to site development.

Aaron Denham joined Thrasher Engineering in 2000 and serves as Manager of all Construction Inspection and Materials Testing projects for the firm. Mr. Denham is responsible for all construction

inspection for water, sewer, site development, and WVDOH projects, and the daily activities of the materials testing department for highway, airport, site development, structural and public utilities projects.

PROJECT TEAM

Thrasher Engineering has assigned a team of experienced professionals to the Cacapon Upper and Lower Dams project.

Chadwick D. Biller, P.E. will be the **Principal-in-Charge**. His role in this project will be to oversee all contractual aspects of the project with the DNR. Mr. Biller is a Partner in Thrasher Engineering, Inc. and manages site development projects, many of which include remediation, soil and erosion control and drainage aspects.

Jeffrey L. Gola, P.E., will serve as **Project Manager and Engineer**, in addition to design aspects of the project. He will work closely with the Division of Natural Resources Parks and Recreation office to ensure timeliness, client satisfaction and will oversee budgetary aspects. Mr. Gola's experience includes conducting a dam safety inspection and assessment, and development of a rehabilitation plan and Monitoring and Emergency Action Plan (EAP) for Buffalo Lake Dam (WV03305). The rehabilitation plans, specifications, and EAP were subsequently reviewed and approved by the West Virginia Department of Environmental Protection, pending completion of legal advertisement requirements. In addition, he has performed a safety inspection and developed an EAP for the Mannington Water Supply Dam (WV04921). He has also planned drainage design projects for site development as well as numerous projects for the West Virginia Department of Highways. Additionally, Mr. Gola is trained and experienced in hydrology and hydraulics.

Wes Morrow, Project Engineer will be responsible for design of the projects. Mr. Morrow, who graduated from West Virginia University with a degree in civil engineering, joined Thrasher Engineering, Inc. in 2007, following 30 years with the National Resources Conservation Service (NRCS), where he served as Planning Engineer, Design Engineer, State Design Engineer, and Aging Dam Rehabilitation Assessment Project Team Leader. His experience focused primarily on the planning and design of federally funded Public Law-566 flood control dams and channel modifications, and conducting rehabilitation assessments of aging NRCS dams and preparation of assessment reports for the NRCS Aging Dam Rehabilitation Program in West Virginia. Mr. Morrow's technical background includes extensive experience in dam and channel hydrology and hydraulics, geologic investigations, sedimentation storage requirements, principal and auxiliary spillway performance, embankment and foundation stability, quantity and cost estimates, development of contract specifications and construction drawings, and contract documentation.

Field services aspects of the project – survey, construction monitoring and materials testing will be under the direction of **Aaron Denham**.

Resumes for these individuals follow.

CHADWICK D. BILLER, P.E. – PARTNER / PRINCIPAL IN CHARGE

QUALIFICATIONS SUMMARY

Chad Biller has experience in all aspects of engineering. His primary emphasis has been on highways, roads, bridges and airports. Chad joined Thrasher Engineering, Inc. in 1999 and is a partner of Thrasher Engineering. Chad is also responsible for managing the survey department in Thrashers field services division. Chad manages and designs the following disciplines:

- *Manage and design engineering projects for the WVDOH. The projects included 4 lane divided highways, bridges, 2-lane roads and road widening projects.*
- *Site Development projects for private and public clients. These projects included mass grading, roads, drainage, storm water management, erosion and sediment control and numerous regulatory permitting activities.*
- *Airport Engineer for North Central WV Airport. Involved in the day to day and long term upgrades of the airport to promote safety and develop airport properties.*
- *Responsible for managing 7 full time survey crews. Responsibilities include cost estimating, scheduling and supervision of 30 employees.*

EDUCATION

- *B.S., Civil Engineering – West Virginia University, 1992*

CERTIFICATIONS

- *Registered Professional Engineer (PE), State of West Virginia #13620*
- *Registered Professional Engineer (PE), State of Pennsylvania #PE056012E*
- *Registered Professional Engineer (PE), State of Ohio #64594*
- *American Society of Civil Engineers*
- *American Society of Highway Engineers*
- *Member of the Taylor County Economic Development Authority*

REPRESENTATIVE PROJECT EXPERIENCE

- *WVDOH Indian Fork: Two span steel beam bridge 127 feet long in Gilmer County, West Virginia. Design of a bridge structure and roadway approaches.*
- *WVDOH Jakes Run: Single span steel girder bridge 95 feet long. Design consisted of a bridge, roadway approaches, detour road, water line relocation, and right-way-plans.*
- *WVDOH Corley Bridge and Little Grassy Creek Box Beam Bridge: Single concrete box beam bridges. Provided the construction plans for the bridge, road approaches, and rights-of-way plans.*
- *WVDOH Orlando Bridge: Single concrete box beam bridge with approximately 1000 linear feet of roadway realignment. Provided the construction plans for the bridge, road realignment, and rights-of-way plans.*
- *WVDOH Corridor H – Davis to Bismarck: Design of over 2 miles of a 4-lane divided highway, including an additional 1.5 miles of secondary roads. The project also includes a three span bridge spanning Corridor H and a set of twin mainline bridges spanning a secondary road.*

