McCORMICK TAYLOR

EAST GOSHEN TOWNSHIP, WEST CHESTER, PA

MILLTOWN DAM PROJECT

June 1, 2015

McCORMICK TAYLOR

MILLTOWN DAM
EAST GOSHEN TOWNSHIP, PA

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McCORMICK TAYLOR

1 LETTER OF INTRODUCTION

June 1, 2015

Mr. Rick Smith, Township Manager
East Goshen Township
1580 Paoli Pike
West Chester, PA 19380

REFERENCE: Proposal to Provide Professional Consulting Services for Milltown Dam
East Goshen Township, PA
McCormick Taylor, Inc. Federal ID #23-168-3759

Dear Mr. Smith:

McCormick Taylor, Inc. is pleased to submit our Technical Proposal for the above-referenced project, as well as our Cost Proposal. McCormick Taylor has developed this Proposal based upon the contents of the Request for Proposal (RFP) dated May 7, 2015, discussions with PADEP Division of Dam Safety, and our site visit.

Work for this contract will be performed from our Mount Laurel, NJ office with support from our Exton and Philadelphia, PA, and Baltimore, MD offices. We have designated **Eric J. Ditchey, P.E.** as our Project Manager and the primary point of contact for this contract. Mr. Ditchey can be contacted at:

Eric J. Ditchey, P.E.
McCormick Taylor, Inc.
700 East Gate Drive, Suite 201
Mt. Laurel, NJ 08054
Phone: 856.793.0800 / Email: ejditchey@mccormicktaylor.com

Our extensive background with similar work, familiarity with East Goshen Township, expertise of our employees, and commitment to excellence will ensure that McCormick Taylor can meet and exceed the Township's expectations. We have assembled a highly successful team of specialists to perform the various tasks solicited by the Township. Please find resumes enclosed for our Project Manager and key staff in the Appendix.

PROJECT UNDERSTANDING:

Milltown Reservoir Dam does not meet PADEP Division of Dam Safety Regulations. The results of an "in-house" hydrology and hydraulic assessment performed by PADEP in 2014 indicate that the appropriate spillway design flood (SDF) for the Milltown Reservoir Dam is the ½ Probable Maximum Flood (PMF). The existing spillway has capacity to pass only about 0.14 PMF prior to the embankment dam overtopping. During the SDF the embankment would overtop by slightly more than 4 feet. Overtopping of the earth embankment would result in a breaching failure of the dam and an uncontrolled release of the stored water, causing significant property damage and possibly loss of life downstream.

East Goshen Township, the owner of the dam, has the obligation to rehabilitate the dam to safely pass the SDF or breach and remove the dam such that it does not pose a risk of failure. Rehabilitation alternatives to bring the dam into compliance with the Regulations include constructing a larger spillway sized to safely pass the SDF or armoring the embankment to allow for safe overtopping, effectively turning the embankment into an auxiliary spillway. There are a number of materials and approaches to providing overtopping protection, many of which were included in a letter from the Township engineer dated December 9, 2014.

McCormick Taylor and their proposed project manager have experience in evaluating alternatives, designing and constructing these various methods of overtopping protection including articulated concrete block, roller compacted concrete, conventional concrete, gabions, and steel sheet pile. We also have considerable experience in designing new larger spillways to increase discharge capacity. Our experience working with each of the rehabilitation alternatives will allow us to efficiently review the various alternatives and develop realistic pros and cons, and develop conceptual level cost estimates. From our experience we understand the importance of access to the site, area for construction storage and staging, and diversion and control of water during construction.

McCormick Taylor also has dam removal experience. McCormick Taylor is part of an exclusive group of preferred consultants selected by American Rivers to perform dam removal design and monitoring services nationwide. We understand the issues associated with dam removals such as sediment sampling and testing, on-site sediment stabilization, sediment removal and disposal, dealing with public opinion especially those that live on and near the lake, and stream restoration to list just a few.

Our public sector projects with many states DOT's have given us invaluable experience with public and township officials meetings.

PROJECT APPROACH:

PHASE 1

Task 1 – Dam Rehabilitation Alternative

McCormick Taylor will review available information including the Colesworthy original design plans (1920); Yerkes repair plans (1985); HEC-1 models of the hydrology; previous inspection reports; PADEP hydrology and hydraulic review and update; sluice gate replacement design plans; Pennoni cost estimates; and any other information made available by the Township. The overtopping alternatives previously developed and evaluated will be reviewed for applicability, constructability, and technical merit. McCormick Taylor may develop additional rehabilitation alternatives based on our previous experience with similar overtopping protection projects.

The hydrology and hydraulic review and update performed by PADEP indicates that the embankment overtops by approximately 4 feet during the spillway design flood (SDF). Several of the alternatives presented in the December 9, 2014 Pennoni letter are not suitable for and cannot withstand 4 feet of overtopping.

Using the information made available, supplemented with information developed by McCormick Taylor, we will provide the Township with a recommendation for dam rehabilitation. The rehabilitation will likely include overtopping protection and replacement of sluice gates.

Task 2 – Dam Removal

McCormick Taylor will evaluate the option of removing the dam. Several critical factors affect the evaluation of dam removal. The amount and condition of the sediment in the reservoir is a critical element. Following several discussions with PADEP Division of Dam Safety, it is our understanding that the need to sample the sediment and test for contamination is a function of the history of the watershed and need to remove sediment offsite. Sediment sampling and testing is required in watersheds that contained heavy industry or other forms of contamination producing activity; or if sediment removal offsite is proposed. The Milltown Dam watershed appears to be mostly residential and light commercial with little to no contaminate producing industries. It is the current opinion of PADEP Division of Dam Safety that sediment sampling and testing will NOT be required if the sediment can be left in place.

It is our understanding that PADEP will allow, and in fact prefer, the sediment to remain in the reservoir as long as the sediment is stabilized to prevent erosion and transport downstream. Some sediment will have to be excavated to reestablish the stream channel and possibly stabilize the sediment to remain. McCormick Taylor will look to use the excavated sediment for regrading of the reservoir bottom to minimize the quantity of sediment requiring offsite disposal. It will be a design priority to eliminate the offsite disposal of any sediment.

McCormick Taylor will develop a Preliminary Sediment Management Plan (PSMP) that describes the proposed method of dewatering the lake and stabilizing the sediment in place, eliminating the need for costly sediment excavation and offsite disposal. The PSMP may include a downstream cofferdam to capture any sediment leaving the lake during the lake lowering and dewatering process. The sediment captured by the downstream cofferdam would be placed back in the reservoir. Some sediment excavation in the reservoir would be necessary to recreate the original stream channel and facilitate dewatering of the sediment. The excavated sediment would be used to re-grade areas of the lake bottom. The dewatering would occur over several weeks/months allowing the sediment to stabilize in place and vegetation to reestablish. Once the sediment is stabilized, the dam breach would be undertaken by removing the spillway and a portion of the earth embankment.

A meeting was held with PADEP on March 11, 2015 to discuss the dam removal option. PADEP provided a preliminary plan and schedule for the phased removal of the spillway and section of embankment. McCormick Taylor will use this plan along with the SMP to provide a dam removal recommendation.

The recommendations from Task 1 and 2 will be summarized in a brief letter report providing background information and discussion on the areas of comparison and reasons for selecting the recommended alternatives.

Task 3 – Cost Estimates

Estimates of construction cost will be developed for both the dam rehabilitation and dam removal alternatives. McCormick Taylor will develop conceptual level layout and design of both alternatives to provide sufficient detail for the cost estimates. The cost estimates will be broken down by typical bid items for dam and reservoir construction; with estimated quantities multiplied by appropriate unit costs. Some bid items may be presented as lump sum items. Unit and lump sum costs will be derived from our experience on similar projects, bid tabulations from projects recently bid, bid summaries from PennDOT, and cost estimating references such as R.S. Means.

Annual maintenance cost for both alternatives will be developed to estimate the 30-year life cycle cost.

Task 4 – Schedule

Project schedules will be developed for both alternatives. The schedules will include time for design, permitting, bidding, and construction. We will develop an initial baseline Primavera Schedule that will be used to update progress of the project. The Project Manager will update the schedule on a regular basis and coordinate any changes with the Township. The schedule will help the Project Manager identify key milestone dates, establish priorities, recognize problem areas, and communicate progress of the design.

Early identification of schedule impacts coupled with a prearranged recovery plan will allow the team to address these problems in a timely manner. In the case that additional manpower is needed, we will obtain support from our Exton and Philadelphia offices. The depth and capacity of our Dams / Water Resources Group allows us to handle difficult projects with ease and efficiency. Our team has the ability to accelerate any project, if necessary. During the period of the contract, we will maintain a focus on cost control by identifying only what is required to complete the project.

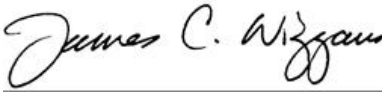
Task 5 – Public Meetings

The project team has extensive experience meeting with the public, government boards, and other stakeholders. We have staff capable of producing the required materials for these meetings, organizing and leading meetings, and collecting input from attendees.

If the dam removal alternative is selected, dam removal projects are often controversial. During our site visit we saw signs on residential lawns opposing the removal of the dam. Dam removal public meetings can sometimes be contentious. We have helped to develop dam removal public meeting strategies that diffuse tensions and encourage one-on-one dialog about specific issues. Our team has a long history of helping our clients wade through the difficult public meeting process. We know the questions that will arise, and we know how to answer those questions using solid scientific information. We can convey information about drawdown, post removal restoration vision, wetland impacts, flooding and aesthetics to a lay audience. Our combination of national experience and local knowledge helps to connect with the people of East Goshen and to the Township Council. Our lump sum fee for this task is based on preparing for and attending two (2) public meetings.

If you have any questions, please do not hesitate to contact Mr. Ditchey, at 856.793.0800. We look forward to serving the Township on this and future assignments and appreciate your consideration of our proposal.

Sincerely,
McCormick Taylor, Inc.



James C. Wiggans, P.E.
Chief Executive Officer

McCORMICK TAYLOR

2 EXPERIENCE

MCCORMICK TAYLOR EXPERIENCE:

OVERVIEW OF DAM REHABILITATION SERVICES AND CAPABILITIES

McCormick Taylor has extensive experience in providing engineering services for existing dams. These services range from periodic visual inspections of dams and appurtenant facilities to providing design and construction services for upgrading, expansion or removal. In evaluating the performance of dams, McCormick Taylor focuses its vision on the entire project. Hydrology and hydraulic (H&H) analyses are fundamental to the assessment of the appropriate spillway design storm and spillway capacity, dam break analyses are critical in establishing flood hazard potential. Geotechnical investigations allow for the assessment of the character of the embankment and foundation materials, which are critical to the performance of the structure under a variety of loading conditions.

