LAKE LEMON CONSERVANCY DISTRICT

Board of Directors Annual Meeting

City of Bloomington Utilities Building

February 28, 2019

6:00 p.m.

The February 28th, 2019 Board of Directors Annual Meeting of the Lake Lemon Conservancy District was held at the City of Bloomington Utilities Building and was called to order by Vice-Chairman Mary Jane Brown at 6:00 PM.

BOARD MEMBERS PRESENT: Vice-Chairman Mary Jane Brown, Treasurer Mike Blackwell, Michael Klitzing, Les Wadzinski, Lora Schell, Debra Ladyman. ALSO PRESENT: Adam Casey, District Manager; Alex Snooks, Operations Supervisor; and LLCD Freeholders (see attached sign-in sheet). ABSENT: Chairman Pam Dugan.

I. Call Meeting to Order / Chairman's Remarks (Brown)

II. Approval of January 24, 2019 Board Meeting Minutes (Brown)

KLITZING MOTIONED TO APPROVE THE JANUARY 24th, 2018 BOARD MEETING MINUTES WITH CORRECTIONS. SCHELL SECONDED THE MOTION. ALL "AYE'S". THE MOTION CARRIED.

III. Treasurer's Report (Blackwell)

a. January Budget Highlights
    i. January Income: $1,369.93
    ii. January Expenditures: $29,182.46
b. January Report of Claims: Approval of Vouchers

KLITZING MOTIONED TO APPROVE THE ALLOWANCE OF VOUCHERS FOR JANUARY 2019. BROWN SECONDED THE MOTION. ALL "AYES". THE MOTION CARRIED.

IV. Manager's Report (Casey)

a. Casey summarized the 2018 Annual Report.
b. Casey reviewed the 2018 Vegetation control efforts and requested a motion to approve the 2019 Vegetation Control contract with Aquatic Control.

LADYMAN MOTIONED FOR APPROVAL OF THE 2019 VEGETATION CONTROL CONTRACT. WADZINSKI SECONDED THE MOTION. ALL "AYE'S". THE MOTION CARRIED.

c. Casey presented the Pollution Liability Coverage Quote from First Insurance Group. This item was tabled for the March meeting when Lance Eberle will explain in further detail.

d. Blackwell, based on the Dredging Study Group recommendation, recommended the following for the 2019 Dredging priorities.

   i. Priority One, Zone 125

   ii. Priority Two, Zone 138

   iii. Priority Three, Zone 136

BLACKWELL MOTIONED TO APPROVE THE 2019 DREDGING PRIORITIES. PRIORITY ONE- ZONE 125, PRIORITY TWO- ZONE 138, PRIORITY THREE- ZONE 136. BROWN SECONDED THE MOTION. ALL "AYE'S" THE MOTION CARRIED.

V. Sediment Management Project Update (Casey)

a. After reviewing the scope of services, Blackwell motioned to approve Umbaugh as the Sediment management Project Financial Advisor

BLACKWELL MOTIONED FOR APPROVAL OF UMBAUGH AS FINANCIAL ADVISOR FOR THE SEDIMENT MANAGEMENT PROJECT. SCHELL SECONDED THE MOTION. ALL "AYE'S". THE MOTION CARRIED.

b. Patricia Zelmer went through Ice Miller's scope of services and answered questions from the Board and public

BLACKWELL MOTIONED FOR APPROVAL OF ICE MILLER AS BOND COUNCIL FOR THE SEDIMENT MANAGEMENT PROJECT. LADYMAN SECONDED THE MOTION. ALL "AYE'S". THE MOTION CARRIED.

c. Casey went over the Sediment Transport Study contract bids and gave an official recommendation to use Christopher Burke for the Sediment Transport Study

BLACKWELL MOTIONED FOR APPROVAL OF CHRISTOPHER BURKE FOR THE SEDIMENT TRANSPORT STUDY CONTRACT, NOT TO EXCEED FIFTY-THOUSAND DOLLARS. BROWN SECONDED THE MOTION. ALL "AYE'S". THE MOTION CARRIED.

d. An Authorization to Apply to the State Revolving Fund was discussed

SCHELL MOTIONED FOR AUTHORIZATION TO APPLY TO THE STATE REVOLVING FUND. LADYMAN SECONDED THE MOTION. ALL "AYE'S". THE MOTION CARRIED.

VI. Strategic Planning Committee: Update (Casey)
   a. Casey recapped the February 15th, 2019 meeting
   b. Brown requested approval of the scope of services for Mark Boillotat, fundraising and donor researcher

BLACKWELL MOTIONED FOR APPROVAL OF SCOPE OF SERVICES FOR MARK BOILLOTAT. LADYMAN SECONDED THE MOTION. ALL "AYE'S". THE MOTION CARRIED.

   c. The next SPC meeting will take place Friday March 15th, 2019 at 3:30pm in the LLCD Office.

VII. 2019 Resident Annual Boat Permit Drawing
   a. Residents Sandy Lee and Scott Adamson won the 2019 drawing and received one voucher each for resident annual boat passes.

VIII. Public Comment (Brown)
   a. Included questions and answers about nuisance wildlife control

IX. Brown administered Oath of Office to Michael Blackwell for representative of District VII

X. New Business/ Correspondence for Future Agenda (Brown)
   a. The next Lake Lemon Conservancy District Board of Directors meeting will take place Thursday March 28th, 2019, 6:00 pm, at the City of Bloomington Utilities Building

XI. Adjournment

KLITZING MOTIONED TO ADJOURN THE FEBRUARY 28TH, 2019 BOARD OF DIRECTORS ANNUAL MEETING AT 7:50 P.M. SCHELL SECONDED THE MOTION. ALL "AYE'S". THE MOTION CARRIED. MEETING ADJOURNED.

RESPECTFULLY SUBMITTED BY:
Alex Snooks, Operations Supervisor

Twenty Third Annual Meeting
City of Bloomington Utilities Building
February 28, 2019
6:00 P.M.

AGENDA

I. Call Meeting To Order/Chairman's Remarks (PD)

II. Approval of Board Meeting Minutes (PD)
   A. Approval of January 24, 2019 Board Meeting Minutes

III. Treasurer's Report (MB)
   A. January 2019 Financial Highlights
   B. January 2019 Report of Claims Approval
   C. 2018 Annual Budget Summary

IV. Manager's Report (AC)
   A. 2018 Annual Report
   B. 2018 Vegetation Review/ 2019 Update
   C. Pollution Coverage Quote
   D. 2019 Dredging Priorities

V. Sediment Management Project (AC)
   A. Financial Council- Scope of Services- Umbaugh
   B. Bond Council- Scope of Services- IceMiller
   C. Sediment Transport Study- Bid review
   D. State Revolving Fund- Authorization to Apply

VI. Strategic Planning Committee: Update (AC)
   A. February 15th meeting recap
   B. Scope of Services - Mark Boillotat
   C. General Update

VII. Drawing (PD)

VIII. Public Comment (PD)

IX. Board Election Results – Sub Areas VII (PD)

XI.	Oath of Office: Sub Area VII	(PD)
XII.	Next Meeting: Thursday, March 28, 2019, 6:00 p.m. at the City of Bloomington Utilities Building	(PD)
XIII.	Adjournment	(PD)

Note: Immediately following the annual meeting the Directors shall meet to elect Board Officers for 2019.

Lake Lemon Conservancy District

Board Meeting Agenda Item

Presenter	**Pam Dugan, Chairman**
Action Requested	**Approval**
Item/Subject	**January, 24 2019 Board Meeting Minutes**
Dollar Amount	**N/A**
Meeting Date	**February 28, 2019**
Summary	**A draft of the minutes for the January 28, 2019 Board Meeting minutes is provided for comment, corrections, additions, or deletions.**
Staff Recommendation	**Approval of the January 28th, Board meeting minutes**

LAKE LEMON CONSERVANCY DISTRICT
Board of Directors Meeting
City of Bloomington Utilities Building
January 24, 2019
6:00 p.m.

The January 24th, 2019 Board of Directors Meeting of the Lake Lemon Conservancy District was held at the City of Bloomington Utilities Building and was called to order by Chairman Pam Dugan at 6:00 PM.

BOARD MEMBERS PRESENT: Chairman-Pam Dugan, Vice-Chairman Mary Jane Brown, Treasurer Mike Blackwell, Michael Klitzing, Les Wadzinski, Lora Schell. ALSO PRESENT: Adam Casey, District Manager; Alex Snooks, Operations Supervisor; and LLCD Freeholders (see attached sign-in sheet). ABSENT: Debra Ladyman.