- *Three Forks Bridge: Complete design of a three span steel girder bridge 325 feet long. The purpose of the bridge was to provide access for a new mining facility owned by the International Coal Group. The bridge had to span both a stream and railroad tracks.*
- *City of Salem Slip Repairs: The goal of the project was to repair two slip areas that occurred below a city street and above some residential structures. The problem areas were investigated by a geotech engineer. Based on site conditions and funds, the most efficient method to correct the problems were to use gabion walls.*
- *City of Ripley, Main Street Revitalization: Took all of the existing overhead utility lines along Main Street and put them underground in conduit. The project involved direct coordination with the utility companies to ensure they had the necessary number, size, and location of conduit. Beyond the utilities, the Main Street was designed with new sidewalks that incorporated brick pavers, hand railing, decorative street lights, and handicap ramps.*
- *City of Ripley Safe Routes to School Sidewalks: Designed 1,000 feet of sidewalk along with drainage improvements. Worked with the city as they used their own work force to construct the project.*
- *Raleigh County Memorial Airport Industrial Park: Originally designed the roadway and drainage for a 100 acre industrial park and then continued with the design of a 1,100 linear foot road extension in the park. The project included a detailed erosion and sediment control plan.*
- *Benedum Airport Authority: Provided a grading, drainage, and erosion and sediment control package for improving the North Central WV Airport runway safety area approach slopes. The project is now proceeding to the design of an 800 foot runway extension.*
- *Mid-Atlantic Aerospace Complex: Design of approximately 5,400 linear feet of a storm water system and a detention pond. The proposed system will provided drainage infrastructure for future development along an existing airport taxiway.*

QUALIFICATIONS SUMMARY

Mr. Gola joined Thrasher Engineering in 1998 and serves as Project Manager/Engineer on Highway Projects, Community Improvement Projects, and Commercial Site Development Projects. He is experienced in all aspects of the project control, from design and drafting to the bidding process to the over site of the construction inspection. Specialties include:

- *Highway Engineering: planning and design of roadways and sidewalks.*
- *Structural Engineering: design of bridges, retaining walls, and utility plant structures/demolition plans*
- *Site/Land Development: design of roads, drainage, storm water manager, erosion and sediment control and numerous regulatory permitting activities.*
- *Hydrology and Hydraulic Engineering: stream modeling and dam break analysis.*

EDUCATION

- *B.S. Civil Engineering, – West Virginia University, Summa Cum Laude, 1998*

CERTIFICATIONS

- *Registered Professional Engineer (PE), State of West Virginia #15621*
- *Registered Professional Engineer (PE), State of Maryland #33492*
- *American Society of Civil Engineers*
- *American Society of Highway Engineers*
- *City of Mannington Code Enforcement Appeal Board*

RELATED PRIOR EXPERIENCE

- *Buffalo Lake Dam Improvements: Provided a dam break analysis of the existing dam to provide a report on improvements that would be needed to bring the dam within compliance with the WV Dam Safety Act. The procedure included determining the hazard class of the dam and compiling plans that would enable the dam to be brought up to the latest standards. During the project we were able to form a close working relationship with WVDEP Dam Safety Section*
- *Harrison County BOE, Liberty H.S. Athletic Facility: Worked with school booster club and members of the board of education to provide project plans to construct an soccer, track, and football facility on campus of Liberty High School. The design includes the parking, access roads, field house, bleachers, fielding lighting, track, and a practice field.*
- *Fairmont State University, Athletic Field Improvement: The goal of the design was to provide grading and the aggregate sub base for the installation of field turf. The field turf was to be installed on both the main football field and softball field. The design included a retaining wall, drainage structure, and a new access road to the fields. The biggest obstacle for the project was that the contract had to be designed and built before the first football game. Having not started the design until late spring, we were still able to competitively bid and award the contract and work with the contractor to meet the deadline.*
- *Fairmont State University, Engineering Technology Building: For this project we were working with the architect who was renovating the existing technology building on campus. Our portion of the job was to provide grading and utility plans for the renovation. As the plans progressed, the owner decided to*

- include a retaining wall. The wall was designed as a segmental block wall which had grating that spanned between the wall and the proposed building.
- *Old Bridgeport Hill Drainage* was a WVDOH project the consists of designing approximately 6000 linear feet of drainage pipe ranging in size from 36" diameter to a 10'x10' box culvert. The new storm system was shallower than the existing to eliminate disturbance of surrounding structure and to aid in future maintenance. However the existing system was left in place and eventually tied into the new system downstream near the outlet. This assured that any unknown existing outlet would still function. The storm system had to be designed around existing structure and utilities and we had to coordinate with the WVDEP to size the system to handle a mine reclamation project they were going to perform in the area.
 - *McDonald's Drainage, Bridgeport, WV:* As client primarily of the McDonald's Corporation along with Tri-City Foods Corporation, a drainage study was complete to replace a deteriorated 24" diameter pipe that was approximately 30' below the ground in some locations. The goal was to install new 30" storm pipe at a much shallower depth and tie all existing structures into the system. The system had to be installed per the City of Bridgeport standard and once complete would be owned by the city.
 - *WVDOH Indian Fork:* Two span steel beam bridge 127 feet long in Gilmer County West Virginia. Design of a bridge structure and roadway approaches. A Hec-Ras analysis was performed to determine stream water elevations. The bridge is unique in that the steel girders were simple supported made composite.
 - *WVDOH Jakes Run:* Single span steel girder bridge 95 feet long. Design consisted of a bridge, roadway approaches, detour road, waterline relocation, and right-way-plans.
 - *WVDOH Corley Bridge and Little Grassy Creek Box Beam Bridge:* Single concrete box beam bridges. Provided the construction plans for the bridge, road approaches, and right of way plans. The stream was modeled to provide stream elevations for different storm events. Worked directly under the WVDOH District 7 bridge engineer to provide plans in shorten time frame of 3 months.
 - *WVDOH Orlando Bridge:* Single concrete box beam bridge with approximately 1000 linear feet of roadway realignment. Provided the construction plans for the bridge, road realignment, and right of way plans. The stream was modeled to provide stream elevations for different storm events. Worked directly under the WVDOH District 7 bridge engineer.
 - *WVDOH Corridor H – Davis to Bismarck:* Design of over 2 miles of a four-lane divided highway, including an additional 1.5 miles of secondary roads. The project also includes a three span bridge spanning Corridor H and a set of twin mainline bridges spanning a secondary road.
 - *Three Forks Bridge:* Complete design of a three span steel girder bridge 325 feet long. The purpose of the bridge was to provide access for a new mining facility owned by the International Coal Group. Bridge had to span both a stream and railroad tracks.
 - *City of Salem Slip Repairs:* The goal of the project was to repair two slip areas that occurred below a city street and above some residential structures. The problem areas were investigated by a geotech engineer. Based on site conditions and funds, the most efficient method to correct the problems were to use gabion walls.
 - *City of Clarksburg Slip Repairs:* The goal of the project was to repair two slip areas within the city. One repair involved designing a segmental retaining wall at playground. The area included a design of a soldier pile wall with concrete lagging.