Given the significant potential for damages and loss of life that can result from a dam failure, it is important that safety inspections be performed on a periodic basis and that updated Emergency Action Plans are prepared and available for use. McCormick Taylor has extensive experience in performing inspections, training others to monitor performance, and preparing and updating Emergency Action Plans.

McCormick Taylor's Environmental Group includes wetland scientists, biologists, aquatic biologists, and archeologists. We perform all environmental permitting services in-house including wetland delineation, wetland mitigation, cultural resource studies (historic architecture/archaeology), endangered species impacts, hazardous waste screening, parkland and Green Acre involvement, agency coordination, and public involvement.

McCormick Taylor has performed dam inspections and evaluations on over 40 dams in the past five years. These inspections have been for a variety of dam owners:

- State of New Jersey – 17 dams
- State of Delaware – 7 dams
- Public Water Company – 8 dams
- County / Municipality – 4 dams
- Private individual or home owner association – 10 dams

DAM EVALUATION AND REHABILITATION DESIGN SERVICES

McCormick Taylor has extensive experience performing dam investigations, evaluations, and rehabilitation design for existing structures. McCormick Taylor's experience in performing hydrology, hydraulic, stability and seepage analyses allows us to efficiently and effectively assess the current condition of a dam for compliance with the standards. McCormick Taylor has performed detailed investigations, engineering evaluations, and ***developed rehabilitation designs for overtopping protection for the following dams:***

- Hearns Pond Dam, DE
- Williams Pond Dam, DE
- Birchwood Lake Dam, NJ
- Timber Lake Dam, NJ
- Centennial Lake Dam, NJ

Prior to joining McCormick Taylor, our Project Manager Eric Ditchey worked extensively on ***dam projects involving overtopping protection.*** The following is a partial list of these overtopping projects:

- Philipsburg Dam No 3, RCC overtopping protection, PA
- Putnam Reservoir Dam, ACB overtopping protection, CT
- Douthat Dam, RCC overtopping protection, VA
- Lake Whitehurst Dam, RCC overtopping protection, VA
- Marrowbone Dam, RCC overtopping protection, VA
- Lake Gilman Dam, ACB overtopping protection, NJ
- Robinson's Branch Dam, RCC overtopping protection, NJ
- Tobesofkee Dam, RCC buttress, GA

McCormick Taylor was recently awarded a 5 year open ended contract for dam engineering services by Delaware Department of Natural Resources and Environmental Control. Services to be performed will include design of low level gate replacement, gate operator replacement and modifications, concrete repairs, and embankment slope repairs and improvements.

PENNSYLVANIA DAM EXPERIENCE

Our Project Manager Eric Ditchey, prior to joining McCormick Taylor gained significant experience working on dam projects in Pennsylvania. These projects included inspections, engineering evaluations, EAP development and updates, and rehabilitation designs. The following is a partial listing of Pennsylvania dam projects:

- Hibernia Dam, Chester County Water Resources Authority
- Mound Dam, Philadelphia Water Department
- Philipsburg Dam No.3, PA-American Water Company
- Spruce Run Dam, PA-American Water Company
- Canonsburg Dam, PA Fish & Boat Commission
- Dutch Fork, PA Fish & Boat Commission
- Leaser Lake Dam, PA Fish & Boat Commission
- Bear Gap Reservoir Dam No. 1, Aqua Pennsylvania Water Company
- Bear Gap Reservoir Dam No. 2, Aqua Pennsylvania Water Company
- Bear Gap Reservoir Dam No. 6, Aqua Pennsylvania Water Company
- Lower Crum Creek Dam, Aqua Pennsylvania Water Company
- Green Lane Dam, Aqua Pennsylvania Water Company
- Ironworks Dam, Aqua Pennsylvania Water Company
- Pickering Dam, Aqua Pennsylvania Water Company
- Springton Dam, Aqua Pennsylvania Water Company
- Township Line Dam, Aqua Pennsylvania Water Company
- Trout Run Dam, Aqua Pennsylvania Water Company
- Waymart Reservoir No. 7 Dam, Aqua Pennsylvania Water Company

ADDITIONAL DAM REHABILITATION EXPERIENCE

McCormick Taylor has been working with the New Jersey Department of Transportation to bring 29 of the DOT's dams into compliance with Dam Safety Regulations. McCormick Taylor has conducted numerous inspections, EAP updates, rehabilitation designs, permitting, construction phase services, and emergency response services for NJDOT over the last 15 years. Many of the NJDOT dams have inadequate spillway capacity. McCormick Taylor developed rehabilitation alternatives to increase spillway capacity and improve structural deficiencies, and performed final design, permitting, and construction phase services for the following list of NJDOT dams:

- Pohatcong Lake Dam, NJ
- Malaga Lake Dam, NJ
- Cumberland Pond Dam, NJ
- Atsion Lake Dam, NJ
- Rainbow Lake Dam, NJ
- Mullica Hill Pond Dam, NJ
- Blue Anchor Dam, NJ
- Crystal Lake Dam, NJ
- Layton's Lake Dam, NJ
- Newton Lake Dam, NJ

OVERVIEW OF DAM REMOVAL EXPERIENCE

When a dam is removed, a large amount of sediment formerly contained within the impoundment becomes prone to transport. The fate of this sediment is a primary concern during dam removal, since a downstream pulse of sediment can have negative ecological effects (Wildman and MacBroom, 2005). The mobilization of sediment in the impoundment

and upstream reaches can often be prevented by placing grade control structures, dewatering the impoundment prior to removal, and allowing the growth of vegetation which will stabilize sediments. In some cases, providing suitable sediment to downstream reaches which may have been sediment starved can be beneficial to these areas if done properly. In other cases sediments may be contaminated with pollutants and require dredging and careful disposal. Careful study to determine that nature, contamination, and quantity of impounded materials is vital to successful dam removal projects. Natural techniques for sediment stabilization are often favored over engineered structures and dredging due to cost savings and the reduction of instream construction time.

Depending on the size and age of the impoundment as well as upstream conditions, significant quantities of sediment can be present. Disposition of these sediments can be a major challenge to the project. The typical first step is to sample and test the sediment for contamination. If the sediment is contaminated, in-situ stabilization and capping, or excavation and disposal at a certified disposal facility are the likely alternatives. If the sediment is not contaminated, then beneficial reuse is the preferred approach. The sediment can be utilized on site if there are development plans associated with the dam removal. Offsite reuse can include agricultural application, mining reclamation, landfill cover material, and roadway fill material. Similarly, removed non-contaminated concrete can be used for site improvements or employed for underwater habitat. Innovative reuse of this material is the preferred option in most cases.

Depending on the material properties of the sediment and the configuration of the dam, dewatering can also present a challenge. The larger quantity of fines and organic contents, the more difficult it will be to dewater the sediment. The most economical method for dewatering is to draw down the impoundment and allow the sediments to dewater in place. Once the sediment is dewatered, it can be removed using traditional excavation and hauling equipment. If site constraints dictate that the sediment be removed in a wet condition, then excavation by drag line or dredge and transportation in watertight containers is required. Drawdown may be accomplished by features (sluice gates) inherent to each unique dam or may require structural modification and/or partial removal.

DAM REMOVAL DESIGN SERVICES

McCormick Taylor has been involved in several dam removal projects in Maryland. These projects include:

- Bloede Dam Removal, Baltimore and Howard Counties, MD
- Centreville Dam Removal, Queen Anne's County, MD
- Simkins Dam Removal, Baltimore and Howard Counties, MD

IN-STREAM STRUCTURE DESIGN AND EVALUATION

Many problems can arise without careful consideration of the hydraulic effects of in-stream structures including steep drops below structures preventing aquatic species migration, structure undermining resulting in failure, and excessive scour downstream or excessive deposition upstream of a structure. The team uses hydraulic models, created spreadsheets, and design experience to ensure the proper selection, placement, orientation, and slope of structures. These techniques range from critical and normal flow depth calculations to more involved submerged weir flow equations or estimates of rapidly varied flow conditions. In most cases, full dam removal across the base of the channel is preferred as opposed to leaving portions of the dam in place.

PUBLIC INVOLVEMENT

McCormick Taylor is frequently called upon to provide public education and outreach services, since public support is often crucial in advancing projects. McCormick Taylor conducts public involvement programs that build a relationship of trust between our clients and the public. McCormick Taylor's public involvement services include, but are not limited to: public relations, mediation, visioning and community consensus building, newsletter production, public education, graphic design, and web development.

Our public education and outreach efforts focus on reaching out to the diverse audiences associated with each project including project sites landowners, the general public, and the resource and regulatory agencies. The underlying objective is to create common goals and partnerships, while generating a sense of ownership for each individual project.

3 REFERENCES

MCCORMICK TAYLOR REFERENCES:

Another indicator of McCormick Taylor's ability to complete projects successfully is our list of satisfied clients that are willing to provide references for us. The following is a partial list of clients and their contact information.

David R. Twing, P.E.

State Dam Safety Engineer
Department of Natural Resources and Environmental Control
Division of Soil & Water Conservation
2430 Old County Road
Newark, DE 19702
302.834.5557

Work Performed for This Client:

McCormick Taylor performed inspections and hydrology and hydraulic analyses including incremental inundation analyses to downgrade the spillway design storms for Hearn's Pond and Williams Pond Dams. Developed final design of articulated concrete block (ACB) overtopping protection and new enlarged spillway and outlet culvert; permitting, bid, and construction phase services for Hearn's Pond Dam. We performed inspections and dam break analyses; and prepare inundation maps, EAP's and O&M Manuals for the following dams:

- Beck's Pond Dam
- Burton Pond Dam
- Wagamon's Pond Dam
- Red Mill Pond Dam
- Craig's Pond Dam

Mike Kasbekar, P.E.

Project Manager
Division of Project Management
New Jersey Department of Transportation
Third Floor, E&O Building
1035 Parkway Avenue, P.O. Box 600
Trenton, New Jersey 08625
609.530.6627

Work Performed for this Client:

Performed regular inspection, preliminary and final design, permitting, bidding, and construction phase services on the following NJDOT owned dams. All of the dams had insufficient spillway and outlet bridge capacity. New enlarged spillways were designed and constructed as well as new larger bridge/culvert opening.

- Malaga Lake Dam, Franklin Township, Gloucester County, NJDEP ID #31-24, 2004
- Rainbow Lake Dam, Pittsgrove Township, Salem County, NJDEP ID #35-1, 2007
- Mullica Hill Pond Dam, Harrison Township, Gloucester County, NJDEP ID #30-19, 2008
- Layton Lake Dam, Carney's Point, Salem County, NJDEP ID #30-15, 2015
- Newton Lake Dam, Camden County, NJDEP ID #31-74, 2015

John Cirenza

President
Birchwood Lake Colony Club
106 North Lakeside Drive East
Medford, NJ 08055
609.744.2900

Work Performed for this Client:

Performed regular inspection, preliminary and final design, permitting, bidding, and construction phase services for Birchwood Lake and Timber Lake Dams. Both dams had inadequate spillway capacity and both were badly damaged during the 2004 Burlington County Floods. Heavy residential development around both lakes and a lake downstream of Timber Lake Dam precluded any rehabilitation alternatives that would have changed the hydraulic characteristics of either spillway. Armoring with ACB's and roller compacted concrete was investigated, both tailwater conditions at both dams due to downstream lakes made armoring unfeasible. The ultimate solution was steel sheet piling driven along the length of each dam to retain the lakes in the event of overtopping and erosion of the embankments.