I. Call Meeting to Order / Chairman's Remarks (Dugan)

II. Approval of December 12, 2018 Board Meeting Minutes (Dugan)

BLACKWELL MOTIONED TO APPROVE THE DECEMBER 12, 2018 BOARD MEETING MINUTES. SCHELL SECONDED THE MOTION. ALL "AYE'S". KLITZING ABSTAINS. THE MOTION CARRIED.

III. Treasurer's Report (Blackwell)

a. December Budget Highlights
    i. December Income: $109,335.87
    ii. December Expenditures: $25,478.01

b. December Report of Claims: Approval of Vouchers

KLITZING MOTIONED TO APPROVE THE ALLOWANCE OF VOUCHERS FOR DECEMBER 2018. BROWN SECONDED THE MOTION. ALL "AYES". THE MOTION CARRIED.

IV. Manager's Report (Casey)

a. Blackwell will run uncontested for Board Representative of District II
b. Mowing Extension Agreement – N. Anderson Lawn Care, LLC.
    i. Casey requested the Approval of the 2019 Mowing Extension Agreement with Anderson Lawn Care. 2019 will be the final year allowable for mowing extension agreements and will need to be bid out in 2020.

DUGAN MOTIONED FOR APPROVAL OF THE MOWING EXTENSION AGREEMENT FOR 2019. BROWN SECONDED THE MOTION. ALL "AYE'S". THE MOTION CARRIED.

c. Casey presented the proposal for the 2019 biennial Dam Inspection Proposal by DLZ at an estimated cost of $5,280.00.

BLACKWELL MOTIONED TO APPROVE THE 2019 DAM INSPECTION PROPOSAL BY DLZ. WADZINSKI SECONDED THE MOTION. ALL "AYE'S" THE MOTION CARRIED.

d. Casey presented an online payment option for 2019 Resident and Non-Resident annual boat passes and requested permission to put this option in place.

KLITZING MOTIONED TO APPLY AN ONLINE PAYMENT OPTION FOR 2019 RESIDENT AND NON-RESIDENT ANNUAL BOAT PASSES. BROWN SECONDED THE MOTION. ALL "AYE'S" THE MOTION CARRIED.

e. Casey gave an update on Pollution Insurance from First Insurance Group. Topic has been tabled for the meeting on Thursday February 28th, 2019.

V. Strategic Planning Committee: Update (Brown)
   a. The Board approved requesting scope of services for Bond and financial Advisors.
      i. The Board also requested a scope of service for a potential fundraising researcher recommended by Mary Jane Brown
   b. The next SPC meeting will take place Friday January 18th, 2019 at 3:30pm in the LLCD Office.

VI. Public Comment (Dugan)
   a. Comments included plans to discuss the retaining of a lawyer and financial advisor, who specialize in bonding issues.

VII. New Business/ Correspondence for Future Agenda (Dugan)
   a. The 24th Annual Lake Lemon Conservancy District Board of Directors meeting will take place Thursday February 28, 2019, 6:00 pm, at the City of Bloomington Utilities Building

VIII. Adjournment

BROWN MOTIONED TO ADJOURN THE JANUARY 24TH, 2019 BOARD OF DIRECTORS MEETING AT 7:05 P.M. KLITZING SECONDED THE MOTION. ALL "AYE'S". THE MOTION CARRIED. MEETING ADJOURNED.

RESPECTFULLY SUBMITTED BY:
Alex Snooks, Operations Supervisor

Lake Lemon Conservancy District

Board Meeting Agenda Item

Presenter	Mike Blackwell, Treasurer
Action Requested	**Revie**w
Item/Subject	**January 2019 Financial Revie**w
Dollar Amount	**N/A**
Meeting Date	**February 28, 2019**
Summary	**Conservancy District financial Summary for January 2019**
Staff Recommendation	N/A

LAKE LEMON CONSERVANCY

Financial Statements

For the Period Ending

January 1, 2019 THRU January 31, 2019

(UNAUDITED)

Watkins Accounting
113 E. 19th Street
Bloomington, IN 47408

LAKE LEMON CONSERVANCY

I have prepared the financial statements for LAKE LEMON CONSERVANCY as of January 31, 2019 on the basis used in the preparation of its federal income tax returns. The tax returns are prepared on the accrual basis when appropriate.

The following are the company's significant accounting policies under this basis:

Income Tax. No provision or liability for income taxes has been included in the financial statements.

Provision for Doubtful Accounts. No provision for doubtful accounts is made. The company follows the practice of charging off all accounts deemed uncollectible directly to expense.

Property and Equipment. Property and equipment, as well as liabilities pertaining thereto, are recorded at cost as determined for income tax purposes.

Shirley Watkins, CPA
February 12, 2019

LAKE LEMON CONSERVANCY
Balance Sheet
As of January 31, 2019

	Jan 31, 19
ASSETS	
Current Assets	
Checking/Savings	
1000 · Peoples State Bank	330,474.54
1010 · Petty Cash	100.00
1020 · Change Fund	200.00
1030 · CD's General Fund	116,008.85
1040 · CD's Cumulative Maint Fund	101,912.41
1050 · Savings Account	4,042.89
Total Checking/Savings	552,738.69
Total Current Assets	552,738.69
Fixed Assets	
1510 · Trucks	132,761.25
1520 · Other Asset	3,993.11
1550 · Boats	300,550.00
1680 · Other Fixed Assets	146,411.85
Total Fixed Assets	583,716.21
TOTAL ASSETS	**1,136,454.90**
LIABILITIES & EQUITY	
Liabilities	
Current Liabilities	
Other Current Liabilities	
2010 · FICA & Federal Taxes Payable	1,222.06
2020 · State & Co. Withholding Payable	195.07
Total Other Current Liabilities	1,417.13
Total Current Liabilities	1,417.13
Total Liabilities	1,417.13
Equity	
3000 · Opening Balance Equity	101,373.66
3040 · General Fund	503,214.77
3060 · Cumulative Maintenance Fund	96,942.92
3200 · Retained Earnings	461,318.95
Net Income	-27,812.53
Total Equity	1,135,037.77
TOTAL LIABILITIES & EQUITY	**1,136,454.90**

LAKE LEMON CONSERVANCY
Profit & Loss YTD Comparison
January 2019

	Jan 19	Jan 19
Income		
4020 · Marina & Club Fees	500.00	500.00
4060 · Interest	219.93	219.93
4080 · Fishing Tournament	650.00	650.00
Total Income	1,369.93	1,369.93
Expense		
6000 · Manager	2,530.77	2,530.77
6001 · Operations Supervisor	1,307.69	1,307.69
6010 · FICA	358.53	358.53
6020 · State Unemployment Tax	19.25	19.25
6025 · Merchant Fees	11.50	11.50
6030 · Retirement	545.06	545.06
6110 · Lake Biologist	458.00	458.00
6112 · Dredger (Other)	390.00	390.00
6120 · Season & Launch Permits	52.65	52.65
6130 · Daily Permits	270.00	270.00
6170 · Miscellaneous-Other	218.52	218.52
6180 · Postage	200.00	200.00
6190 · General Business Supplies	30.47	30.47
6251 · Dredging Supplies	352.52	352.52
6300 · Accounting Services	450.00	450.00
6370 · Phone, LDT, Pager, E-Mail	274.79	274.79
6430 · Ads	49.68	49.68
6450 · Insurance	15,558.00	15,558.00
6460 · Electric	460.95	460.95
6470 · Water	55.11	55.11
6480 · Trash	67.68	67.68
6490 · Port-O-Lets	1,689.00	1,689.00
6510 · Building & Grounds Expense	3,814.00	3,814.00
6520 · Boat	11.94	11.94
6530 · Truck	6.35	6.35
Total Expense	29,182.46	29,182.46
Net Income	**-27,812.53**	**-27,812.53**