WYNARD "WES" MORROW – PROJECT ENGINEER

QUALIFICATIONS SUMMARY

Mr. Morrow joined Thrasher Engineering Inc. (TEI) in 2007 and serves as Project Engineer for planning and design of flood control projects including impoundments (single and multiple purpose dams), stream channel modifications (stabilization and/or increased capacity), and nonstructural measures (floodplain acquisition, relocation, flood - proofing, and flood warning systems). Mr. Morrow also serves as Project Engineer for the planning and design of sanitary sewer rehabilitation projects and development of Long Term Control Plans for small community combined sewer overflow control projects. Prior to joining TEI, Mr. Morrow worked for the United States Department of Agriculture's Natural Resources Conservation Service (NRCS) and Soil Conservation Service (SCS), West Virginia University, and United States Armed Forces. Positions held include:

- *Project Engineer – TEI*
- *State Design Engineer – NRCS (Head, Design Unit)*
- *Design Engineer – NRCS*
- *Civil Engineer – NRCS/SCS*
- *Planning Engineer – SCS*
- *Instructor/Coach – West Virginia University (College of Physical Activity and Sports Science)*
- *U.S. Army Commissioned Officer (1st Lieutenant: Combat Engineer, Paratrooper – 82nd Airborne Division and 18th Airborne Corps)*

EDUCATION

- *B.S. Civil Engineering – West Virginia University*
- *U.S. Army Officer Candidate School – Commissioned Officer (Branch: Corps of Engineers)*
- *Moniteur d'Armes – United States Fencing Coaches Association*

AFFILIATIONS

- *American Society of Civil Engineers (past member)*
- *United States Fencing Association*

PUBLICATIONS

- *Co-author; "Planning Non-Structural Measures in West Virginia", US Department of Agriculture SCS – West Virginia Engineering Guide*

REPRESENTATIVE PROJECT EXPERIENCE

- *NRCS Aging Dam Rehabilitation Program: led interdisciplinary team of NRCS specialist with the prioritization, assessment, and evaluation of aging dams and preparation of Rehabilitation Assessment Reports, as requested by sponsoring local organizations in West Virginia. The evaluation/assessment process involved reviewing available design data, conducting field reviews of each dam and its appurtenant structures, and use of the ARS/NRCS-SITES computer program to evaluate dam structural stability and integrity during passage of 100 percent of the probable maximum precipitation event without overtopping the dam. Results of the evaluations (which were documented in Rehabilitation Assessment Reports) included determination of hazard classification, total failure index, population at risk, and total risk index. Dams evaluated include:*

- *Brush Creek Sites 7A and 19A, located in Mercer County, WV*
- *Upper Deckers Creek Sites 1, 4, and 6, located in Preston County, WV*
- *Patterson Creek Sites 14, 46, and 49, located in Mineral and Grant Counties, WV*
- *New Creek Sites 14 and 16, located in Grant County, WV*

- *Barbour County Water Resources Study: Phase I – evaluated potential dam sites to serve as a reserve water supply source for the City of Philippi. Developed preliminary design of seven (7) potential sites: to include watershed and site hydrology and hydraulics; site (embankment and auxiliary spillway) layout; flood, water supply, and sediment storage requirements; embankment template configuration; sizing of principal spillway components (inlet riser, principal spillway pipe, outlet/energy dissipater). Used the ARS/NRCS-SITES computer program to develop principal and auxiliary spillway hydraulic performance ratings curves, performed embankment and auxiliary spillway integrity and stability analysis; and developed quantity and cost estimates.*

- *Barbour County Water Resources Study: Phase II – developed dam site geologic foundation investigation plan (layout and investigation parameters) for the selected site; developed investigation protocol for determination of storage capacity for the City of Belington’s existing water supply impoundment (Mill Creek Dam).*

- *WVDEP (Dam Safety Division) Annual Safety Inspections: assisted with annual dam safety inspections for the City of Salem and Town of Lumberport water supply dams.*

- *USDA NRCS/SCS Emergency Watershed Protection Program (EWP): served on numerous NRCS/SCS EWP Damage Survey Teams to assess damage caused by severe flooding events throughout West Virginia (1985, 1995, 1996, and 2001). Determined if flood damaged areas qualified for federal assistance:*
 - *Identified and ranked potential EWP sites as exigency or non-exigency projects, in accordance with national program policy and criteria*
 - *Insured consistency in application of EWP national program policy across county and conservation district boundaries*
 - *Developed preliminary and final designs, contract drawings, construction specifications, and cost estimates for EWP projects*
 - *Served as the Contracting Officer’s Technical Representative for oversight of EWP project contracts*
 - *Served as Project Engineer for construction of EWP projects*

- *USDA NRCS/SCS - Civil/Planning Engineer: conducted preliminary investigation studies, developed preliminary engineering reports, final work plans and environmental impact statements for the investigation of potential Public Law -566 projects. The planning process involved:*
- *Problem and opportunity identification – researched available records from federal, state, and local units of government; local businesses and local residents regarding economic flood damages (historical flooding, rainfall event intensity and frequency, number of properties impacted, loss of life); defining high and low hazard zones in flood prone areas; inventory and forecasting of present and future resources (area economics, socioeconomic projections, and land uses)*
- *Formulation of alternatives:*
 - *Structural – dams, stream channel modification (see Design Engineer, below)*
 - *Nonstructural flood reduction measures – floodplain acquisition, relocation of structures from flood prone areas, flood proofing of structures in the floodplain, installation of early flood warning systems*
- *Development of nonstructural flood reduction alternatives: National Economic Development (NED) Plan – formulated to maximize net economic benefits by reducing flooding damages:*
 - *Develop project installation cost; average annual cost (amortized over the project life)*
 - *Determine benefits – flood damage reduction and other incidental benefits*