J. Llewellyn Mathews
Attorney at Law
East Gate Center
309 Fellowship Road, Suite 200
Mount Laurel, NJ 08054
609.519.7744

Work Performed for this Client:
Performed regular inspection, preliminary and final design, permitting, bidding, and construction phase services for Centennial Lake Dam. The spillway was undersized and could not safely pass the spillway design flood for this high hazard dam. McCormick Taylor developed and evaluated rehabilitation alternatives including overtopping protection. The preferred alternative was to armor the embankment with cast-in-place concrete and anchor the concrete with steel sheet piling. Design and construction are anticipated to begin in 2015.

Serena McClain
American Rivers
Director, River Restoration
SMcClain@americanrivers.org
202.243.7044

Work Performed for this Client:
McCormick Taylor is part of an exclusive group of preferred consultants selected by American Rivers to perform dam removal design and monitoring services nationwide. The Centerville Dam Removal Project in Centreville, MD includes dam removal and channel rehabilitation in a highly sensitive watershed preventing any mobilization of impounded sediments downstream and is scheduled for construction in June 2015. The Bloede Dam Removal is the largest of its kind in the State of Maryland and is located on the Patapsco River. McCormick Taylor, as a subconsultant, provides dam engineering services to assist in the development of the dam removal plan. This involves evaluating the potential for catastrophic dam failure and evaluating dam removal techniques. McCormick Taylor has also been tasked with permitting for this highly controversial project. Finally, McCormick Taylor has recently completed long term geomorphic monitoring following the removal of the Simkins and Union Dams also on the Patapsco River, removed in 2009 and 2010, respectively. Tasked with tracking the transport of impounded materials downstream (the project was completed with passive sediment management), staff established digital elevation models, facies mapping, cross sections, and a series of over 100 photo monitoring points to inform regulatory requirements and further the science of dam removal. Results of this study are being prepared for distribution in numerous peer reviewed academic journals and have been presented at several national conferences.

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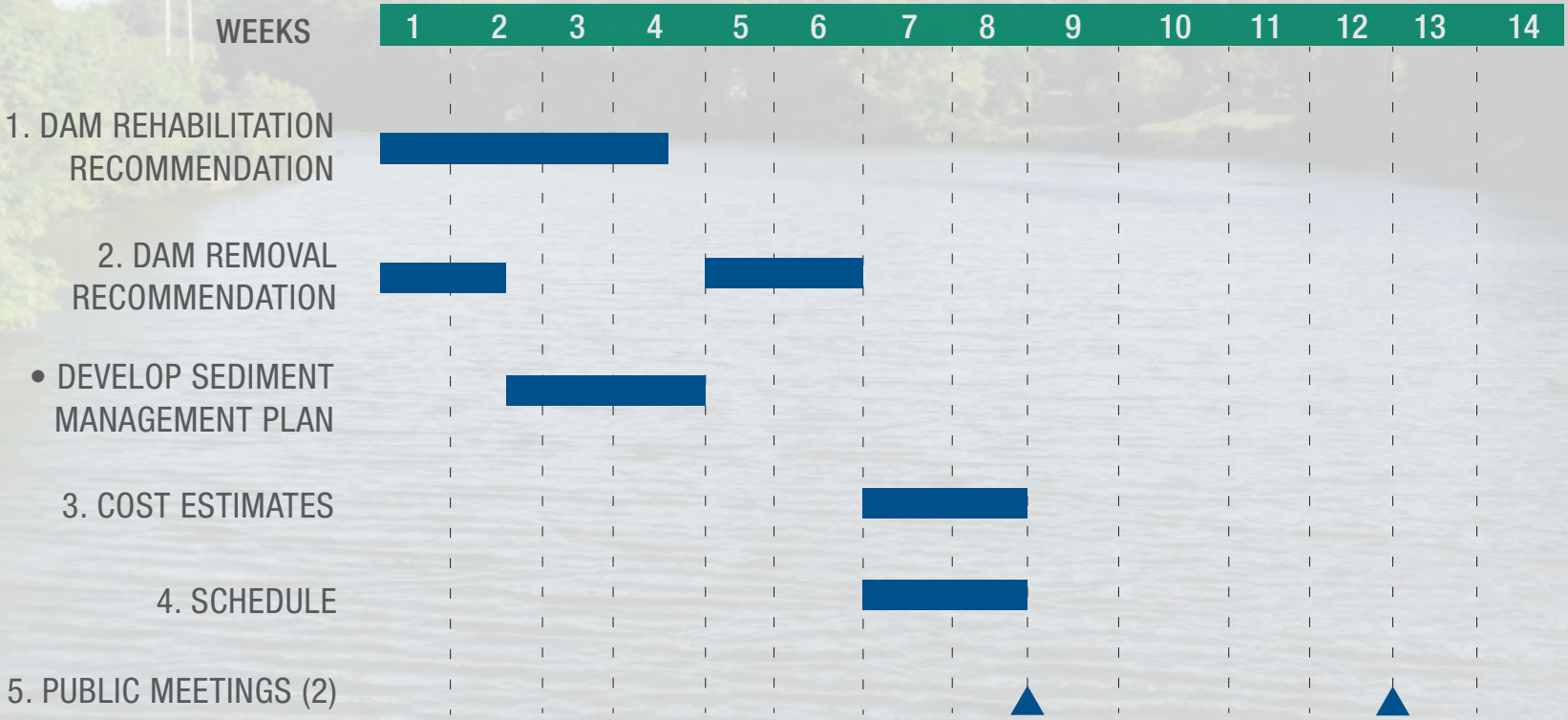
4 SCHEDULE

SCHEDULE:

McCormick Taylor is firmly committed to maintaining the project delivery principles of schedule, budget, and quality. Effective compliance with these principles begins with having the appropriate key staff involved with the project, and directly responsible for task assignments. Eric J. Ditchey, P.E., has been designated our Project Manager. We have assigned key staff to serve as Task Leaders for the various engineering tasks. The Task Leaders will report directly to Mr. Ditchey and will be responsible for timely and accurate completion of tasks within their areas of expertise. The designation of additional support staff for each discipline will allow for flexibility in the assignment of staffing and the ability to keep the project on schedule and within budget. As our organization chart shows ***we have, with the exception of survey services, in-house expertise to perform all work expected for this project.***

Schedule – The initial baseline schedule for Phase 1 is included in this proposal. It will be used to update progress of the project. The schedule will help the Project Manager identify key milestone dates, establish priorities, recognize problem areas, and communicate progress to the Task Leaders and the Township. This project will be managed from the Mount Laurel, New Jersey office and the majority of the work will be performed by staff in this office. If additional manpower is needed, we will be able to obtain experienced design professionals from our other nearby offices in Exton and Philadelphia, PA, and Baltimore, MD.

MILLTOWN DAM PHASE 1



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5 COST PROPOSAL

COST PROPOSAL:

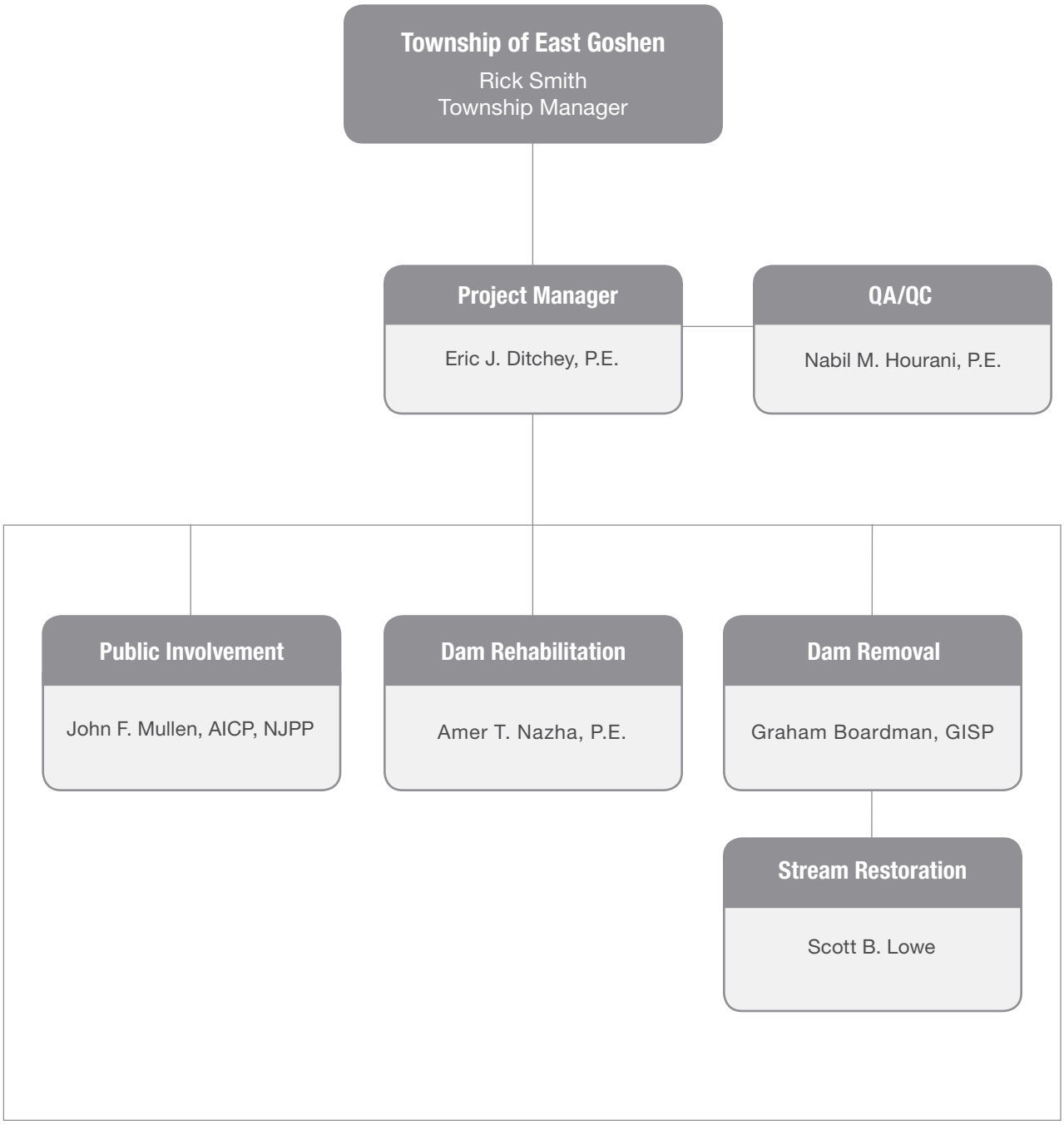
As compensation for the services outlined in our proposal, McCormick Taylor, Inc. proposes the following lump sum costs for the identified project tasks:

PHASE 1:	Lump Sum Fee
Dam Rehabilitation Recommendation	$5,200
Dam Removal Recommendation	$7,900
Cost Estimates	$4,600
Schedule	$800
Public Meetings (2)	$1,900
Total for Phase 1:	$20,400

6 APPENDIX

Organization Chart

Milltown Dam
East Goshen Township, PA
Professional Consulting Services



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RESUMES:

We have included the following resumes for key staff that will be involved with this project.