LAKE LEMON CONSERVANCY
Profit & Loss Budget vs. Actual
January 2019

	Jan 19	Budget	$ Over Budget	% of Budget
Income				
4000 · Watercraft Permits	0.00	115,000.00	-115,000.00	0.0%
4010 · Launch Fees	0.00	21,000.00	-21,000.00	0.0%
4020 · Marina & Club Fees	500.00	9,000.00	-8,500.00	5.6%
4030 · Sublease & Access Fees	0.00	27,000.00	-27,000.00	0.0%
4040 · Property Tax - Brown Co.	0.00	82,420.00	-82,420.00	0.0%
4050 · Property Tax -Monroe Co.	0.00	234,580.00	-234,580.00	0.0%
4060 · Interest	219.93	1,250.00	-1,030.07	17.6%
4070 · Grants & Donations	0.00	7,000.00	-7,000.00	0.0%
4080 · Fishing Tournament	650.00	1,500.00	-850.00	43.3%
4090 · Park Reservations	0.00	4,000.00	-4,000.00	0.0%
4100 · Park Admisioin Fees	0.00	40,000.00	-40,000.00	0.0%
4110 · Concessions	0.00	1,000.00	-1,000.00	0.0%
4130 · Dredging/Rip-Rap Income	0.00	20,000.00	-20,000.00	0.0%
4140 · Dredging Equipment Loan Proceed	0.00	1,000,000.00	-1,000,000.00	0.0%
Total Income	1,369.93	1,563,750.00	-1,562,380.07	0.1%
Expense				
6000 · Manager	2,530.77	59,800.00	-57,269.23	4.2%
6001 · Operations Supervisor	1,307.69	35,000.00	-33,692.31	3.7%
6010 · FICA	358.53	13,700.00	-13,341.47	2.6%
6020 · State Unemployment Tax	19.25	800.00	-780.75	2.4%
6025 · Merchant Fees	11.50	1,200.00	-1,188.50	1.0%
6030 · Retirement	545.06	14,000.00	-13,454.94	3.9%
6040 · Health Insurance	0.00	6,000.00	-6,000.00	0.0%
6050 · Life Insurance	0.00	0.00	0.00	0.0%
6060 · Dental Insurance	0.00	0.00	0.00	0.0%
6070 · Gate Attendant	0.00	21,000.00	-21,000.00	0.0%
6080 · Seasonal Labor	0.00	0.00	0.00	0.0%
6090 · Park Maintenance Technician	0.00	0.00	0.00	0.0%
6100 · Lake Patrol	0.00	4,800.00	-4,800.00	0.0%
6110 · Lake Biologist	458.00	0.00	458.00	100.0%
6111 · Dredger	0.00	23,400.00	-23,400.00	0.0%
6112 · Dredger (Other)	390.00	14,625.00	-14,235.00	2.7%
6113 · Assistant Dredger	0.00	12,000.00	-12,000.00	0.0%
6114 · Assistant Dredger (Other)	0.00	6,000.00	-6,000.00	0.0%
6115 · Dredger (Private)	0.00	3,900.00	-3,900.00	0.0%
6116 · Assistant Dredger (Private)	0.00	2,000.00	-2,000.00	0.0%
6120 · Season & Launch Permits	52.65	2,000.00	-1,947.35	2.6%
6130 · Daily Permits	270.00	400.00	-130.00	67.5%
6140 · Receipt/Tickets Books	0.00	400.00	-400.00	0.0%
6150 · Checks	0.00	200.00	-200.00	0.0%
6160 · Printer, Copier & Computer Supp	0.00	800.00	-800.00	0.0%
6170 · Miscellaneous-Other	218.52	1,300.00	-1,081.48	16.8%
6180 · Postage	200.00	750.00	-550.00	26.7%
6185 · Receipt Books	0.00	0.00	0.00	0.0%
6190 · General Business Supplies	30.47	750.00	-719.53	4.1%
6200 · Regular Gas	0.00	6,000.00	-6,000.00	0.0%
6210 · Diesel	0.00	7,000.00	-7,000.00	0.0%
6220 · Janitorial Supplies	0.00	0.00	0.00	0.0%
6230 · Medical Supplies	0.00	0.00	0.00	0.0%
6240 · Building & Grounds	0.00	6,000.00	-6,000.00	0.0%
6250 · Boat/Weed Harvester/Truck	0.00	1,500.00	-1,500.00	0.0%
6251 · Dredging Supplies	352.52	12,000.00	-11,647.48	2.9%
6252 · Rip Rap/Erosion Control	0.00	15,000.00	-15,000.00	0.0%
6260 · Uniforms	0.00	200.00	-200.00	0.0%
6270 · Boat Equipment	0.00	0.00	0.00	0.0%
6280 · Radio/Communication Equipment	0.00	1,000.00	-1,000.00	0.0%
6290 · Signs & Nautical Markers	0.00	2,500.00	-2,500.00	0.0%
6300 · Accounting Services	450.00	5,400.00	-4,950.00	8.3%
6310 · Grass	0.00	10,560.00	-10,560.00	0.0%
6320 · Attorney	0.00	4,000.00	-4,000.00	0.0%
6325 · Fish Managment Survey	0.00	0.00	0.00	0.0%
6330 · Consulting Engineer	0.00	50,000.00	-50,000.00	0.0%
6340 · State Board Accounts Audit	0.00	0.00	0.00	0.0%
6350 · Other Prof/Secretarial Service	0.00	1,000.00	-1,000.00	0.0%

LAKE LEMON CONSERVANCY
Profit & Loss Budget vs. Actual
January 2019

	Jan 19	Budget	$ Over Budget	% of Budget
6370 · Phone, LDT, Pager, E-Mail	274.79	3,000.00	-2,725.21	9.2%
6380 · Travel	0.00	0.00	0.00	0.0%
6390 · Hotel	0.00	300.00	-300.00	0.0%
6400 · Meals	0.00	150.00	-150.00	0.0%
6410 · Subscriptions	0.00	800.00	-800.00	0.0%
6420 · Newsletter	0.00	600.00	-600.00	0.0%
6430 · Ads	49.68	500.00	-450.32	9.9%
6440 · Other	0.00	1,500.00	-1,500.00	0.0%
6450 · Insurance	15,558.00	45,000.00	-29,442.00	34.6%
6460 · Electric	460.95	5,000.00	-4,539.05	9.2%
6470 · Water	55.11	750.00	-694.89	7.3%
6480 · Trash	67.68	1,500.00	-1,432.32	4.5%
6490 · Port-O-Lets	1,689.00	2,000.00	-311.00	84.5%
6500 · Pump Holding Tank	0.00	800.00	-800.00	0.0%
6510 · Building & Grounds Expense	3,814.00	15,500.00	-11,686.00	24.6%
6520 · Boat	11.94	2,000.00	-1,988.06	0.6%
6530 · Truck	6.35	1,000.00	-993.65	0.6%
6540 · Sluice Gate Inspection	0.00	0.00	0.00	0.0%
6541 · Dredging Equipment Maintenance	0.00	10,000.00	-10,000.00	0.0%
6542 · Equipment Rental	0.00	5,000.00	-5,000.00	0.0%
6550 · Operating Loan	0.00	0.00	0.00	0.0%
6560 · Water Testing	0.00	6,500.00	-6,500.00	0.0%
6570 · Lake Weed Treatment	0.00	50,000.00	-50,000.00	0.0%
6580 · Erosion Control/Matching Fund	0.00	0.00	0.00	0.0%
6590 · Contigency Funds 10%	0.00	5,000.00	-5,000.00	0.0%
6600 · 6% MarinaPermit Sales	0.00	2,300.00	-2,300.00	0.0%
6610 · Cumulative Maintenance Fund	0.00	5,000.00	-5,000.00	0.0%
6620 · Dam/Spillway Inspection	0.00	5,000.00	-5,000.00	0.0%
6630 · Spillway Repairs	0.00	0.00	0.00	0.0%
6640 · Soil Testing IDEM	0.00	0.00	0.00	0.0%
6650 · Dredge Matching Fund	0.00	10,000.00	-10,000.00	0.0%
6660 · Dredging/Engineering	0.00	0.00	0.00	0.0%
6661 · Disposal Site Preparation	0.00	10,000.00	-10,000.00	0.0%
6662 · Debt Service-Dreding Loan	0.00	67,000.00	-67,000.00	0.0%
6663 · Barge Assembly	0.00	0.00	0.00	0.0%
6670 · Debt Service (Dreding Equip.)	0.00	0.00	0.00	0.0%
6680 · Other Services and Charges	0.00	1,500.00	-1,500.00	0.0%
6681 · Fireworks	0.00	6,500.00	-6,500.00	0.0%
6682 · Ramp Repairs	0.00	2,000.00	-2,000.00	0.0%
6685 · Dredging Engineering	0.00	0.00	0.00	0.0%
6690 · Office Equipment	0.00	0.00	0.00	0.0%
66900 · Reconciliation Discrepancies	0.00	0.00	0.00	0.0%
6700 · Computer Equipment	0.00	0.00	0.00	0.0%
6701 · Barge	0.00	0.00	0.00	0.0%
6702 · Push Boat/Motors	0.00	0.00	0.00	0.0%
6703 · Excavator	0.00	0.00	0.00	0.0%
6710 · Boat Dock	0.00	0.00	0.00	0.0%
6720 · Utility Vehicle	0.00	0.00	0.00	0.0%
6730 · Patrol Boat	0.00	0.00	0.00	0.0%
6740 · Work Boat (Pontoon)	0.00	0.00	0.00	0.0%
6750 · Sediment Mitigation	0.00	950,000.00	-950,000.00	0.0%
6760 · Other Capital Outlays	0.00	0.00	0.00	0.0%
6770 · LLCD Pick-up Truck	0.00	0.00	0.00	0.0%
Total Expense	29,182.46	1,563,185.00	-1,534,002.54	1.9%
Net Income	**-27,812.53**	**565.00**	**-28,377.53**	**-4,922.6%**