- *Determine benefit/cost ration for each alternative*
 - *Select recommended plan*
- **Projects:**
- *Howard Creek Watershed – flood retarding/recreation dam Site 1; White Sulphur Springs, Greenbrier County, WV*
 - *Upper Mud River Watershed – flood retarding/recreation dam Site 2A; Hamlin, Lincoln County, WV*
 - *Wheeling Creek Watershed – flood retarding/recreation dam Site 3A; Elm Grove, Marshall County, WV*
 - *Howard Creek Watershed – stream channel modification; White Sulphur Springs, Greenbrier County, WV*
 - *Piney Creek Watershed – (Cranberry Creek, Little Whitestick Creek, and Soak Creek); Beckley, Raleigh County, WV*
 - *Upper Buffalo Creek Watershed – flood control channel modification; Mannington, Marion County, WV*
 - *Lower Mud River Watershed – flood control channel modification; Milton, Cabell County, WV*
 - *Evitt’s Run Watershed – flood control channel modification; Inwood, Berkley County, WV*
 - *Pleasant Valley Watershed – flood control channel modification – Local Implementation Plan; Pleasant Valley, Marion County, WV*
- *Design Engineer (NRCS Design Unit): designed PL-566 flood control measures including dams, stream channel modifications, non-structural flood reduction measures, and EWP protection projects throughout West Virginia. Specific projects designed include:*
 - *Howard Creek Site 12 - flood prevention dam located in Greenbrier County, WV.*
 - *Performed dam hydrology and hydraulics evaluation using the NRCS TR-48 (DAMS2) program, embankment and foundation design; developed site layout, quantities, cost estimates, contract specifications, directed development of construction drawings, and provided technical assistance during construction of the dam.*
 - *Wheeling Creek Site 3 – flood prevention dam located in Marshall County, WV. Performed dam hydrology and hydraulics evaluation, embankment and foundation design; developed contract specifications, and provided technical assistance during construction of the dam.*
 - *Howard Creek Channel, located in Greenbrier County, WV. Served as the NRCS Contracting Officer’s Technical Representative to provide Agency technical oversight for a consulting engineering firm under contract to NRCS to design flood control channel work for the protection of the City of White Sulphur Springs, WV. Review of all design submittals and billing invoices; made recommendations to the CO concerning acceptance/corrections/rejection of design submittals, contract modifications, and the accuracy and justification for payment invoices.*
 - *WVDEP (Dam Safety Division) Annual Safety Inspections: assisted with annual dam safety inspections and report preparation for the City of Salem and Town of Lumberport water supply dams.*
 - *Tennerton Public Service District - Phase III Sanitary Sewer Extension: developed preliminary design layout for a proposed service extension.*
 - *State Design Engineer: supervised and provided technical guidance to a staff of three civil engineer, three civil engineering technicians, and a NRCS Earth Team volunteer ; designed and reviewed PL-566 flood control measures including earth/rock fill dams, stream channel modifications, non-structural flood reduction measures, and EWP projects throughout West Virginia.*

AARON W. DENHAM – PARTNER / GENERAL MANAGER MATERIALS TESTING AND INSPECTION

QUALIFICATIONS SUMMARY

Mr. Denham joined Thrasher Engineering in 2000 and serves as Manager of all Construction Inspection and Materials Testing projects for the firm. Mr. Denham is responsible for all construction inspection for water, sewer, site development, and WVDOH projects, and the daily activities of the materials testing department for highway, airport, site development, structural and public utilities projects.

EDUCATION

- *B.S. Civil Engineering Technology, 1999 – Fairmont State University*

CERTIFICATIONS

- *Fairmont State University Level V Certification – Transportation Engineering Technologist – Engineering Specialization*
- *WVDOH Compaction Inspector*
- *WVDOH Concrete Inspector/Technician*
- *WVDOH Aggregate Sampling Inspector*
- *WVDOH Aggregate Technician/Inspector*
- *WVDOH Bituminous Inspector/Technician*
- *WVDOH Radiation Safety*
- *Troxler Basic Safety – Nuclear Compaction Gauge*

AFFILIATIONS

- *ASHE – American Society of Highway Engineers*

REPRESENTATIVE PROJECT EXPERIENCE

- ❑ *WV National Cemetery Expansion – Grafton, WV [Project Representative]: Performed inspection on the daily activities of the general contractor and all sub-contractors pertaining to the new construction of fifteen (15) acres of future burial sites, and one (1) mile of roads. Inspected a twenty (20) foot high and 1,200 foot long segmental retaining wall, installation of concrete crypts, cut and fill of the four (4) future burial sites. Additional duties included submittals, pay estimates, and as-builts. Construction began and ended in 2002.*
- ❑ *Fairmont State University (Parking Garage, Bryant Place Dormitory, Campus Renovations, Engineering Building Addition, and Falcon Center) [Materials Testing Technician]: Responsibilities included materials testing and inspection of all material used in the construction all the renovations and new construction for Fairmont State University. Performed compaction testing, with nuclear gauge, on soils, stone, and asphalt, tested concrete for air content, slump, temperature, and compressive strength of cylinders, mortar cubes and grout prisms; rebar inspection, and fireproofing testing which included density and thickness. (Robert Kelley, KC Craddock, Steve Harman, and Steve Wright)*
- ❑ *West Virginia Division of Highways – Appalachian Corridor H 0.57 miles North of CR 1 & CR 3/3 I/S to 1.6 miles West of CR 3 in Grant County [Project Manager]: Responsible for completing fee proposal*

for construction inspection, quality assurance, and surveying. Building a construction inspection team, which meets WVDOH qualifications, and assigning them to the project as requested by the WVDOH. Weekly on-site visits to the project to oversee the inspection duties, and interaction with WVDOH construction engineer. Review of all invoices for submittal to WVDOH. Construction cost was \$54.8 million, and construction began in August 2008 and completion is September 2010. (Will Kump, Bill Swaim, Steve Haynes, Shawn Jack, Steve Wright, and Steve Harman)