ERIC J. DITCHEY, P.E.

Project Manager

EDUCATION:
B.S., Civil Engineering, Drexel University, 1983
M.S., Geotechnical Engineering, Drexel University, 1988

PROFESSIONAL REGISTRATIONS:
Professional Engineer: PA, #PE036570E, 1987; NJ, #24GE04038700, 1996; DE, #16798, 2010; MD, #40313, 2011; VA, #0402048381, 2011

PROFESSIONAL AFFILIATIONS:
Association of State Dam Safety Officials
American Society of Civil Engineers
American Concrete Institute

SUMMARY OF EXPERIENCE:
Mr. Ditchey is a Project Manager at McCormick Taylor with more than 30 years of experience in inspection, site investigation, analysis, design and construction phase services for dam projects. He has extensive experience in the design and construction of both new dams and upgrading and/or expansion projects for existing dams. He is a member of ACI Committee on Mass Concrete ACI 207, and currently serves as chairman of the Association of State Dam Safety Officials (ASDSO), Advisory Committee.

DETAILED EXPERIENCE:
Hearn's Pond Dam, Sussex County, DE: Performed hydrology, hydraulic and dam break analyses; incremental flooding assessment (IFA); inundation zone mapping; spillway design flood determination, spillway adequacy, and hazard class verification; subsurface investigations and geotechnical evaluation; structural assessment and stability analysis; and rehabilitation alternative development. McCormick Taylor performed final design for spillway and bridge replacement and overtopping protection to safely pass the SDF which is 0.3 PMF. The new spillway and bridge will be designed to pass the 100-year storm and the embankment will be armored to safely pass the SDF. McCormick Taylor developed an Emergency Action Plan (EAP) and Operation & Maintenance Manual in accordance with Delaware DNREC's new enacted dam safety standards (7 Del. C., Ch 42).

Rehabilitation of Birchwood Lake and Timber Lake Dams, Medford Township, Burlington County, NJ, Birchwood Lake Colony Club: Project Manager for the rehabilitations of the Birchwood Lake Dam, a significant hazard dam and Timber Lake Dam, a high hazard dam located in Medford Township, Burlington County, NJ. The Birchwood Lake Dam consists of an earth embankment and concrete ogee spillway. The Timber Lake Dam consists of an earth embankment and concrete box drop spillway. Both dams were damaged during heavy rains that affected Burlington County in July 2004. Mr. Ditchey was responsible for the investigation, design, permitting, bidding, and construction and helped the club obtain funding for construction. He oversaw preparation of contract plans and specifications for overtopping protection consisting of steel sheet piling. Responsible for engineering evaluations including slope stability analysis, seepage analysis, foundation design, dam break analysis, and HMR-52 PMF rainfall development. All work was done in accordance with NJDEP Dam Safety rules and regulations. Obtained Dam Safety, Wetland and Pineland Permits. Prepared the Operation and Maintenance (O&M) Manual and Emergency Action Plans (EAP) for both dams.

West Milford Dam, West Milford, Passaic County, NJ: Lead designer for the emergency breach of an unsafe high hazard dam. The dam was badly deteriorated and considered a public hazard. NJDEP ordered a fast track design, bid and construction of a temporary breach through the concrete and stone masonry spillway. Design tasks included sizing the breach, designing the lake drawdown system, and stabilizing the breach area from erosion.

Lake Solitude Dam, Borough of High Bridge, Hunterdon County, NJ: Provided consultation and expert witness services where the private owner of Lake Solitude Dam intended to breach the dam and empty the reservoir to bring the dam into compliance with NJDEP Dam Safety regulations. Consultation services including analyzing permit requirements, sizing the breach and assessing the sediment quantity and quality in the reservoir. The Borough condemned the property to prevent the owner from breaching the dam.

Bloede Dam Removal Project, Baltimore County MD: Provided consultation services related to the breach design of a hollow Ambursen type, reinforced concrete dam 34 feet high and 160 feet long, with a 40 foot wide base located on the Patapsco River forming the boundary between Baltimore and Howard Counties, Maryland. The impoundment area is currently filled with sediment and the dam, built to provide hydroelectricity, has not been operational since the early 20th century. McCormick Taylor is largely responsible for contributing geomorphic survey/analysis assistance, Hydrologic and Hydraulic Analysis (H&H), geotechnical and engineering analysis and reporting, permitting assistance, and other support tasks as needed. McCormick Taylor also assisted in the evaluation of a proposed remnant of the dam to be left in place for historic representation of the site as well as assisting in the development of dam removal methodology for preservation of this remnant. Viewing platforms have been designed by McCormick Taylor to allow park users following dam removal an impression of the former dam site. McCormick Taylor staff has been asked to be on site

during construction to address unforeseen removal challenges.

Mullica Hill Pond Dam, US Route 322, Harrison Township, NJ: Performed a visual inspection, hydrologic and hydraulic analysis, and evaluation of rehabilitation alternatives as part of the Feasibility Assessment (FA) Report for the NJDOT highway embankment dam. Mr. Ditchey was responsible for geotechnical investigations that included borings and developing parameters for scour analysis. He performed slope stability and seepage analyses for embankment; and an incremental dam break analysis (using HEC-1 and HEC-RAS) for computation of an appropriate inflow design flood. The FA Report presented several rehabilitation strategies to allow the dam to economically and safely pass the inflow design flood. Recommendations included several new primary spillway configurations.

Deputy project manager for the preparation of construction plans, specifications and estimate for the construction of the new enlarged concrete spillway, sheet pile cutoff, and new concrete box-beam bridge. The design includes a sluice gate for low level outlet and fish ladder. All activities have been coordinated with NJDEP Dam Safety and Fish and Wildlife Sections. The design incorporated a complex staging sequence to construct the new bridge and spillway while maintaining one lane of traffic in each direction.

Route 56 Rainbow Lake Dam, Pittsgrove Township, Salem County, NJ, NJDOT: Team Leader for the FA investigation, evaluation and design of rehabilitation measures for Rainbow Lake Dam. Responsible for preparation of an inspection report followed by detailed evaluations including subsurface investigations, hydrologic and hydraulic analyses, geotechnical evaluations, and incremental dam break analysis. Rehabilitation alternatives were developed and evaluated during the FA. During the final design, Mr. Ditchey performed slope stability analysis, seepage analysis, dam break analysis, and HMR-52 PMF rainfall development. All work was done in accordance with NJDEP Dam Safety rules and regulations, Dam Safety Act (NJAC 7:20) and the New Jersey Department of Environmental Protection, Dam Safety Section Regulations. Following a breaching failure, he was responsible for fast-track design of a new ogee spillway, steel sheet pile cutoff, low level outlet, and fish ladder. The design was completed in less than a month.

Anacostia Levee Flood Control Project, Prince George's County, MD: Performed evaluations and raising design for the Anacostia and Allison Street Levees in accordance with 44 CFR Section 65.10. Evaluations include hydrology and hydraulic review and analyses, review of a FDA analysis performed by the USACE, interior drainage analysis, slope and structural stability analyses, seepage analyses, and inspections of penetrations and pump stations. Raising design included review of raising concepts developed by the USACE Baltimore District, and design of levee raising using earthfill and riprap, utility relocation and coordination, and easement acquisition.

Route 40 Malaga Lake Dam, Franklin Township, Gloucester County, NJ, NJDOT: Team Leader for the investigation, evaluation and design of rehabilitation measures for Malaga Lake Dam. Performed the inspection of the dam, and was responsible for the geotechnical investigations and evaluations including slope stability analysis, seepage analysis, dam break analysis, HMR-52 PMF rainfall development, and developing parameters for scour analysis. All work was done in accordance with NJDEP Dam Safety rules and regulations. He supervised the preparation of the plans, specifications and estimate for the construction of the new enlarged concrete spillway, sheet pile cutoff, and concrete bridge repairs. The design included sluice gate and fish ladder. He coordinated the design with NJDEP Fish and wildlife section.

Statewide Dam Inspection Services Contract, NJ: Performed regular inspections and prepared Emergency Action Plans on nearly half of the dams owned by NJDOT located throughout the northern, central and southern portions of New Jersey. All of the dams consist of embankments that support the state roadway, overflow spillways constructed of concrete and or timber, and culvert or bridge structures that convey spillway discharge under the roadway. The inspections were performed in accordance with the Safe Dam Act (NJAC 7:20) and the New Jersey Department of Environmental Protection, Dam Safety Section Regulations. The scope of the inspections included evaluation of previous reports, original construction drawings, performance and instrumentation data; visual site inspection; review of Operation and Maintenance Manuals, Emergency Action Plans, and inundation mapping; and preparation of Visual Inspection Checklists and Regular Inspection Reports. Also performed emergency inspections of 16 NJDOT owned dams following the catastrophic flooding of July 2004.

Layton Lake Dam, NJ Route 48: Performed a visual inspection, hydrologic and hydraulic analysis, and evaluation of rehabilitation alternatives as part of Preliminary Engineering (PE) for the NJDOT highway embankment dam. Mr. Ditchey was responsible for geotechnical investigations that included borings and developing parameters for slope stability and seepage analyses for the embankment; and an incremental dam break analysis (using HEC-1 and HEC-RAS) for computation of an appropriate inflow design flood. The PE Report presented several rehabilitation strategies to allow the dam to economically and safely pass the inflow design flood. Recommendations included several new primary spillway configurations.

Deputy project manager responsible for preparing the construction plans, specifications and estimate for the construction of the new enlarged concrete spillway, sheet pile cutoff, and new concrete box-beam bridge. The roadway profile was raised to provide suitable freeboard against the SDF. The design includes a sluice gate for low level outlet. All activities have been coordinated with NJDEP Dam Safety and Fish and Wildlife Sections. The design incorporated a staging sequence to construct the new bridge and spillway while maintaining one lane of traffic in each direction and diversion of the spillway flow through the construction area.