LAKE LEMON CONSERVANCY
Reconciliation Summary
1000 · Peoples State Bank, Period Ending 01/31/2019

	Jan 31, 19
Beginning Balance	372,305.80
Cleared Transactions	
Checks and Payments - 19 items	-40,374.27
Deposits and Credits - 6 items	1,369.93
Total Cleared Transactions	-39,004.34
Cleared Balance	**333,301.46**
Uncleared Transactions	
Checks and Payments - 7 items	-2,826.92
Total Uncleared Transactions	-2,826.92
Register Balance as of 01/31/2019	**330,474.54**
New Transactions	
Checks and Payments - 5 items	-2,071.74
Deposits and Credits - 2 items	6,167.34
Total New Transactions	4,095.60
Ending Balance	**334,570.14**

Lake Lemon Conservancy District

Board Meeting Agenda Item

Presenter	**Mike Black**well**,** Treasurer
Action Requested	**Approval**
Item/Subject	**Allo**wance of Vouchers for the month of January 2019
Dollar Amount	$27,017.69
Meeting Date	**February 28, 2019**
Summary	**Summary of LLCD vouchers and payroll for January 2019**
Staff Recommendation	**Approval of the January , 2019 Allo**wance of Vouchers

Lake Lemon Conservancy District

Date: February 28, 2018 **ALLOWANCE OF VOUCHERS** **Mike Blackwell**
Treasurer

(Report of Claims)

(IC 5-11-10-2 permits the governing body to sign the Accounts Payable Voucher Register in lieu of signing each claim the governing body is allowing.) We have examined the vouchers listed on the foregoing accounts payable voucher register and payroll journal, consisting of 5 pages, and except for vouchers not allowed as shown on the Register such vouchers are allowed in the total of $27,017.69

Dated this 28th Day of February 2019

Signature of Governing Board

PAM DUGAN, CHAIRMAN

MARY JANE BROWN, VICE-CHAIR

MIKE BLACKEWELL, TREASURER

MICHAEL KLITZING, Sub-Area I

DEBRA LADYMAN, Sub-Area II

LORA SCHELL, Sub-Area IV

LES WADZINSKI, Sub-Area V

7599 North Tunnel Road, Unionville, IN 47468
Phone 812/334-0233 • Fax 812/335-0038

LAKE LEMON CONSERVANCY
Check Detail
January 2019

Type	Num	Date	Name	Item	Account	Paid Amount	Original Amount
Check	**4625**	**1/11/2019**	**PAUL YOUNG PLUMBING, INC.**		**1000 · Peoples State Bank**		**-440.00**
				Bathroom Winterization	6510 · Building & Grounds Expense	-440.00	440.00
TOTAL						-440.00	440.00
Check	**4626**	**1/11/2019**	**SCI SECURITY**		**1000 · Peoples State Bank**		**-105.00**
				Security System service	6460 · Electric	-105.00	105.00
TOTAL						-105.00	105.00
Check	**4627**	**1/11/2019**	**HOOSIER TIMES PROCESSIN...**		**1000 · Peoples State Bank**		**-16.17**
				Meeting Notice	6430 · Ads	-16.17	16.17
TOTAL						-16.17	16.17
Check	**4628**	**1/11/2019**	**STAPLES CREDIT PLAN**		**1000 · Peoples State Bank**		**-30.47**
				Paper towels/ soap	6190 · General Business Supplies	-30.47	30.47
TOTAL						-30.47	30.47
Check	**4629**	**1/22/2019**	**REPUBLIC SERVICES**		**1000 · Peoples State Bank**		**-67.68**
					6480 · Trash	-67.68	67.68
TOTAL						-67.68	67.68
Check	**4630**	**1/22/2019**	**COMCAST CABLE**		**1000 · Peoples State Bank**		**-274.79**
					6370 · Phone, LDT, Pager, E-Mail	-274.79	274.79
TOTAL						-274.79	274.79
Check	**4631**	**1/22/2019**	**SCI REMC**		**1000 · Peoples State Bank**		**-355.95**
					6460 · Electric	-355.95	355.95
TOTAL						-355.95	355.95
Check	**4632**	**1/22/2019**	**INDIANA DEPT OF WORKFOR...**		**1000 · Peoples State Bank**		**-19.25**
					6020 · State Unemployment Tax	-19.25	19.25
TOTAL						-19.25	19.25

LAKE LEMON CONSERVANCY
Check Detail
January 2019

Type	Num	Date	Name	Item	Account	Paid Amount	Original Amount
Check	**4617**	**1/2/2019**	**HERALD-TIMES**		**1000 · Peoples State Bank**		**-16.17**
				2019 meeting notice	6430 · Ads	-16.17	16.17
TOTAL						-16.17	16.17
Check	**4618**	**1/2/2019**	**ROTH CONTRACTING**		**1000 · Peoples State Bank**		**-3,374.00**
				Bathroom Renovations	6510 · Building & Grounds Expense	-3,374.00	3,374.00
TOTAL						-3,374.00	3,374.00
Check	**4619**	**1/9/2019**	**US POST MASTER**		**1000 · Peoples State Bank**		**-100.00**
				Stamps	6180 · Postage	-100.00	100.00
TOTAL						-100.00	100.00
Check	**4620**	**1/11/2019**	**BLOOMINGTON HARDWARE**		**1000 · Peoples State Bank**		**-11.94**
				Dry-gas/stabil	6520 · Boat	-11.94	11.94
TOTAL						-11.94	11.94
Check	**4621**	**1/11/2019**	**MONROE TUFF-JON**		**1000 · Peoples State Bank**		**-1,689.00**
				2018 Port-o-john rental	6490 · Port-O-Lets	-1,689.00	1,689.00
TOTAL						-1,689.00	1,689.00
Check	**4622**	**1/11/2019**	**B & B WATER CORP**		**1000 · Peoples State Bank**		**-55.11**
					6470 · Water	-55.11	55.11
TOTAL						-55.11	55.11
Check	**4623**	**1/11/2019**	**AIM MEDIA INDIANA**		**1000 · Peoples State Bank**		**-17.34**
				Meeting Notice	6430 · Ads	-17.34	17.34
TOTAL						-17.34	17.34
Check	**4624**	**1/11/2019**	**KLEINDORFER HARDWARE**		**1000 · Peoples State Bank**		**-41.95**
				rags/ hand cleaner	6251 · Dredging Supplies	-41.95	41.95
TOTAL						-41.95	41.95