- ❑ **Jackson County Airport Taxiway Widening [Materials Testing Technician]:** Performed materials testing on fill material used for the taxiway widening. Duties included laboratory testing of soil material for compaction curve and classification, on-site compaction testing of soil fill by nuclear gauge method and sand cone method, and tested concrete for air content, slump, temperature, and compressive strength of cylinders. Construction duration was from 2002 to 2003. (Robert Kelley)
- ❑ **Walgreens - Grafton, WV and Oakland, MD [Project Manager]:** Responsibilities including reviewing asphalt and concrete mix designs. Coordinating with contractor on assigning field technicians and any special testing. Reviewing field technician's daily reports, field testing reports, and all laboratory testing results before being submitted to owner. Construction for the Grafton Walgreens was from 2008 to 2009, Oakland Walgreens was from October 2008 to November 2009. (KC Craddock, Andy Kincell, Matt Watson, Michael Sanders, Jared Woofter)
- ❑ **Blanchette Rockefeller Neuroscience Institute – Morgantown, WV [Project Manager]** Responsibilities including reviewing asphalt and concrete mix designs. Coordinating with contractor on assigning field technicians and any special testing. Reviewing field technician's daily reports, field testing reports, and all laboratory testing results before being submitted to owner. Construction began May 2006 and completed September 2007. Construction cost was \$35 million. (KC Craddock and Michael Sanders)
- ❑ **Bio Medical Research Facility – Morgantown, WV [Project Manager]:** Responsibilities including reviewing asphalt and concrete mix designs. Coordinating with contractor on assigning field technicians and any special testing. Reviewing field technician's daily reports, field testing reports, and all laboratory testing results before being submitted to owner. Construction began July 2006 and completed October 2007. Construction cost was \$30 million. (KC Craddock and Michael Sanders)
- ❑ **Mon General Hospital Hazel Ruby McQuain Tower – Morgantown, WV [Project Manager]:** Responsibilities including reviewing asphalt and concrete mix designs. Coordinating with contractor on assigning field technicians and any special testing. Reviewing field technician's daily reports, field testing reports, and all laboratory testing results before being submitted to owner. Construction began September 2006 and completed August 2008. Construction cost was \$90 million. (KC Craddock)
- ❑ **West Virginia University Cancer Center – Morgantown, WV [Project Manager]:** Responsibilities including reviewing asphalt and concrete mix designs. Coordinating with contractor on assigning field technicians and any special testing. Reviewing field technician's daily reports, field testing reports, and all laboratory testing results before being submitted to owner. Construction began March 2007 and completed May 2008. Construction cost was \$18 million. (KC Craddock)
- ❑ **West Virginia University Alumni Center – Morgantown, WV [Project Manager]:** Responsibilities including reviewing asphalt and concrete mix designs. Coordinating with contractor on assigning field technicians and any special testing. Reviewing field technician's daily reports, field testing reports, and all laboratory testing results before being submitted to owner. Construction began September 2007 and completed July 2008. Construction cost was \$20 million. (KC Craddock)
- ❑ **Health Science Learning Center – Morgantown, WV [Project Manager]:** Responsibilities including reviewing asphalt and concrete mix designs. Coordinating with contractor on assigning field technicians and any special testing. Reviewing field technician's daily reports, field testing reports, and all laboratory testing results before being submitted to owner. Construction began May 2005 and completed May 2006. Construction cost was \$12 million. (KC Craddock, Steve Wright and Robert Kelley)
- ❑ **Ruby Memorial Hospital NE Addition – Morgantown, WV [Project Manager]:** Responsibilities including reviewing asphalt and concrete mix designs. Coordinating with contractor on assigning field technicians and any special testing. Reviewing field technician's daily reports, field testing reports, and

all laboratory testing results before being submitted to owner. Construction began January 2004 and completed May 2005. Construction cost was \$70 million. (KC Craddock, Steve Wright and Robert Kelley)

- ❑ *Mountaineer Challenge Academy – Camp Dawson, WV [Project Manager]: Responsibilities including reviewing asphalt and concrete mix designs. Coordinating with contractor on assigning field technicians and any special testing. Reviewing field technician’s daily reports, field testing reports, and all laboratory testing results before being submitted to owner. Construction began September 2007 and completed January 2010. (KC Craddock, Steve Wright, Michael Sanders, Jared Woofter and Robert Kelley)*
- ❑ *Rubenstein Center for Youth – Davis, WV [Project Manager]: Responsibilities including reviewing asphalt and concrete mix designs. Coordinating with contractor on assigning field technicians and any special testing. Reviewing field technician’s daily reports, field testing reports, and all laboratory testing results before being submitted to owner. (Jared Woofter)*
- ❑ *Glenville State College Dormitory – Morgantown, WV [Project Manager]: Responsibilities including reviewing asphalt and concrete mix designs. Coordinating with contractor on assigning field technicians and any special testing. Reviewing field technician’s daily reports, field testing reports, and all laboratory testing results before being submitted to owner. Construction began October 2009 and completed May 2011. Construction cost was \$100 million. (Patrick Shaver)*