NABIL M. HOURANI, P.E.

Senior Water Resources Engineer

EDUCATION:
M.S., 1988, Water Resources, City College of City University of New York
B.S., 1986, Civil Engineering, City College of City University of New York

PROFESSIONAL REGISTRATION:
Professional Engineer, Pennsylvania, #048687-E, 1994
Professional Engineer, New Jersey, #GE 38889, 1995
Professio Association of State Dam Safety Officials

PROFESSIONAL AFFILIATIONS:
American Society of Civil Engineers
American Society of Highway Engineers
National Society of Professional Engineers
The National Civil Engineering Honor Society Chi Epsilon
The National Engineering Honor Society Tau Beta Pinal
Engineer, Maryland, #21581, 1995

SUMMARY OF EXPERIENCE:
Mr. Hourani is an Associate and Manager of the Water Resources Group in the NJ office. Nabil holds Professional Engineer licenses in New Jersey, Pennsylvania and Maryland. He has been responsible for numerous hydrologic/hydraulic studies and drainage designs associated with dams, bridges, tunnels, and roadway improvement projects throughout his professional career. Nabil has extensive experience with hydrologic and hydraulic models and remote sensing computer software. He is currently serving as Project Manager for various Final Design and Feasibility Assessments for drainage, dams and flood control projects throughout New Jersey.

DETAILED EXPERIENCE:
Route 322 Raccoon Creek Bridge / Mullica Hill Pond Dam Harrison Township, Gloucester County, NJ: Project Manager for the Preliminary and Final Design for U.S. Route 322 Mullica Hill Pond Dam. The final design includes, design of 40 ft wide new bridge and 132 ft concrete ogee spillway. The spillway design includes sluice gate and fish ladder. Modified the horizontal and vertical geometry of the road to avoid design exception and provide 2 lanes of traffic at all time during construction. The profile was raised almost 2 feet above the existing low point to provide one foot of free board in the 100-year storm event which is the SDF of the dam. Provided two 12 feet lanes one lane each direction and 8 feet shoulders. The work included coordination with utility companies to relocate the gas line and water line under the stream, design special beam to fit the sanitary sewer line, relocation of utility poles, and cables. Determined the impact to the stream and established the Riparian Buffer Zone. Performed the impact analysis for different storm events 2, 5, 10, 25, 100, 0.2 PMF, 0.3PMF, 0.5PMF and 1PMF.and complied with NJDEP The Flood Hazard Control Regulation Act (FHCRA). Designed the spillway to balance the existing and proposed conditions without impact to downstream or upstream areas. The work also included roadway drainage design, stormwater management facility for water quality and groundwater recharge design to satisfy GP18 in accordance of BMP Manual. Completed Right-of-Way plans, and designed diversion system and cofferdam to maintain the pool level in the lake during the construction. The following computer programs were utilized in the H & H analyses: HEC-1, HEC-HMS, HEC-2, HEC-RAS, HMR-52, DAMBRK HEC-23, Storm -Cad, and Pond Pack.

Rehabilitation of Birchwood Lake and Timber Lake Dams, Medford Township, Burlington County, NJ, Birchwood Lake Colony Club: Project Manager for the rehabilitation of the Birchwood Lake Dam and Timber Lake Dam, both significant hazard dams located in Medford Township, Burlington County. During heavy rains that affected Burlington County in July 2004 the Birchwood Lake Dam embankment completely breached and the Timber Lake Dam embankment partially breached, The heavy rains ultimately resulted in 18 dam failures and 28 dams damaged. Mr. Hourani was responsible for preparing contract plans for bid and construction. Designed sheet piles to rehab the existing embankment, geotechnical investigation including foundation design Obtained Dam safety, wetland and Pineland Permits. McCormick Taylor performed an incremental inundation analysis to support the reduction in the spillway design flood. The following computer programs were utilized in the H & H analyses: HEC-1, HEC-HMS, HEC-2, HEC-RAS, HMR-52 and DAMBRK. MT Team prepared EAP with inundation mapping and O&M Manual. The studies and final design were performed in accordance with the Safe Dam Act (NJAC 7:20) and the New Jersey Department of Environmental Protection, Dam Safety Section Regulations.

US Route 30 Cooper River Drainage Improvement, Camden, NJ: Project Manager for this culvert design emergency repair project along the GSP after Tropical Storm Irene. Responsible for inspection of sinkholes at (1) GSP Exit 130 exit ramp due to a collapsed pipe, (2) twin CMP arch culverts at MP 118.5 under 12 lanes of the GSP and interchange ramps, (3) twin CMP culverts at MP 121.5 in the embankment, and (4) CMP at MP 120.8 in grass median. Project included preparing H&H analyses for 7 Flood Hazard Area Permits and 6 Wetlands Permits. Project also included jacking 2 major culverts under the GSP to replace the collapsed ones. Final Structural Design and Structural Plans were completed to support and rehabilitate the culverts at MP 118.5 using steel ribs with reinforced shotcrete. Prepared construction plans, MPT plans, structure plans, tie sheets, SE&SC plans, specifications and cost estimates for the culvert design. Completed on an accelerated schedule within 6 months.

AMER T. NAZHA, P.E.

Senior Water Resources Engineer

EDUCATION:
B.S., Civil Engineering, Damascus University, 1982
B.S., Environmental Science, Stockton State College, 1993
M.S., Water Resources, Drexel University, 1996

PROFESSIONAL REGISTRATIONS:
Professional Engineer: Pennsylvania, #PE053416E, 1999; New Jersey, #24GE04229100, 2000

SUMMARY OF EXPERIENCE:
Mr. Nazha has 32 years of experience in highway drainage design, hydrology and hydraulic analysis, stormwater management, stream restoration and scour analysis. He completed many feasibility studies for flood control, drainage improvement projects and as drainage lead engineer he completed drainage design for many final design projects.

DETAILED EXPERIENCE:
Route 322 Raccoon Creek Bridge/Mullica Hill Pond Dam, Harrison Township, NJ, NJDOT: Lead Designer for Preliminary and Final Design for this project to raise the roadway profile of Route 322 by 2 feet and replace the bridge and concrete ogee spillway. Responsible for design of the proposed spillway and design of the proposed bridge opening. Conducted drainage design for Route 322, performed stormwater drainage spread calculations and designed a stormwater management infiltration basin to compensate for groundwater recharge and water quality.

Route 48 Layton Lake Dam Final Design, NJDOT: Lead Designer during the Preliminary and Final Design phases of the NJDOT Capital Project Delivery Process for the Route 48 Layton Lake Dam. Final design includes design of 44-ft wide new bridge and 120 ft concrete ogee spillway. The roadway profile was raised almost 1.5 feet above the existing low point to provide one foot of free board in the 100-year storm event which is the SDF of the dam. Performed flood routing calculations to route the flood through the proposed spillway to determine the impact downstream area.

Designed the opening of the proposed bridge and the size of the spillway. Prepared highway drainage design for Route 48, performed highway stormwater drainage spread calculations, and hydraulic grade line analysis for the proposed drainage system. Designed a stormwater management bioretention basin to compensate for the groundwater recharge and water quality.

Prepared H & H report for Dam Safety permit and Freshwater Wetlands permit. Final design work also entailed utility investigation SUE, final drainage design, and design for soil/slope erosion and sediment control measures. Completed soil erosion/sediment control plans, cost estimates and specifications.

Hearn's Pond Dam, Sussex County, DE: Lead Designer. McCormick Taylor performed final design for spillway and bridge replacement and overtopping protection to safely pass the SDF which is 0.3 PMF. The new spillway and bridge will be designed to pass the 100-year storm and the embankment will be armored to safely pass the SDF. McCormick Taylor developed an Emergency Action Plan (EAP) and Operation & Maintenance Manual in accordance with Delaware DNREC's new enacted dam safety standards (7 Del. C., Ch 42).

Rehabilitation of Birchwood Lake and Timber Lake Dams, Medford Township, Burlington County, NJ, Birchwood Lake Colony Club: Lead Designer for the rehabilitations of the Birchwood Lake Dam, a significant hazard dam and Timber Lake Dam, a high hazard dam located in Medford Township, Burlington County, NJ. The Birchwood Lake Dam consists of an earth embankment and concrete ogee spillway. The Timber Lake Dam consists of an earth embankment and concrete box drop spillway. Both dams were damaged during heavy rains that affected Burlington County in July 2004.

Newton Lake Dam, NJ Route 168: Lead Designer. McCormick Taylor performed a visual inspection, hydrologic and hydraulic analysis, and evaluation of rehabilitation alternatives as part of Preliminary Engineering (PE) for the NJDOT highway embankment dam. McCormick Taylor was responsible for geotechnical investigations that included borings and developing parameters for slope stability and seepage analyses for the embankment. Performed an incremental dam break analysis (using HEC-1 and HEC-RAS) for computation of an appropriate inflow design flood. The PE Report presented several rehabilitation strategies to allow the dam to economically and safely pass the inflow design flood. Recommendations included several new primary spillway configurations.

Currently part of a design team that is preparing the construction plans, specifications and estimate for the construction of the new enlarged concrete spillway, sheet pile cutoff, and new concrete box-beam bridge superstructure. The design includes a sluice gate for low level outlet and fish ladder. All activities have been coordinated with NJDEP Dam Safety and Fish and Wildlife Sections.

GRAHAM BOARDMAN, GISP

Environmental Scientist/Fluvial Geomorphologist

EDUCATION:
M.B.A., In Progress, Towson University
M.A., Geography, University of Connecticut, 2008
B.A., Geology/Environmental Studies, Franklin and Marshall College, 2004

PROFESSIONAL REGISTRATIONS:
2013, Rosgen Level 1. Applied Fluvial Geomorphology
2012, MDE, Erosion and Sediment Control Cert. (Green Card)
2008, Certificate in Geographic Information Systems
2007, EPA Watershed Management Training Certificate

SUMMARY OF EXPERIENCE:
Mr. Boardman is an Environmental Scientist/Fluvial Geomorphologist with ten years of experience. His academic background is in Geology and Fluvial Geomorphology. Mr. Boardman has experience with all aspects of stream restoration and dam removal design including project prioritization, identification, initial scoping, field assessment, design, reporting, cost estimate development, permitting, construction management, and post construction monitoring.

DETAILED EXPERIENCE:
Centreville Dam Removal Project, Centreville, Maryland: Served as lead designer during the feasibility assessment and subsequent dam removal design phases. The Centreville Dam is a 25-foot wide, 5 foot high structure which prevents fish passage and creates artificial lentic habitat. The concrete structure will be removed using unique dewatering techniques to ensure minimal downstream migration of fine sediments. A fish passage structure is included in the design to pass fish over a concrete encased sewer crossing that is downstream of the existing dam. The project is in the construction bidding phase and is expected to be complete in Winter, 2014.