LAKE LEMON CONSERVANCY
Check Detail
January 2019

Type	Num	Date	Name	Item	Account	Paid Amount	Original Amount
Check	**4633**	**1/25/2019**	**VISA**		**1000 · Peoples State Bank**		**-578.47**
				Stamps	6180 · Postage	-100.00	100.00
				Office Desk and computer screen	6170 · Miscellaneous-Other	-218.52	218.52
				Battery Jumper & Charger	6251 · Dredging Supplies	-253.60	253.60
				Title Request, gmc	6530 · Truck	-6.35	6.35
TOTAL						-578.47	578.47
Check	**4634**	**1/25/2019**	**FIRST INSURANCE GROUP**		**1000 · Peoples State Bank**		**-15,558.00**
					6450 · Insurance	-15,558.00	15,558.00
TOTAL						-15,558.00	15,558.00
Check	**4635**	**1/29/2019**	**BLOOMINGTON HARDWARE**		**1000 · Peoples State Bank**		**-56.97**
				Gas can /stabil	6251 · Dredging Supplies	-56.97	56.97
TOTAL						-56.97	56.97
Check	**4636**	**1/29/2019**	**WATKINS ACCOUNTING**		**1000 · Peoples State Bank**		**-450.00**
					6300 · Accounting Services	-450.00	450.00
TOTAL						-450.00	450.00
Check	**4637**	**1/29/2019**	**BAUGH FINE PRINT**		**1000 · Peoples State Bank**		**-322.65**
					6120 · Season & Launch Permits	-52.65	52.65
				2019 Pass Printing	6130 · Daily Permits	-270.00	270.00
TOTAL						-322.65	322.65

Total: $23,580.91

LAKE LEMON CONSERVANCY DISTRICT
Payroll Summary
January 2019

	Casey, Adam W			Manley, Andrew T			Snooks, Franklin A			Warthan, Levi R			TOT...
	Hours	Rate	Jan 19	Hours	Rate	Jan 19	Hours	Rate	Jan 19	Hours	Rate	Jan 19	Hours
Employee Wages, Taxes and Adjustments													
Gross Pay													
Salary-6000			2,530.77			0.00			0.00			0.00	
Salary-6001			0.00			0.00			1,307.69			0.00	
Reg. Pay-6070			0.00			0.00		11.50	0.00			0.00	
Reg.Pay-6110			0.00	25.5	13.00	331.50	11	11.50	126.50			0.00	36.50
Reg.Pay-6111			0.00			0.00			0.00		39.00	0.00	
Reg.Pay-6112			0.00			0.00			0.00	10	39.00	390.00	10.00
Reg.Pay-6115			0.00			0.00			0.00		39.00	0.00	
Total Gross Pay			2,530.77	25.5		331.50	11		1,434.19	10		390.00	46.50
Deductions from Gross Pay													
Insurance			0.00			0.00			0.00			0.00	
Retirement			-151.85			0.00			-39.23			0.00	
Total Deductions from Gross Pay			-151.85			0.00			-39.23			0.00	
Adjusted Gross Pay			2,378.92	25.5		331.50	11		1,394.96	10		390.00	46.50
Taxes Withheld													
Federal Withholding			-365.00			0.00			-132.00			-8.00	
Medicare Employee			-36.70			-4.81			-20.80			-5.66	
Social Security Employee			-156.91			-20.55			-88.92			-24.18	
IN - Withholding			-76.84			-10.71			-45.06			-12.60	
Medicare Employee Addl Tax			0.00			0.00			0.00			0.00	
Monroe Co.			-26.05			-4.46			-15.28			-4.07	
Total Taxes Withheld			-661.50			-40.53			-302.06			-54.51	
Net Pay			**1,717.42**	**25.5**		**290.97**	**11**		**1,092.90**	**10**		**335.49**	**46.50**
Employer Taxes and Contributions													
Federal Unemployment			15.18			1.99			8.61			2.34	
Medicare Company			36.70			4.81			20.80			5.66	
Social Security Company			156.91			20.55			88.92			24.18	
IN - Unemployment Company			12.65			1.66			7.17			1.95	
Total Employer Taxes and Contributions			**221.44**			**29.01**			**125.50**			**34.13**	

LAKE LEMON CONSERVANCY DISTRICT
Payroll Summary
January 2019

	TOTAL	
	Rate	Jan 19
Employee Wages, Taxes and Adjustments		
Gross Pay		
Salary-6000		2,530.77
Salary-6001		1,307.69
Reg. Pay-6070		0.00
Reg.Pay-6110		458.00
Reg.Pay-6111		0.00
Reg.Pay-6112		390.00
Reg.Pay-6115		0.00
Total Gross Pay		4,686.46
Deductions from Gross Pay		
Insurance		0.00
Retirement		-191.08
Total Deductions from Gross Pay		-191.08
Adjusted Gross Pay		4,495.38
Taxes Withheld		
Federal Withholding		-505.00
Medicare Employee		-67.97
Social Security Employee		-290.56
IN - Withholding		-145.21
Medicare Employee Addl Tax		0.00
Monroe Co.		-49.86
Total Taxes Withheld		-1,058.60
Net Pay		**3,436.78**
Employer Taxes and Contributions		
Federal Unemployment		28.12
Medicare Company		67.97
Social Security Company		290.56
IN - Unemployment Company		23.43
Total Employer Taxes and Contributions		**410.08**

Lake Lemon Conservancy District

Board Meeting Agenda Item

Presenter	**Adam Casey, District Manager**
Action Requested	**N/A**
Item/Subject	**LLCD 2018 Annual Report**
Dollar Amount	**N/A**
Meeting Date	**February 28, 2019**
Summary	**This report is a summary of significant operational objectives the LLCD addressed in 2018.**
Staff Recommendation	**N/A**

Lake Lemon Conservancy District
2018 Annual Report
February 28, 2019

This report is a summary of significant operational objectives the LLCD addressed in 2018.

1. BOARD OF DIRECTORS:

Two (2) LLCD Board positions were filled in 2018. Pam Dugan ran unopposed and was elected to a four (4) year term in Sub Area VI. Debra Ladyman ran unopposed and was elected to a four (4) year term in Sub Area II. Board officers for 2018 were Pam Dugan, Chairman; Mary Jane Brown, Vice-Chairman; and Mike Blackwell, Treasurer.

2. PERSONNEL:

Staff for 2018 included Alex Snooks, Andrew O'Malia, Scott Bode, and Matt Hopkins as Gate Attendants; Andrew Manley, Operations Supervisor Intern; Levi Warthan, Barge Operator; Clinton Allender, James Schreiner, Isaac Walls and Branson Gilliland as Push Boat Operators.

3. GATE HOUSE OPERATIONS:

The 2018 boating season started on Monday, March19th, and ended on Sunday, November 19th. Boat permits and launch fees collected in 2018 totaled $129,343.00. A $5,550.00 increase in revenue compared to 2017. The District hosted 15 fishing tournaments in 2018.

4. 2018 AQUATIC PLANT MANAGEMENT:

Lake Lemon, 2018 Treatment Summary

Date	Acres Treated	Targeted Vegetation	Products Applied
5/31/18	50.6	Submersed	Renovate, ProcellaCOR, Aquathol & Clipper
8/2/18	23.7	Submersed (13.7) Lotus/Spatterdock (10)	Clipper, ProcellaCOR, AquaPRO
8/16/18	3.5	Lotus/spatterdock	AquaPRO

LLCD received a 50% match $5,000 maintenance grant from IDNR's LARE program for treatment of Eurasian watermilfoil areas in 2018. Eurasian watermilfoil growth started later this season than it did in 2017. An initial survey was completed on May 25th and found dense Eurasian watermilfoil in several areas of the lake, however bed sizes were smaller than in 2017. A total of 37.7 acres of Eurasian watermilfoil were treated on May 31st with Renovate or ProcellaCOR herbicides. In addition, 12.9 acres of pondweed and other mixed native plants were treated with Aquathol herbicide. A second treatment for submersed weeds and emergent vegetation was completed on August 2nd.
A total of 23.7 acres were treated, of which 10.9 acres of mixed natives were treated with Clipper, 1.8 acres of Eurasian watermilfoil with ProcellaCOR and 10 acres of spatterdock and lotus were treated with AquaPRO. A pre-planned, third application was completed on August 16th for touch up applications to control 3.5 acres of American lotus and spatterdock that remained in the previously treated areas.

5. 2018 WILDLIFE CONTROL:

The LLCD received a nuisance wildlife permit from DNR, for the treatment of resident Canada goose nests and eggs. 16 nests were treated on Cemetery Island in Monroe County.

6. 2018 WATER TESTING:

A. Indiana University's School of Public and Environmental Affairs (SPEA) conducted lake wide testing during 2018. The tests included a review of such parameters as clarity, nutrients, algae, dissolved oxygen, and fecal coliform bacteria. The 2018 results are expected in May 2019 from SPEA. All previous reports may be found on our website.

B. Fecal Coliform concentrations at Riddle Point Park beach were tested once a week starting in May and ending in September. All tests were below the risk threshold established by the State of Indiana.