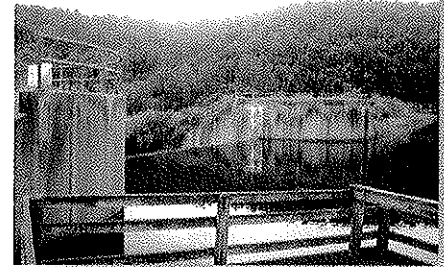
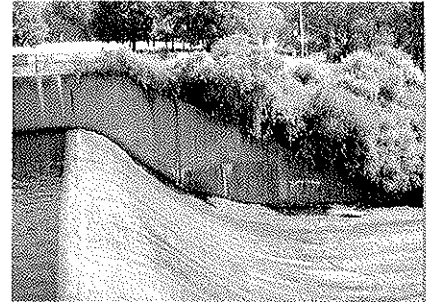
RELATED PRIOR EXPERIENCE

The Thrasher Engineering team offers significant experience in aging dam assessments and development of alternatives for rehabilitation plans. The following section contains examples of our experience in each of these areas as related to the development and implementation of a rehabilitation plan for the Cacapon Upper and Lower Dams project.

BUFFALO LAKE DAM

Thrasher Engineering, Inc. conducted a dam safety inspection and rehabilitation assessment, and development of a rehabilitation plan and Monitoring and Emergency Action Plan (EAP) for the Buffalo Lake Dam (WV03305).

Buffalo Creek Reservoir was originally designed and constructed during the late 1950's as a domestic water supply source for the Clarksburg Water Board. Our assessment determined that the lake had a normal pool elevation of 1018.5, covering a surface area of approximately 55 acres, with a storage capacity of 903 acre-ft. Although the maximum elevation of flow through the spillway could reach an elevation of 1028.5 ft., the top of dam elevation was only 1028.0. At maximum elevation, the pool surface area was 82.3 acres with a storage capacity of 1579 acre-ft. The spillway (ogee spillway) had a crest elevation of 1018.5 ft. with an 85 ft bottom width. Based off of the dimensions of the existing spillway, the approach depth was 10 ft. in height and had a design head of approximately 10 ft. Flow from the spillway travels down Buffalo Creek, under US Rt. 19 to its confluence with the West Fork River.



Our watershed hydrology and dam/spillway hydraulics analysis determined that the existing dam would only pass 58% of a PMP/6 hour design storm; therefore modifications to the existing dam/spillway would have to be made to safely pass the 70% PMP/6 hour design storm. In order to achieve that goal, TEI determined that the most efficient and economical solution would be to raise the dam to elevation and spillway to elevation 1031.0. To achieve the required height a concrete retaining wall would be installed along the top of the existing dam and spillway. The impoundment of additional water will not affect any existing structure or roadways upstream of the dam that were not previously disturbed by the original dam impoundment.

The rehabilitation plans, specifications, and EAP were subsequently reviewed and approved by the West Virginia Department of Environmental Protection, pending completion of legal advertisement requirements.

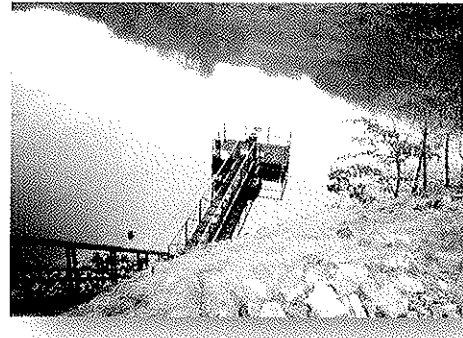
Thrasher Engineering, Inc.'s scope of services for the project included:

- ***Confirming structural dimensions and elevations of the existing spillway, surveying hydrology/hydraulic cross sections of the outlet channel and floodplain from the dam downstream to the confluence with the West Fork River,***
- ***Developing PMP storm parameters***
- ***Setting up the watershed hydraulic model in the HEC-RAS program and performing the hydraulic analysis to determine the dam hazard classification***
- ***Defining classification and providing additional analysis***
- ***Performed dam break analysis to determine recommendations for development and implementation of an emergency action plan***
- ***Performed a slope stability analysis of the proposed rehabilitated dam***

- *Developed a dam rehabilitation plan that would bring the dam into compliance with WV State Dam Safety Regulations*
- *Developed final design, cost estimate, and construction plans*
- *Providing final report to DEP with geo-technical data and construction plans for approval.*

MANNINGTON WATER SUPPLY DAM – HUEYS RUN

Thrasher Engineering, Inc. performed a safety inspection and developed an EAP for the Mannington Water Supply Dam (WV04921).



**TYGARTS VALLEY CONSERVATION DISTRICT
(WATER SUPPLY DAM) – PROJECT ENGINEER**

Thrasher was contracted by the Tygarts Valley Conservation District (TVCD) to perform an engineering assessment (Phase – 1 of the Barbour County Water Resources Study) of potential dam sites in the immediate vicinity of Philippi, WV to serve as a supplemental source of drinking water for Philippi and the Barbour County area that it serves. Seven dam-sites were initially evaluated; however, only one (Little Laurel Run) meet all of the requirements of the TVCD. Major components of the engineering assessment for each site included development of watershed hydrology and hydraulics, impoundment sediment and water supply storage capacities, and determination of hazard classification. Mr. Morrow, who served as Project Engineer for the engineering assessment utilized the NRCS SITES computer program and NRCS Technical Release – 60 (TR-60) to evaluate each dam. The assessment investigation, findings, and recommendation, and preliminary quantity and costs estimates were presented to the TVCD in the Phase – 1 Report.