White Marsh Run Stream Restoration Project, White Marsh, Maryland: Mr. Boardman serves as a designer and fluvial geomorphologist for the assessment and restoration design for White Marsh Run at White Marsh Road Stream Restoration. The estimated channel length being restored is approximately 11,000 linear feet. The objective of the project is to provide a channel design plan that creates a stable channel network which yields ecological uplift, increases lateral and longitudinal connectivity of the system and protects existing infrastructure in the stream valley. Mr. Boardman also leads the property notification and negotiation process with approximately 40 landowners and businesses whose property will be directly impacted by the stream restoration project. Permitting for this accelerated project was led by Mr. Boardman. Construction is expected to begin in Summer, 2014.

Patapsco River Restoration Project, Simkins Dam Removal, Baltimore County, Maryland: Serving as Environmental Scientist/Fluvial Geomorphologist, Mr. Boardman assisted in the development and implementation of a monitoring plan to determine the long-term geomorphic impacts of the Simkins Dam Removal. The project involved the removal of the 170-foot long 10-foot high concrete spillway which resulted in the release of approximately 88,000 cubic yards of impounded sediment to downstream reaches in late 2010. The data collected will contribute to the design of the removal of the Bloede Dam and subsequent geomorphic impacts to the river. Academic publications are expected to provide data analysis and interpretation to the larger dam removal community in order to inform future large scale projects.

Patapsco River Restoration Project, Bloede Dam Removal, Baltimore County, Maryland: Acting as a subconsultant, Mr. Boardman offers technical guidance and permitting expertise for the removal of the Bloede Dam. This 220-foot wide 26 foot high hollow structure is to be removed to provide fish passage. Several hundred thousand cubic yards of material are stored behind the dam and the fate of these sediments is an important part of dam removal. Several approaches are being evaluated to determine and preferred alternative. The project is in the design phase with construction expected in 2016.

Herring Run at Overlook Park Stream Restoration, Towson, Maryland: Comprehensive geomorphic evaluation and restoration design for 6,000 linear feet of stream channel. The project focus is to evaluate the site specific and systematic character of the drainage network in order to determine channel impairment and to prioritize and select restoration opportunities. Mr. Boardman was responsible for identifying restoration reaches, determining constraints, and implementing the design. The design features an innovative wall feature intended to attract users of a local park to the stream while providing aesthetic appeal. Interpretive signs, picnic areas, and other amenities are included in the design.

SCOTT B. LOWE

Environmental Scientist

EDUCATION:
B.S., Civil Engineering, University of Massachusetts, 1994
M.S., Environmental Engineering and Applied Science, Johns Hopkins University, 2005

SUMMARY OF EXPERIENCE:

Mr. Lowe is an Environmental Scientist and Project Manager for McCormick Taylor's (MT) Environmental Design Group. His academic and professional background is in aquatic ecology, wetland ecology, fluvial geomorphology, and limnology and watershed management. He has over 19 years of experience performing watershed studies, stream assessments, macroinvertebrate sampling and analysis, sediment transport evaluations, wetland delineation and design, fish passage assessment and design, bioengineering and bank stabilization design, stream restoration design, and construction management services.

Mr. Lowe has served as restoration designer or construction manager on over 48,000 linear feet of streams in Maryland, Virginia, North Carolina, West Virginia, and Pennsylvania. He has extensive experience with sediment transport analysis, bioengineering techniques, hydrologic evaluations, and natural channel design.

DETAILED EXPERIENCE:

Montgomery County Water Resources Engineering Support Services, Montgomery County, MD: Contract Manager overseeing efforts on CIP projects for the County including the Kensington Park and Aspen Hill Libraries, Low Impact Development Project, Roadway Low Impact Development, Forest Estates and Four Corners Area, Low Impact Development Retrofit Projects at two schools and three roadways, and the Game Preserve SWM Retrofit Projects. Additional duties include overseeing efforts on the Anacostia Watershed Stream Assessment and Watershed Restoration Pre and Post Construction Restoration Effectiveness Monitoring project.

Northwest Branch 160/170 Stream Restoration Montgomery County, MD: Project Manager and Lead Geomorphologist for comprehensive stream restoration assessment and design for a four mile reach of Northwest Branch. This project was completed as part of the compensatory mitigation and environmental stewardship package for the ICC. Involved detailed stream survey and geomorphological assessments, streambed facies characterization, combined bedload trapping and in-steam hydraulics program, large woody debris (LWD) surveys and buoyancy calculations, logjam engineering evaluations and design, in-stream and riparian habitat assessment. The PS&E package was completed in 2009, with project advertisement in fall of 2009. MT developed monitoring plans as part of the project as well. He served as the designated specialist for the duration of construction, which began in 2010 and was completed in 2012.

PB-85 Stream Mitigation, Prince George's County, MD: Project Manager for a mitigation project that incorporates stream, floodplain, and wetland restoration efforts along Paint Branch. The project extended from MD 193 (University Boulevard) upstream approximately 4,180 feet, and portions of Little Paint Branch from the confluence with Paint Branch upstream approximately 3,116 feet. Design efforts used data collected during instream and riparian habitat assessments, geomorphological evaluations, surface and subsurface hydrology evaluations, wetland assessments, development of a suspended sediment model, and detailed hydrology and hydraulics modeling (including 2-D hydraulics modeling). MT prepared a presentation, display boards, and attended a public meeting to address the public's concerns. MT developed monitoring plans as part of the project as well. PS&E was submitted in February 2012.

Stream Stabilization/Restoration, Environmental, Permitting and Ancillary Services, Fairfax County, VA: Lead Stream Designer for all task orders under this On-Call contract. Extensive design development is required for each project due to the highly urban nature of the systems. He worked closely with the County to solve numerous design challenges for each site, including landowner requests/restrictions, utilities, culverts, and previous channel work including gabion walls, riprap along the banks, etc.

Mudlick Creek Stream Restoration Roanoke County, VA: Lead Restoration Designer responsible for the design development for this 3,000 linear foot stream restoration effort. This highly urban system required extensive design considerations. The final design was a hybrid of several design methodologies. Final design stabilized the stream system while allowing and encouraging public access.

Plumtree Run Stream Restoration, Harford County, MD, SHA: Stream restoration project manager and lead designer for assessment and restoration design for 3,000 linear feet of Plumtree Run in Bel Air, MD. This project was the first stream restoration project in Maryland initiated in pursuit of TMDL credit. The assessment involved detailed stream survey and geomorphic assessments and in-stream and riparian habitat assessment. Proposed design elements include channel planform and profile adjustment with two full channel relocations, riffle grade control structures, bank grading and bioengineering techniques for bank stabilization and riparian planting for buffer enhancement.

JOHN MULLEN, AICP, NJPP

Public Involvement

EDUCATION:
Entrepreneurial Business Certificate, University of Pennsylvania, Wharton School of Business, 2012
Bachelor of Liberal Studies (BLS), Communications, Political Science & Marketing, Iowa State University, 1997

PROFESSIONAL REGISTRATIONS:
American Institute of Certified Planners (AICP), License Number: 019806
New Jersey Professional Planner (NJPP), License Number: 33LI00607300
American Planning Association (APA), Member, New Jersey and Pennsylvania chapters

SUMMARY OF EXPERIENCE:
As a Senior Transportation Planner and Public Involvement Specialist at McCormick Taylor, Mr. Mullen has extensive experience in managing multimodal transportation planning and public involvement programs for both small and large-scale capital improvement projects. Mr. Mullen participates in all aspects of the project development process, and incorporates land use planning, transit planning, roadway design and environmental best practices into all projects. Mr. Mullen is an instructor for the National Transit Institute's (NTI) Transportation and Land Use Course, and he promotes sound, practical and sustainable multimodal transportation solutions to communities around the country. A trained facilitator, he has designed and implemented educational and public involvement programs for municipal, county and state agencies throughout Pennsylvania, New Jersey, Delaware, Maryland and Virginia.

DETAILED EXPERIENCE:
SEPTA Norristown High Speed Line Extension (NHSL) Project, Philadelphia, Delaware & Montgomery Counties, PA: Project Manager for the Norristown High Speed Line Extension Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS) public outreach program. Known locally as the "King of Prussia Rail Project," the project proposes to extend the Norristown High Speed Rail Line to various destinations within the King of Prussia area. As part of this effort, Mr. Mullen leads the development and implementation of a robust public outreach strategy that informs the public about the project, gauges public opinion, and integrates public feedback into the AA/DEIS. In addition, the public outreach conducted as part of this project is designed to adhere to the public involvement requirements of the National Environmental Policy Act (NEPA). Specific deliverables include: development of a project theme; project newsletters and fact sheet; website and social media program; surveys; displays, advertisements, and printed and electronic materials; and media relations (press releases, frequently asked questions). In addition, Mr. Mullen works with the public, project stakeholders and Environmental Justice communities to build partnerships to improve mobility in the King of Prussia area.

Crum Creek Viaduct Replacement Project, Nether Providence Township and Swarthmore Borough, Delaware County, PA: Mr. Mullen is the public outreach manager for SEPTA's Crum Creek Viaduct Replacement Project. The program entails public involvement activities for residents and stakeholder near the construction site, as well as community coordination regarding the location of the project's temporary construction access easement. Mr. Mullen is assisting SEPTA in the development of consistent and effective messaging, project handouts and display materials, and the organization and management of community outreach meetings.

Route 130 Over Raccoon Creek Bridge Replacement Project, Logan Township, NJ: Mr. Mullen coordinated with the Township to identify traffic management solutions and context-sensitive designs for this small bridge replacement project in Logan Township, NJ. He was responsible for the management of design workshops for conceptual plans that replace the Route 130 Bridge over Raccoon Creek, including potential construction and traffic impacts affecting a small community and recreational boating activities in the area.

PATCO (DRPA) Ben Franklin Bridge Track Replacement: Mr. Mullen is the project manager for a robust public outreach and information program designed to inform riders of schedule, operations and policy changes resulting from the track replacement along the bridge. The project entails alternating track outages on the bridge, resulting in reduced peak period train capacity, schedule changes and service interruptions. The outreach program includes on-site publicity efforts at key stations along the rail line, public meetings, informational interviews on transit platforms, informational flyers, seat-drops, displays and website updates.

Route 4 Bridge / Intersection Studies, Englewood City and Teaneck Township, Bergen County, NJ: Mr. Mullen managed the community impact assessment and public involvement programs for a series of bridge and intersection studies along Route 4 in Englewood City and Teaneck Township, Bergen County. Project activities included identifying the potential impacts proposed transportation improvements would have on communities along the corridor, as well as documenting pending and proposed development activities that may be affected during construction.

PROJECT SUMMARIES:

The following Project Summaries illustrate a number of projects that McCormick Taylor recently completed. These projects are examples of our experience with dam rehabilitation design including overtopping protection, dam removal, stream restoration, and sediment transport modeling.