7. RIDDLE POINT PARK:

A. The park opened on Friday, May 25th, 2018. Park admissions were charged daily thru Monday, September 3th, 2018. The season vehicle pass was $60.00; daily park admission was $7.00 per vehicle. Total park admissions collected were $46,338.00. An increase in revenue of $1,432.00 compared to 2017.

B. The Riddle Point Park shelter was rented 19 times. The shelter rental fee was $125.00/day. Total shelter rental fees collected were $2,375.00.

C. Events hosted by the IU Women's Varsity Rowing Team, generated an additional $800.00 in revenues.

D. The LLCD Board hosted the Independence Day Fireworks Show at Riddle Point Park on Tuesday July 3rd. Heath Headdy and Bill Hawkins conducted the show at a cost of $6,500.00. Donations and contributions collected for the event totaled $7,530.00

8. SHORELINE PROJECT PERMITS:

A. Six (6) permits were issued to lake freeholders in 2018. These projects dealt primarily with shoreline erosion control, and minor shore-line improvements. Since 1996, 380 shoreline permits have been issued to Conservancy freeholders.

9. 2018 LLCD LAKE ENHANCEMENT PROGRAM:

The Lake Enhancement Program consists of four primary maintenance functions: lake debris and stump removal; shore-line erosion control stabilization (rip-rap stone); lake dredging (sediment removal); and disposal site(s) development and maintenance.

These functions are accomplished through LLCD's self-managed barge operation. Operation consisted of two (2) seasonal positions and the following pieces of equipment: A. 66 foot long x 36 foot wide steel barge; B. Excavator; C. Push boat; D. Bulldozer; E. Articulated off road truck; F. Maintenance Utility Truck; and G. 40 foot long x 20 foot wide steel barge.

The dredging operation was ended on November 16th. As of November 16th, 11,863 cubic yards of sediment had been removed from the lake. This includes 6563 cubic yards from zone 137 in the interior Chitwood Channels, and 5300 cubic yards in zone 208 at Ice Box Cove.

A Summary of 2018 Barge Operation Costs are as follows:

I. **ATTACHMENT A- STAFF COSTS: 2018 LLCD (DREDGING); LLCD (OTHER); LLCD (PRIVATE)**

II. **ATTACHMENT B- 2018 BARGE OPERATING NON-STAFF COSTS**

III. **ATTACHMENT C- 2018 LLCD PRIVATE WORK SUMMARY**

10. INSURANCE SERVICES:

Provided by First Insurance Group, Bloomington, IN. (Lance Eberle).

11. ACCOUNTING SERVICES:

Provided by Watkins Accounting, Bloomington, IN. (Shirley Watkins).

12. LEGAL SERVICES:

Provided Carmin Parker PC, Bloomington, IN. (Angela Parker).

13. LLCD'S FINANCIAL INSTITUTION:

The Peoples State Bank, Ellettsville, IN.

Attachment A

2018 Barge Operation Staff Costs

Operation Sub-Category	Position (Line Item)	Hours	Annual Expenditure
LLCD Dredging	Dredger (6111)	458	$17,633.00
	Assistant Dredger (6113)	759	$15,177.00
	Total	1,217	$32,810.00
LLCD Other*	Dredger (6112)	426	$16,404.63
	Assistant Dredger (6114)	396	$7,915.00
	Total	822	$24,319.63
LLCD Private	Dredger (6115)	90	$3,465.00
	Assistant Dredger (6116)	89.50	$1,702.00
	Total	179.50	$5,167.00
Barge Operation staff Total			$62,296.63

* LLCD Other consist of all non-dredging and private work activities. Including but not limited to debris removal, disposal site prep, equipment maintenance, Riddle Point Park work, office work

Attachment B

2018 Barge Operation & Equipment Operating Costs (non-staff)

Category	Line Item	Annual Expenditure
Regular Gas	6200	$5,355.46
Diesel	6210	$12,702.02
Dredging Supplies	6251	$9,945.98
Dredging Equipment Maintenance	6541	$1,836.59
Equipment Rental	6542	$5,074.00
Disposal Site Preparation	6661	$3,364.21
Non-staff Total		$38,278.26

Attachment C

2018 Rip-Rap Summary

District (# of private jobs)	Shoreline Footage	Project Cost* (Billed)
I (4)	213’	$5,160.00
III (1)	184’	$1,570.00
IV (1)	192’	$3,820.00
V I(1)	243’	$5,600.00
VII(1)	271’	$4,398.85
Total 2018 Rip-Rap	1,103’	$20,548.85
	Stone Cost	$16,353.54
	Net Revenue*	$1,144.31
	* income-(staff cost + Stone cost)= net revenue	

*Project Cost (Billed) - refers to the final invoice cost paid by freeholder; Inclusive of stone cost and labor cost ($100.00/hr.)

Lake Lemon Conservancy District

Board Meeting Agenda Item

Presenter	**Adam Casey, District Manager**
Action Requested	**Approval**
Item/Subject	**2019** Vegetation Control Contract
Dollar Amount	**$50,000.00**
Meeting Date	**February 28, 2019**
Summary	**Vegetation Control/Treatment contract for 2019 with Aquatic Control Inc.**
Staff Recommendation	**Approval of the** Vegetation control contract with Aquatic Control Inc.

VEGETATION MANAGEMENT

LAKE SURVEYS

FISH MANAGEMENT

AQUATIC CONTROL® Est. 1966

PROFESSIONAL CONSULTANTS

FOUNTAINS

AERATION SYSTEMS

Phone 812-497-2410 Fax 812-497-2460

Proposal No.: 247994
Created : 01/08/2019
Company ID : 1026

Mr. Adam Casey
Lake Lemon Conservancy District
7599 North Tunnel Road
Unionville, IN 47468

812-334-0233
315-486-3413

Invoices will be mailed to:
Lake Lemon Conservancy District
7599 North Tunnel Road
Unionville, IN 47468

We hereby submit specifications and costs for a **Custom Vegetation Management Program**.

Program Specifications:

Aquatic Control, Inc. will provide licensed aquatic applicators and equipment to complete the treatment of submersed vegetation, American lotus, and spatterdock in Lake Lemon during the 2019 season at a per acre cost as listed below. In addition, Aquatic Control will complete an initial plant survey of the lake in order to determine treatment areas. Per acre treatment cost includes registered aquatic herbicides, certified aquatic applicators, initial mapping to determine treatment areas, and a guarantee of 90% control of vegetation present at the time of application. If 90% control of target species is not achieved within 14 days of application an evaluation of control and retreatment will be made by Aquatic Control at no additional charge. Regrowth of submersed vegetation may occur following treatment. Additional treatments of this vegetation will incur additional charges. For invasive Eurasian watermilfoil, ProcellaCOR EC will be used on areas less than 3 acres in size. Renovate 3 will be used for areas greater than 3 acres in size.

American Lotus and Spatterdock Application Cost: $390.00/acre and includes an initial treatment along with a touch-up treatment 2-3 weeks later.
Aquathol/Reward/Clipper Submersed Vegetation Application Charge: <10.0 acres - $555.00/acre; 10.0-20.0 acres - $510/acre; >20.0 acres - $457/acre
Renovate/ProcellaCOR Systemic Milfoil Control <10.0 acres-$650/acre; >10.0 acres-$570/acre.

Options and/or special terms included in this contract /proposal are as follows:

Client will only be billed on a per/acre basis. Price listed below is an estimate for the 2019 season.

PROGRAM COST: $50,000.00 ($50,000.00 plus $0.00 sales tax)	**Nontaxable** ☐ **Tax Rate** 0.000%

Payment Options (see back of document)

Notes and Precautions:

May require suspension of use of treated water for domestic use, swimming, irrigation, and livestock watering. Restrictions vary with the herbicide used with a maximum of 24 hours on swimming, 14 days for livestock watering, 14 days for domestic use, and 30 days irrigation. Water use restrictions for your lake will be posted on the day of treatment, unless other notification arrangements have been made.

Terms:

This contract is for the complete program as described in the above specifications and options sections, with material cost prorated over the entire contract period. Payment will be according to the payment option chosen on back. Overdue accounts are subject to suspension services and late fees.

Authorized Signature: Jeff Willey _____

Acceptance of Proposal

The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as stated on the back of this document.
Date _____ Signature _____

(Fill in Payment Information on back.)