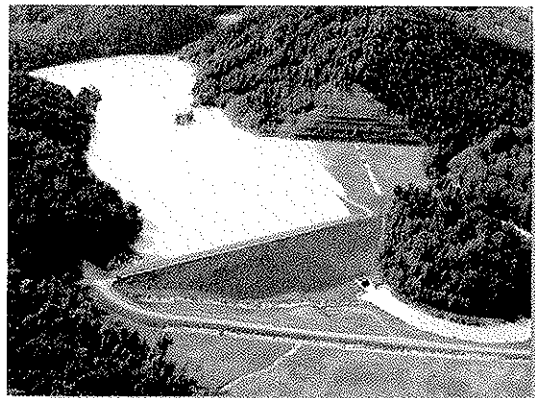
Based upon the findings and recommendations in the Phase – I Report, the TVCD directed TEI, Inc. to develop a preliminary design (Phase – II) of the Little Laurel Run Dam. Mr. Morrow refined the parameters of the initial engineering assessment for this site in order to better define site conditions and to accurately assess its water storage capability. TEI, Inc. contracted with the geo-technical firm (GeoNovell) to perform a dam foundation investigation in order to confirm suitability of the site as a water supply impoundment. Mr. Morrow developed the foundation investigation plan and coordinated the drilling and borrow pit investigation with GeoNovell’s geotechnical engineer. Evaluation of the site demonstrated that it is a suitable location and has sufficient storage capacity to meet the water supply objectives of the TVCD.

EXPERIENCE OF WES MORROW, PROJECT ENGINEER

NRCS AGING DAM REHABILITATION PROGRAM - PROJECT TEAM LEADER / ENGINEER

Before retiring from the NRCS, Mr. Morrow led an interdisciplinary Planning Team in the initial stages of the NRCS Aging Dam Rehabilitation Program in West Virginia. The evaluation process (engineering assessment) employed by the team included compiling design information for each dam from various sources including NRCS as-built drawings, design folders, and the US Corps of Engineers National Inventory of Dams; conducting an on-site inspection of each dam; reviewing the most recent dam safety inspection reports; and reviewing and determining the status of the Operations and Maintenance Program and hazard classification for each dam.

Morrow used the NRCS SITES computer program and NRCS Technical Release 60 (TR-60) to determine if the existing dam met TR-60 hazard classification requirements (which coincide with or exceed WV State Dam Safety requirements). In order to bring a dam(s) into compliance with NRCS TR-60 criteria, the Team evaluated both structural and nonstructural alternatives. Alternatives considered included (but not limited to) raising the top of dam, increasing principal and/or auxiliary spillway performance, a combination of raising the top of dam and increasing spillway(s) capacity, and decommissioning the dam.



Wheeling Creek #3 Nearly Full During Hurricane Ivan

An Assessment Report was developed for each dam; which summarized the engineering assessment and investigation findings; and where necessary, recommendations for rehabilitation. The Report addressed adequacy of the dam's existing hazard classification; eligibility for rehabilitation under the NRCS Aging Dam Rehabilitation Program, assessment of its physical and functional capability with respect to the original design; and (where necessary) a description of the recommended solution; and an estimate of quantities, construction and land-rights cost.

Dams that were evaluated by the Team included:

- ***Upper Deckers Creek Site 1 (WV07706) - performed engineering assessment and developed assessment report***
- ***Upper Deckers Creek Site 6 (WV07712) -performed engineering assessment, conducted sediment survey (which determined that over 50% of sediment pool capacity was still available), and developed assessment report***
- ***Salem Fork 11 (WV03308) – performed engineering assessment and developed assessment report***
- ***Salem Fork 11A (WV03309) – performed engineering assessment and developed assessment report***
- ***Brush Creek 7A (WV05506) – performed engineering assessment, directed sediment survey (which determined that over 50% of sediment pool capacity was still available, and developed assessment report***
- ***Brush Creek 19A (WV05531) – performed engineering assessment and developed assessment report***

- *Patterson Creek 37 (WV05714) – performed engineering assessment and developed*
- *New Creek 14 (WV02404) – performed engineering assessment and developed assessment report. Recommended protocol for sediment pool survey. The NRCS has subsequently developed a “draft” Supplemental Watershed Plan – Environmental Assessment for the project.*
- *New Creek 16 (WV05705) – performed engineering assessment and developed assessment report*

Mr. Morrow also served in other engineering capacities with the NRCS (SCS) including Planning Engineer, Design Engineer, and State Design Engineer for the implementation of NRCS flood control/recreation dams in West Virginia. These dams include the following:

UPPER MUD RIVER 2A (WV04307)

As planning engineer, he developed all aspects of the dam (structure size, spillway sizes and capacities) to a planning level of detail, which was included in the Watershed Plan and Environmental Impact Statement. This effort included development of dam hydrology and hydraulics, embankment and foundation design, sediment requirements, quantity and costs estimates. This dam was subsequently installed under the SCS PL-566 Program.

WHEELING CREEK 3 (WV05120)

As design engineer, he co-designed the final design of the dam. This effort included development of dam hydrology and hydraulics, embankment and foundation design, sediment requirements, quantity and costs estimates, construction drawings, contract specifications, instructions to the project (field engineer), and contract documentation. This dam was subsequently installed under the NRCS PL-566 Program.

HOWARD CREEK

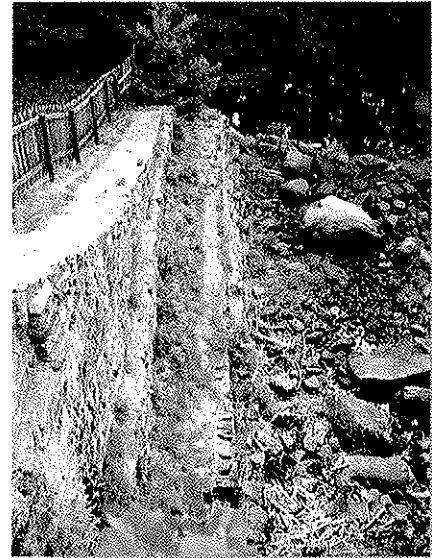
Howard Creek 12 (WV02507) – As design engineer, he developed final design of the dam. This effort included development of dam hydrology and hydraulics, embankment and foundation design, sediment requirements, quantity and costs estimates, construction drawings, contract specifications, instructions to the project (field engineer), and contract documentation. This dam was subsequently installed under the NRCS PL-566 Program.