All of the Project Summaries represent projects that were completed in the last eight years. Also the key members of the project team each had roles on the various projects highlighted.

MULLICA HILL POND DAM

Harrison Township, Gloucester County, NJ

McCormick Taylor completed an inspection and engineering evaluation of Mullica Hill Pond Dam, a high hazard dam formed by the roadway embankment for US Route 322. Mullica Hill Pond Dam is located in Harrison Township, Gloucester County, New Jersey. The dam has a maximum height of 19 feet, is 250 feet long, and retains a reservoir used for recreation. The existing spillway is a concrete box drop with four sets of timber stop logs. Spillway discharge is conveyed under a concrete bridge that supports US Route 322. There are remnants of a historic canal and masonry railroad bridge abutments located immediately downstream of the dam. The canal has portions of the original towpath intact. There is a gate structure at the left abutment of the dam that controls flow to two 48-inch pipes that fed water to the canal.

The program included preparation of an inspection report followed by detailed evaluations including subsurface investigations, hydrologic and hydraulic analyses, geotechnical evaluations, and incremental dam break analysis. Rehabilitation alternatives were developed and evaluated. An EAP with inundation mapping and O&M Manual were also prepared.

The hydrologic and hydraulic analysis involved assessing the existing conditions. The original spillway had insufficient capacity to pass the design storm. McCormick Taylor performed an incremental inundation analysis to support the reduction in the spillway design flood from the full PMF to the 100-year flood. This reduction in the SDF significantly reduced the size of the new spillway and the corresponding construction cost. The following computer programs were utilized in the H & H analyses: HEC-1, HEC-HMS, HEC-2, HEC-RAS, HMR-52 and DAMBRK. The geotechnical evaluations consisted of a boring program to assess the embankment and foundation material properties, seepage analysis, slope stability analysis, and seismic stability assessment. Various rehabilitation alternatives were developed and evaluated that would safely pass the spillway design flood and bring the dam into compliance with Dam Safety Standards. These alternatives included new enlarged concrete spillway with an ogee crest and overtopping protection using articulated concrete blocks or roller compacted concrete. A comprehensive report was prepared that summarized the findings of the engineering analyses, presented the rehabilitation alternatives, and provided conclusions and recommendations.

McCormick Taylor completed environmental studies for the feasibility assessment and preliminary/final design phases of the project. NEPA documents were prepared including a Categorical Exclusion, Section 106 Studies, Hazardous Waste Screening, and endangered species investigation. Section 106 Studies entailed a Phase I Archaeological Survey and Historic Structures Survey.

McCormick Taylor performed the final design of the preferred alternative consisting of a pile supported semi-circular concrete ogee spillway, fish ladder, low level outlet, concrete outlet channel, sheet pile cutoff, and new single span concrete box beam bridge on a new alignment. McCormick Taylor provided construction support services including shop drawing review, contract document interpretation, periodic site inspection, review of change order requests, and as-built drawing preparation.

SUMMARY

Client:
New Jersey Department of Transportation

Contact:
Mike Kasbekar, P.E.
609.530.6627

BIRCHWOOD LAKE DAM

Medford Township, Burlington County, NJ

McCormick Taylor performed an inspection, evaluation, design, and construction program for the rehabilitation of Birchwood Lake Dam, a significant hazard dam located in Medford Township, Burlington County, NJ. The dam consists of an earth embankment and concrete ogee spillway. The embankment completely breached during heavy rains that affected Burlington County in July 2004, resulting in 18 dam failures and 28 dams damaged.

The program included review of existing information and inspection followed by detailed evaluations including subsurface investigations, hydrologic and hydraulic analyses, geotechnical evaluations, and incremental dam break analysis. Rehabilitation alternatives were developed and evaluated, final design of the selected alternative including preparation of contract documents, permit applications were prepared, and design support was provided during construction. An EAP with inundation mapping and O&M Manual were also prepared.

The hydrologic and hydraulic analysis involved assessing the existing conditions. The original spillway had insufficient capacity to pass the design storm. The following computer programs were utilized in the H & H analyses: HEC-1, HEC-HMS, HEC-2, HEC-RAS, HMR-52 and DAMBRK. The geotechnical evaluations consisted of a boring program to assess the embankment and foundation material properties, seepage analysis, slope stability analysis, and seismic stability assessment. Various rehabilitation alternatives were developed and evaluated that would safely pass the spillway design flood and bring the dam into compliance with Dam Safety Standards. Given the site constraints and a desire to maintain the existing discharge characteristics, rehabilitation alternatives focused on overtopping protection including articulated concrete blocks (ACB's), roller compacted concrete, and steel sheet piling. An evaluation of alternatives comparing construction cost, constructability, construction duration, construction staging requirements, and completed aesthetics; resulted in steel sheet piling being recommended as the preferred alternative. McCormick Taylor performed final design, permitting, bidding and construction phase services.

SUMMARY

Client:
Birchwood Lake Colony Club

Contact:
John Cirenza
President
609.744.2900

TIMBER LAKE DAM

Medford Township, Burlington County, NJ

McCormick Taylor performed an inspection, evaluation, design, and construction program for the rehabilitation of Timber Lake Dam, a high hazard dam located in Medford Township, Burlington County, NJ. The dam consists of an earth embankment and concrete box drop spillway. The embankment partially breached during heavy rains that affected Burlington County in July 2004, resulting in 18 dam failures and 28 damaged dams.

The program included the review of existing documentation and inspection followed by detailed evaluations including subsurface investigations, hydrologic and hydraulic analyses, geotechnical evaluations, and incremental dam break analysis. Rehabilitation alternatives were developed and evaluated, final design of the selected alternative including preparation of contract documents, permit applications were prepared, and design support was provided during construction. An EAP with inundation mapping and O&M Manual were also prepared.

The hydrologic and hydraulic analysis involved assessing the existing conditions. The original spillway had insufficient capacity to pass the design storm. The following computer programs were utilized in the H & H analyses: HEC-1, HEC-HMS, HEC-2, HEC-RAS, HMR-52 and DAMBRK. The geotechnical evaluations consisted of a boring program to assess the embankment and foundation material properties, seepage analysis, slope stability analysis, and seismic stability assessment. Various rehabilitation alternatives were developed and evaluated that would safely pass the spillway design flood and bring the dam into compliance with Dam Safety Standards. Given the site constraints and a desire to maintain the existing discharge characteristics, rehabilitation alternatives focused on overtopping protection including articulated concrete blocks (ACB's), roller compacted concrete, and steel sheet piling. An evaluation of alternatives comparing construction cost, constructability, construction duration, construction staging requirements, and completed aesthetics; resulted in steel sheet piling being recommended as the preferred alternative. McCormick Taylor performed final design, permitting, bidding and construction phase services.

SUMMARY

Client:
Birchwood Lake Colony Club

Contact:
John Cirenza
President
609.744.2900

HEARNS POND DAM

Sussex County, Delaware

Following two storm events in 2001 and 2006 which overtopped Hearns Pond Dam, rehabilitation of the dam was the top priority of the Delaware Department of Natural Resources and Environmental Control (DNREC). The 2001 storm breached the embankment releasing the stored water. The 2006 storm severely damaged the dam, but a breach was averted by steel sheeting installed through the embankment following the 2001 overtopping event. Hearns Pond Dam will be the first state owned dam to have major remediation performed in accordance with the recently adopted Dam Safety Regulations.

Hearns Pond Dam is located on Clear Brook, Sussex County, Seaford, DE. The dam is owned by DNREC and operated and maintained by the Division of Fish and Wildlife. The pond formed by the dam is used for fishing and other recreational activities. The existing spillway and culvert are structurally deficient and severely undersized. The new spillway and culvert system will be able to pass the 100-year storm and overtopping protection will be provided to allow for safe passage of the full spillway design flood (SDF) which is the 0.4 probable maximum flood (PMF).

Adding to the challenge of both permitting and constructing the rehabilitation is a historic mill structure situated at the south abutment of the dam. Water from the pond was formerly used to supply power to the mill. Permits required to construct the project include DNREC Subaqueous Lands Permit and a US Army Corps of Engineers Nationwide Permit (NWP) #3 (a) and (c) with a Pre-Construction Notification (PCN).

McCormick Taylor's scope of services for Hearn's Pond Dam included hydrology, hydraulic and dam break analyses; inundation mapping; spillway design flood determination, spillway adequacy, and hazard class verification; subsurface investigations and geotechnical evaluation; structural assessment and stability analysis; and rehabilitation alternative development. McCormick Taylor performed final design for spillway and culvert replacement and overtopping protection to safely pass the SDF which is 0.4 PMF. The new spillway will be semi-circular in plan and have an ogee shaped cross section. The spillway will contain a sluice gate for emergency draw down and lake level control, and the upstream slope will be protected from erosion with riprap. The embankment sections will be armored with articulated concrete blocks (ACB). The culvert will be twin pre-cast culvert sections, which will reduce construction cost and duration. McCormick Taylor developed an Emergency Action Plan (EAP) and Operation & Maintenance (O&M) Manual in accordance with the Delaware Department of Natural Resources & Environmental Control's newly enacted dam safety standards (7 Del. C., Ch 42).

SUMMARY

Client:
Delaware Department of Natural Resources and Environmental Control (DNREC)

Contact:
David R. Twing, P.E. (DNREC)
302.834.5557

CENTENNIAL LAKE DAM

Medford Township, Burlington County, New Jersey

Centennial Lake Dam is located within Medford Township, Burlington County, New Jersey and has multiple owners. Centennial Land & Development own the lake, outlet tower (principal spillway), and portions of the embankment (slopes) outside the roadway right-of-way. Medford Township owns Centennial Dam Road right-of-way; and Burlington County owns the outlet culvert which conveys flow from the principal spillway under the dam and discharges into Taunton Lake downstream. The dam crosses Haynes Creek and carries Centennial Dam Road over the crest. The lake is used for recreational purposes.

Centennial Lake Dam is comprised of an earthfill embankment approximately 300 feet in length, has a maximum height of approximately 15 feet with a top width of about 30 feet. Centennial Dam Road is a paved roadway carried along the embankment of Centennial Lake Dam. The existing spillway structure is a concrete drop inlet. The spillway discharges to 10 feet wide by 8 feet high concrete box culvert. The culvert discharges into Taunton Lake which is located immediately downstream of Centennial Lake Dam, Taunton Lake submerges the downstream toe of the Centennial Lake Dam.

This dam is classified as Class 1 high hazard dam by the New Jersey Department of Environmental Protection (NJDEP). McCormick Taylor performed a comprehensive dam safety evaluation in order to bring the dam in conformance with NJDEP regulations. The evaluation included hydrologic, hydraulic, and dam break analyses; geotechnical investigations and slope stability analysis; and development of remedial alternatives to address identified deficiencies. The embankment slopes do not meet required stability criteria and the spillway is undersized. It passes only a small portion of the required spillway design flood. The recommended alternative included flattening the upstream and downstream slopes to improve slope stability and armor the downstream slope with concrete to provide overtopping protection.