Please sign, date, and return to

Aquatic Control, Inc, 418 W. State Road 258, Seymour, IN 47274

Lake Lemon Conservancy District

Board Meeting Agenda Item

Presenter	**Adam Casey, District Manager**
Action Requested	**Approval**
Item/Subject	**LLCD Pollution Liability Coverage**
Dollar Amount	**Premium**: $1,400 Annually Deductible: $2,500
Meeting Date	**February 28, 2019**
Summary	**Additional contractor insurance for pollution events and remediation arising from the actions of LLCD staff and operations**
Staff Recommendation	**Approval of pollution liability coverage**

Westchester
A Chubb Company

Westchester Surplus Lines Insurance Company

QUOTE - Option 1

Date: **02/04/2019**

Potential Insured:
Lake Lemon Conservancy District
7599 N Tunnel Rd
Unionville, IN 47468-9733

The following **quote** outlines our proposal for the above referenced account. Please review all coverage terms and conditions as they may differ from the submission. These terms and conditions may be modified upon review of the requested additional information.

Company: **Westchester Surplus Lines Insurance Company - AM Best Rating A++ XV**

Coverage:
Contractor's Pollution Liability Coverage Form – Occurrence

Limits Of Liability:

$2,000,000	General Aggregate
$1,000,000	Contractor's Pollution Liability - Each Pollution Condition

Deductible:

$2,500	Contractor's Pollution Liability - Each Pollution Condition

Premium:	**$1,150**	Policy Fee $150.00
TRIA Premium Charge:	$ 250	SL Tax w/o TRIA $32.50
Total Premium:	$ 1,400	(includes TRIA premium charge - Any requests to Reject TRIA coverage must be submitted to the underwriter prior to binding. See Attached TRIA disclosure.)

Rate: Flat / Not Auditable
Exposure Basis: $120,000 (Estimated Revenue)

Policy Term: 03/01/2019 - 03/01/2020

Retroactive Dates:
Contractor's Pollution Liability Coverage Form – Not Applicable

Covered Locations: Not Applicable

Insurance Company Forms:

ENV-1200 (03/10)	-	Contractors Pollution Liability Insurance Policy - Occurrence - Elite
ENV-1230 (03/10)	-	Non-Owned Disposal Site(s) Liability - Elite
ALL-21101 (11/06)	-	Trade or Economic Sanctions Endorsement
ENV-3100 (08/04)	-	Additional Insured Endorsement
ENV-3101 (08/04)	-	Additional Insured Endorsement - Primary and Non-Contributory
ENV-3103 (12/10)	-	All Known or Reported Incidents Exclusion
ENV-3112 (08/04)	-	Designated Operations Exclusion
ENV-3137 (08/04)	-	Separate Defense Limit Endorsement - Contractors Pollution Liability Coverage
ENV-3143 (03/05)	-	Waiver of Transfer of Rights of Recovery Against Others to Us
ENV-3146 (01/14)	-	Transportation Pollution Liability Coverage Endorsement (Owned)
ENV-3147 (10-12)	-	Global Program Solutions Amendatory (Foreign Indemnity) Endorsement
ENV-3154 (04/17)	-	Definition of Pollution Conditions Amendatory Endorsement
ENV-3213 (05/12)	-	Mold Sublimit Endorsement - Contractors Pollution Liability
ENV-3225 (10/08)	-	Additional Insured Endorsement - Products-Completed Operations Hazard
ENV-3226 (10/08)	-	Additional Insured Endorsement - Products-Completed Operations Hazard Primary & Non-Contributory
ENV-3239 (11/16)	-	Policy Changes Endorsement
ENV-3244 (04/18)	-	Catastrophe Management Coverage Endorsement
ENV-5100 (06/11)	-	Asbestos Amendatory Endorsement
ENV-5102 (10/04)	-	Nuclear Hazard Liability Exclusion
ENV-5519 (09/04)	-	Earned Premium Endorsement - 25% Minimum Earned
IL 02 72 (09/07)	-	Indiana Changes - Cancellation and Nonrenewal
SL-34255a (01/16)	-	Service of Suit Endorsement

Applicable TRIA Endorsements

The quoted coverage is subject to the receipt and satisfactory review of the following information within thirty (30) days unless otherwise noted:

- Signed and dated environmental application - prior to binding
- Three years of currently valued loss runs - prior to binding

Additional Terms and Conditions:

- Proposed terms and conditions may differ from those requested.
- Sample coverage forms will be provided to you prior to binding.
- The producer shall be responsible for all applicable surplus lines filings and taxes.
- Premium is due thirty (30) days from the effective date of coverage.
- The proposed coverage shall be 25% minimum earned at inception.
- The coverage proposed in this quote is valid through 03/06/2019
- We reserve the right to rescind this quote in order to amend the terms and conditions, including premium, or decline the account based upon review of additional underwriting information.
- **PLEASE NOTE THAT FOR POLICIES EFFECTIVE JULY 21, 2011 AND SUBSEQUENT, WE REQUIRE THE PRODUCER TO PROVIDE THE "HOME STATE" AS DEFINED IN THE NONADMITTED AND REINSURANCE REFORM ACT (NRRA) UPON BINDING OF THIS PLACEMENT.**

Please be advised that we do not review Certificates of Insurance issued by you, or by any party, relating to this policy of insurance either for content or accuracy. Accordingly, we request that you do not provide copies of certificates to us for review or for our records. Authority is granted to you for the limited purpose of issuing **unmodified ACORD Certificates (ACORD 25-S).** It is your responsibility to see that any Certificate provides an accurate representation of the coverage form and endorsements applicable to this policy at the time the Certificate is issued. **Any modification of the approved ACORD forms specifically set forth above, or the issuance of a non-approved Certificate of Insurance (ACORD or other) is prohibited.** Certificates of Insurance may only be issued as a matter of information. You have no authority by virtue of a Certificate or otherwise, to amend, extend or otherwise alter coverage afforded under this policy. Certificates of Insurance are never recognized as endorsements or policy change requests. You must submit a separate written request

if an endorsement or policy change (including but not limited to adding additional insureds or loss payees and/or alteration of notice requirements for cancellation) is requested. In the event a policy change is requested, the underwriter will advise if the request is acceptable to the Company.

CHUBB®

U.S. FOREIGN ACCOUNT TAX COMPLIANCE ACT ("FATCA")

The U.S. Foreign Account Tax Compliance Act, commonly known as "FATCA", became the law in the U.S. in March of 2010 and becomes effective July 1, 2014. Pursuant to FATCA, brokers, producers, agents and/or clients may need to obtain withholding certificates from insurance companies. For information on how to obtain the applicable withholding certificate from Chubb U.S. insurance companies, please go to the following web site:

http://www2.chubb.com/us-en/u-s-foreign-account-tax-compliance-act-fatca.aspx

NON-OWNED DISPOSAL SITE(S) LIABILITY ENDORSEMENT

Named Insured			Endorsement Number
Lake Lemon Conservancy District			
Policy Symbol	Policy Number	Policy Period	Effective Date of Endorsement
CPW		03/01/2019 **to** 03/01/2020	03/01/2019
Issued By (Name of Insurance Company)			
Westchester Surplus Lines Insurance Company			

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

THIS ENDORSEMENT MODIFIES INSURANCE PROVIDED UNDER THE FOLLOWING:

CONTRACTOR'S POLLUTION LIABILITY COVERAGE PART

THIS IS A CLAIMS-MADE ENDORSEMENT WHICH COVERS ONLY CLAIMS FIRST MADE AGAINST THE INSURED AND REPORTED TO THE INSURER, IN WRITING, DURING THE POLICY PERIOD.

PLEASE READ THIS ENDORSEMENT CAREFULLY. SOME OF THE PROVISIONS CONTAINED IN THIS ENDORSEMENT RESTRICT COVERAGE, SPECIFY WHAT IS AND IS NOT COVERED AND DESIGNATE RIGHTS AND DUTIES. LEGAL DEFENSE EXPENSES ARE SUBJECT TO AND WILL ERODE THE LIMITS OF INSURANCE AND ANY APPLICABLE DEDUCTIBLES.

SCHEDULE

Limits of Insurance:	$ 1,000,000	Each Claim
	$ 1,000,000	Non-Owned Disposal Site Aggregate Limit (serves to reduce the General Aggregate Limit shown on the Declarations page)
Deductible:	$ 10,000	Each Claim
Retroactive Date:	Policy Inception	

No coverage is provided under this policy for **Non-Owned Disposal Site(s)** unless this endorsement is attached as a part of the policy; coverage then applies only for the Limits of Insurance specifically listed in above SCHEDULE.