PROJECT UNDERSTANDING AND APPROACH

PROJECT UNDERSTANDING

To develop a full understanding of the WV DNR's needs for rehabilitation of the Cacapon Upper and Lower Dams; TEI, Inc.'s representatives conducted an initial site visit to both dams. In addition, we have reviewed obtained and reviewed the 2009 Periodic Dam Inspection Reports for both dams. According to the reports, neither dam is currently certified by the WV DEP Dam Safety Section.

The hazard classification of both dams needs to be verified. The most serious concerns about the lower dam include seepage in the drain pipe and erosion of the rock surface in the auxiliary spillway. The most serious concerns about the upper dam include alignment of the auxiliary spillway outlet channel which directs flow to the "left groin" area of the dam, seepage within the left and right groin areas and downstream face of the dam, and apparent leakage in the 42-inch diameter principal spillway pipe. In addition, data from the USACOE-NID website relative to the dams was also obtained to supplement the inspection reports. Based upon our initial review of the data plus on-site observations, we developed the following project approach to demonstrate our technical abilities and straight-forward method for assessing existing conditions, identification of deficiencies relative to State Dam Safety criteria, hazard classification determination, assessment of rehabilitation needs, and development of a cost effective rehabilitation plan.



Picture of upper dam spillway outlet wall

PROJECT APPROACH

STEP #1 OBTAIN AVAILABLE DESIGN INFORMATION AND CONSTRUCTION/MODIFICATION DRAWINGS.

TEI will obtain copies (where available) of the original design documents and construction drawings, as well as subsequent modifications to the dams; recent Dam Safety Inspection reports; O&M Plans, and citations. We will request a copy of the design report for the Long Branch Lake Dam from the WVDNR; apparently a design report for the dam is not available. We plan to supplement the design report with design information contained in the National Dam Safety Program reports (hydrology and hydraulics, design, geotechnical and foundation assessment).

STEP #2 CONDUCT ON-SITE INSPECTIONS OF THE DAMS

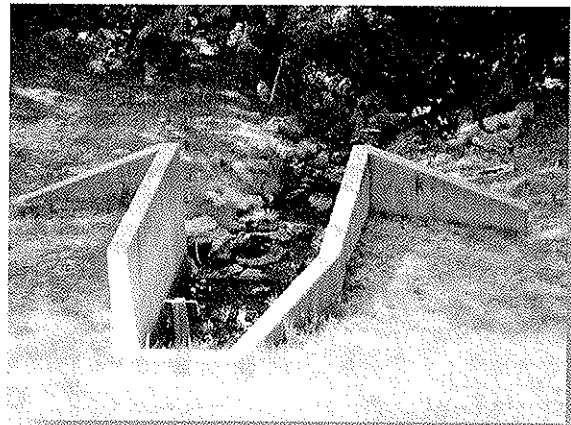
TEI staff will conduct detailed on-site inspections of both dams. We will coordinate the inspections with the WVDNR so that both staffs can participate during the inspections, in order to provide an opportunity to immediately address questions or concerns that may arise.

STEP #3 UPDATE HYDROLOGY AND HYDRAULIC INFORMATION FOR EACH SITE

TEI staff will develop watershed hydrology and dam hydraulics data for both sites, and/or develop new data, as appropriate. TEI's staff will review existing information regarding watershed characteristics, hydrology and hydraulics; sedimentation storage requirements, and update as necessary. This includes determining/confirming watershed land use characteristics using USDA resources and precipitation and runoff values using NRCS Technical Release – 60.

STEP #4 DEVELOP FLOODPLAIN CROSS-SECTIONS (DOWNSTREAM OF THE DAMS)

TEI will obtain and verify existing floodplain hydrology/hydraulic cross-section information (if available); if not, our staff will field survey cross-sections at the locations downstream from the upper dam through the lower dam in the potential breach inundation area, as determined by the engineer.



Lower dam principal spillway outlet channel

STEP #5 EVALUATE DAMS

TEI staff will perform computer modeling of the watershed and dam using the NRCS SITES computer program using principal spillway, auxiliary spillway and freeboard rainfall events plus dam and spillway(s) structural parameters; use the HEC-HMS program to perform a breach failure analysis of the dam; and use the HEC-RAS program to develop water surface profile elevations which will be used with downstream cross-sections to determine the breach inundation area. A geotechnical investigation may be necessary to confirm foundation conditions of the upper dam in the vicinity of the principal spillway pipe and in the auxiliary spillway of the lower dam to determine rock quality characteristics.

STEP #6 DEVELOP ALTERNATIVE(S) AVAILABLE TO BRING THE DAM INTO COMPLIANCE WITH STATE DAM SAFETY REQUIREMENTS AND CRITERIA

Alternatives to be considered include (but not limited to) increasing principal and/or auxiliary spillway performance, raising the top of dam, or a combination of both. Alternatives will be evaluated based on the costs of construction, required mitigation, and necessary land rights.

STEP #7 PREPARE CONSTRUCTION DOCUMENTATION AND SPECIFICATIONS

Develop and submit to the WVDNR a summary report of findings and recommendations; to include recommendations for rehabilitation for one or both dams. Contract/construction documentation will include the rehabilitation quantity and cost estimates; construction drawings; specifications; and items of work and construction details; and instructions to the project (field) engineer.

STEP#8 PROVIDE CONSTRUCTION MANAGEMENT AS REQUESTED BY THE WVDNR FOR THE INSTALLATION OF REHABILITATION MEASURES

As requested by the WVDNR, TEI will provide project management and quality control services during installation of rehabilitation measures for the dam(s).