McCormick Taylor is under contract to perform the final design of overtopping protection using cast-in-place concrete or roller compacted concrete, permitting, bidding and construction phase services.

SUMMARY

Client:
J. Llewellyn Mathews
Attorney at Law

Contact:
J. Llewellyn Mathews
609.519.7744

BLOEDE DAM REMOVAL

Baltimore and Howard Counties, Maryland

The Bloede Dam is a hollow Ambursen type, reinforced concrete dam 34 feet high and 160 feet long, with a 40 foot wide base located on the Patapsco River forming the boundary between Baltimore and Howard Counties, Maryland. The contributing watershed drains an area of approximately 300 square miles, and the dam impounds roughly thirty acres. The impoundment area is currently filled with sediment and the dam, built to provide hydroelectricity, has not been operational since the early 20th century. McCormick Taylor has teamed with Interfluve, Inc. on this project and is largely responsible for contributing geomorphic survey/analysis assistance, Hydrologic and Hydraulic Analysis (H&H), geotechnical and engineering analysis and reporting, permitting assistance, and other support tasks as needed.

The primary goal of the Bloede Dam Removal Project is to restore fish passage for diadromous fish on the Patapsco River. Target species include American eel, American shad, hickory shad, blueback herring, alewife, and perch. Other goals including improving park safety and eliminating the significant liability presented to the state by the dam while preventing costly future maintenance. The project is part of the larger Patapsco River Restoration Project that has included the removal of the Simkins Dam and the Union Dam, both upstream of the Bloede Dam. Key design challenges include safely removing the dam while preventing interruption of service in a large sewer line which bisects the dam.

The most significant engineering challenges encountered when designing this dam removal effort are presented by the management of approximately 300,000 yd3 of material that may be mobilized following dam removal and the unique construction and access considerations which must be included.

Both passive and active sediment management techniques have been evaluated and ranked based on environmental impact and cost. Passive sediment management involves allowing impounded materials to flow downstream while active measures include stabilizing or dredging sediment. Passive sediment has been shown effective in this system and represents a significant cost savings as opposed to dredging. McCormick Taylor has assisted Interfluve in the development of the model designed to inform these decisions as well as to describe the extent and timing of sediment mobilization.

McCormick Taylor also assisted in the evaluation of a proposed remnant of the dam to be left in place for historic representation of the site as well as assisting in the development of dam removal methodology for preservation of this remnant. Viewing platforms have been designed by McCormick Taylor to allow park users following dam removal an impression of the former dam site. McCormick Taylor staff have been asked to be on site during construction to address unforeseen removal challenges.

The project is somewhat controversial as it is highly visible, exists within a heavily used state park, and has unique historic value. McCormick Taylor has been tasked with leading the permitting effort for the project. This effort involves submitting relevant permits and coordinating the unique analysis techniques required by the Maryland Department of the Environment (MDE) and the US Army Corps of Engineers (USACE) among others to document potential adverse impacts. A thorough knowledge of both nationwide and local regulatory practices is required.

The project is in the final design phases. As of May 20, 2015 95% plans have been submitted and the project is being reviewed by permitting agencies, the public, and other stakeholders. Construction will likely be completed in two stages, one in which an adjacent sewer line is relocated and another in which the dam itself is removed and is anticipated for 2016.

SUMMARY

Client:
American Rivers

Contact:
Serena McClain
202.347.7550

CENTREVILLE DAM REMOVAL

Queen Anne's County, Maryland

McCormick Taylor is currently working in partnership with American Rivers, the City of Centreville, NOAA, MD DNR and US FWS to evaluate the feasibility and to design the removal of the Centreville Dam in Centreville, Maryland. The site characterization phase of this project has been completed and, after presentation to the Town Council, design of the dam removal has been completed. Construction is anticipated for June, 2015.

The goals of the projectare fish passage for species including perch, herring, and American eels, improving fisheries, benthic macroinvertebrate and wildlife habitat, restoring /stabilizing stream channel and banks, and establishing native riparian vegetation. Full dam removal was the selected alternative after a feasibility analysis document the existing conditions.

The Centreville Dam consists of a concrete and stone structure approximately four feet tall, three feet wide, and 20 feet long. Several pieces of infrastructure including a sewer line and a water supply line exist in close proximity downstream of the dam. SHA Bridge #1702000 over SR 213 is just downstream. Evaluating the impacts to this bridge due to dam removal represents a key part of the project.

The setting of the project is unique as it lies within the Corsica River Watershed, targeted by MD DNR for the comprehensive restoration of a significant Chesapeake Bay watershed. Therefore, minimizing the mobilization of sediment and nutrients from the impoundment during the removal of the Centreville Dam will be vital to project success.

An exposed concrete encased sewer line downstream of the dam represents a significant fish passage barrier and had to be addressed as part of the project. McCormick Taylor utilized the Manning's equation to determine maximum water velocity and turbulence for target species fish passage. A careful evaluation of target species burst speed and jumping ability was carried out. This resulted in the design of a rock ramp structure that will pass fish during spawning periods and in turn ensure the success of the dam removal project.

Additionally, observations indicate the presence of a significant and highly functioning wetland system and multi-threaded channel upstream of the impoundment area. This wetland system appears to have an advantageous entrenchment ratio providing excellent floodplain accessibility. This floodplain likely provides reduction of peak flow, allows for sediment deposition, and promotes nutrient processing. Therefore, it is important to investigate means to retain the primary functions of this system. Based on review of existing aerial photography, the wetland extends approximately ½ mile upstream of the impoundment.

SUMMARY

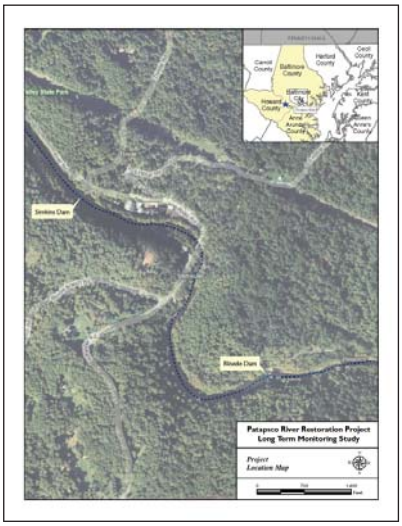
Client:
American Rivers

Contact:
Serena McClain
202.347.7550

SIMKINS DAM REMOVAL

Baltimore and Howard Counties, Maryland

McCormick Taylor was contracted by American Rivers to monitor and evaluate the effects of the Simkins Dam Removal, which was removed in late 2010, on the Patapsco River. The Simkins Dam was a concrete and rebar reinforced structure roughly 10-feet high and built in the early 1900's in order to supply power to a nearby mill. The dam was roughly 170-feet in length and created an impoundment 3,500 feet in length with an area of roughly 10 acres. The dam was located near Ellicott City, Maryland at the intersection of Ilchester Road and River Road.



The purpose of removing the dam was to allow for the passage of diadramous fish, to facilitate a return to free flowing conditions, restore sediment transport processes, lower temperatures and increase dissolved oxygen concentrations. Preliminary notching of the dam was undertaken in late November 2010, and the dam was completely removed during the first week of December 2010. The fish ladder structure adjacent to the dam was removed shortly after.

Long term monitoring included establishing a series of 31 permanently benchmarked cross sections, five digital elevation models characterizing roughly 13,200 linear feet of channel, facies and site mapping at each of the 31 cross sections, a grain size analysis encompassing 18 grab samples and 17 pebble counts and concluding with the establishment of 101 permanently benchmarked photo sites comprising 400 photos.

All permanently benchmarked sites were located using survey equipment and well marked in order to allow the positions to be easily reassumed during follow-up surveys. Finally, the material present behind the dam was sampled and evaluated for bulk density in order to help determine the mass of sediment moving through the system.

To document baseline conditions and to determine the natural variability present in the system, a reference reach was established near the intersection of River Road and Frederick Road, just downstream of Ellicott City. The purpose of the reference reach is to determine potential shifts in the local river system unrelated to the removal of the Simkins Dam. The former site of the Union Dam, just downstream of the Route 40 bridge, was also evaluated as part of this study. The Union Dam was nearly completely breached during Hurricane Agnes in the Summer of 1972, and was fully removed during the summer of 2010. Extensive bank grading and the addition of several structures were included in the design.

A five year monitoring period has been completed for this project. Results have been compiled and are being prepared for presentation in numerous academic peer reviewed journals. At presentations throughout the county, results have been provided to dam removal practitioners to help inform other efforts. To prepare for the removal of the Bloede Dam, the results of the Simkins monitoring were merged with existing modeling to verify assumed scenarios. Monitoring is expect to continue as the system responds to the removal of the Bloede Dam.

SUMMARY

Client:
American Rivers

Contact:
Serena McClain
202.347.7550

AWARD WINNING DESIGNS:

The quality of our work is best defined by the number of awards independent groups bestow on our projects. We are proud of the work we do and believe our work to be of high quality. The following award winning projects were designed by McCormick Taylor's Water Resources Group:

- **The Malaga Lake Dam Rehabilitation Project** received the American Council of Engineering Companies of New Jersey (ACEC/NJ's) Distinguished Award for Engineering Excellence in 2004.
- **The Rainbow Lake Dam Replacement Project** received the Project of the Year Award from the American Society of Civil Engineers, New Jersey Section; the Project of the Year Under $5M Construction Cost from the American Society of Highway Engineers, North Central NJ Section; and the Project of the Year - Minor Project from the American Society of Highway Engineers, Southern NJ Section.
- **The Cooper River Flood Control Project** just received the American Council of Engineering Companies of New Jersey (ACEC/NJ) 2012 Engineering Excellence Distinguished Award recipient.
- **Large Diameter Stormwater Culvert Repair Using Tunneling Methods** received the American Council of Engineering Companies of New Jersey (ACEC/NJ's) Distinguished Award for Engineering Excellence in 2013.
- **The Anacostia River Flood Risk Management Rehabilitation**, Prince George's County, MD, was the recipient of the ACEC of Maryland 2014 Honor Award and County Engineer Association of Maryland 2014 Large Project Award.
- **Route 35 Restoration Project** received New Jersey's Leading Infrastructure Project Award in 2014; NJAFA-- New Jersey Alliance for Action
- **The Route 322 Raccoon Creek Bridge / Mullica Hill Pond Dam Rehabilitation Project** received the 2015 Distinguished Engineering Award from the NJ Alliance for Action and the Outstanding Project Honorable Mention from the American Society of Civil Engineers, New Jersey Section; South Jersey Branch.

McCORMICK TAYLOR

700 East Gate Drive, Suite 201
Mount Laurel, NJ 08054

mccormicktaylor.com