A. For the purposes of this endorsement, **CONTRACTORS POLLUTION LIABILITY COVERAGE PART, COVERAGES, A. Insuring Agreement** is deleted in its entirety and replaced by the following:

COVERAGES – NON-OWNED DISPOSAL SITE LIABILITY

Insuring Agreement

1. We will pay those sums in excess of the deductible shown in the above SCHEDULE that the insured becomes legally obligated to pay for **claim(s)** or **suit(s)** seeking damages for **bodily injury, property damage**, or **cleanup costs arising** from liability of the insured that results from **pollution condition(s)** on, at, under, or migrated beyond the boundaries of a **Non-Owned Disposal Site** as a result of the disposal of any material or waste by the insured provided:

   a. Such **pollution condition(s)** first commence after the Retroactive Date listed in the above SCHEDULE, if any, and before the end of the **policy period** and any resulting **claim(s)** are reported to us in writing, during the **policy period** or any applicable Extended Reporting Period; and

   b. The material or waste is from a job site where **your work** is being performed or has ever been performed; and

c. The **Non-Owned Disposal Site** is not owned, operated, leased, or maintained by the **Named Insured** or any related entity; and

d. The **Non-Owned Disposal Site** is a treatment, storage or disposal facility that:

i. Is currently permitted and/or licensed by the applicable federal, state, provincial, or municipal authorities; and

ii. Is permitted at the time the material or waste is transferred to the **Non-Owned Disposal Site** for treatment, storage or disposal; and

e. the **Non-Owned Disposal Site** is not listed on a proposed or final federal National Priorities List or Superfund database, or any state, provincial and/or municipal equivalent of the National Priorities List or Superfund database, at or prior to the time the material or waste is transferred to the **Non-Owned Disposal Site** for treatment, storage or disposal.

We shall have the right and duty to defend the insured against any **claim** or **suit** seeking those damages. However, we shall have no duty to defend the insured against any **claim** or **suit** seeking damages for **bodily injury** or **property damage** to which this insurance does not apply.

We may, at our discretion, investigate any **loss** and settle any **claim(s)** or **suit(s)** that may result. But the amount we will pay for damages is limited as described in **C. LIMITS OF INSURANCE** below; and our right and duty to defend ends when the applicable limit of insurance has been exhausted in the payment of judgments, settlements or supplementary payments under all attached Coverage Parts and all Supplementary Payments which reduce the Limit of Insurance.

In the event a **loss** continues to take place during multiple policy periods for policies issued by us, all **bodily injury** and **property damage** arising out of such **loss** will be deemed to take place during the earliest period during which the **loss** commenced.

B. For the purposes of this endorsement, **CONTRACTORS POLLUTION LIABILITY COVERAGE PART**, **COVERAGES**, **Exclusions**, **Non-Owned Disposal Sites** is deleted in its entirety and replaced by the following:

Bodily injury or **property damage** arising out of **pollution conditions** on, at, under or migrated from a **Non-Owned Disposal Site**. This exclusion does not apply to **Non-Owned Disposal Site(s)** described above in **COVERAGES, NON-OWNED DISPOSAL SITE LIABILITY, Insuring Agreement**.

C. For the purposes of this endorsement, **CONTRACTORS POLLUTION LIABILITY COVERAGE PART, LIMITS OF INSURANCE** is amended to include the following:

The Each Claim Limit shown in the SCHEDULE set forth above is the most we will pay for the sum of all damages because of a **loss** arising out of any one **claim(s)** or **suit(s)** under this endorsement. The most we will pay with respect to any **pollution condition** that continues during the policy periods of more than one Non-Owned Disposal Site Liability Coverage Part is the Each Claim Limit shown in the SCHEDULE set forth above applicable to the first policy period during which the **pollution condition** commenced. The Contractors Pollution Liability Limit shown in the Declarations is amended to include damages and Supplementary Payments under the Non-Owned Disposal Site Liability Coverage Part.

The Non-Owned Disposal Site Aggregate Limit shown in the SCHEDULE set forth above is the most we will pay for the sum of damages under all Coverage Parts and Supplementary Payments afforded by this endorsement. The General Aggregate Limit shown in the Declarations is amended to include damages and Supplementary Payments under the Non-Owned Disposal Site Liability Coverage Part.

The deductible amount stated in the SCHEDULE set forth above is applicable to each **claim** and applies once to each **claim** and applies to defense expenses, investigation, settlement, compromise, or indemnification.

D. For the purposes of this endorsement, **CONTRACTORS POLLUTION LIABILITY COVERAGE PART, DEFINITIONS** is amended to include the following additional **DEFINITION**:

Non-Owned Disposal Site means a facility or site that is used for treatment, storage or disposal of any material or waste.

E. For the purposes of this endorsement, the following Extended Reporting Period Provisions are added:

EXTENDED REPORTING PERIOD

In the event that the coverage provided by this endorsement is deleted or the policy is cancelled or non-renewed by the insured or the Company, for any reason, except for non-payment of premium or non-payment of deductible amounts, the following shall apply:

A. Automatic Extended Reporting Period

1. The Insurer shall provide the insured at no additional premium an Automatic Extended Reporting Period of sixty (60) days for any **claim(s)** first made against the **insured** during this automatic extended reporting period provided:

   a. The **claim(s)** arises out of a **pollution condition(s)** to which this insurance applies; and

   b. The **pollution condition(s)** commences on or after the Retroactive Date shown in the Declarations and before the expiration or cancellation date of the Policy; and

   c. The **claim(s)** is reported in writing to the Insurer within sixty (60) days immediately following the expiration or cancellation date of the Policy.

2. The Automatic Extended Reporting Period shall become effective on the expiration or cancellation date of the Policy.

3. The Automatic Extended Reporting Period shall not reinstate or increase the Limits of Insurance, nor shall it extend the **policy period** or change the scope of the coverage provided.

4. The Automatic Extended Reporting Period shall not be provided if the insured has purchased other insurance to replace the coverage provided under this Policy.

B. Optional Extended Reporting Period

1. The **Named Insured**, upon payment of a maximum additional premium of 200% of the annual policy premium, shall be entitled to purchase an Optional Extended Reporting Period of thirty-four (34) months for any **claim(s)** first made against the **insured** during this optional extended reporting period or the automatic extended reporting period provided:

   a. The **claim(s)** arises out of a **pollution condition(s)** to which this insurance applies; and

   b. The **pollution condition(s)** commences on or after the Retroactive Date shown in the Declarations and before the expiration or cancellation date of the Policy; and

   c. The **claim(s)** is reported in writing to the Insurer within 36 months immediately following the expiration or cancellation date of the Policy.

2. A written request for the Optional Extended Reporting Period must be received by the Insurer within thirty (30) days immediately following the expiration or cancellation date of the Policy.

3. Upon payment of the additional premium, the Optional Extended Reporting Period may not be cancelled and no return premiums will be provided.

4. The Optional Extended Reporting Period shall become effective on the expiration date of the Automatic Extended Reporting Period.

5. The Optional Extended Reporting Period shall not reinstate or increase the Limits of Insurance, nor shall it extend the **policy period** or change the scope of the coverage provided.

All other terms and conditions remain the same.

Named Insured			Endorsement Number
Lake Lemon Conservancy District			
Policy Symbol	Policy Number	Policy Period	Effective Date of Endorsement
CPW		03/01/2019 **to** 03/01/2020	03/01/2019
Issued By (Name of Insurance Company)			
Westchester Surplus Lines Insurance Company			

Insert the policy number. The remainder of the information is to be completed only when this endorsement is issued subsequent to the preparation of the policy.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED ENDORSEMENT
OWNERS, LESSEES OR CONTRACTORS – SCHEDULED PERSON OR ORGANIZATION

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE
CONTRACTOR'S POLLUTION LIABILITY COVERAGE

SCHEDULE:

Name of Person or Organization:
Any person or organization that is an owner of real property or personal property on which you are performing operations, or a contractor on whose behalf you are performing operations, and only at the specific written request of such person or organization to you, wherein such request is made prior to commencement of operations.

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

A. **SECTION II - WHO IS AN INSURED** is amended to include as an insured the person or organization shown in the Schedule, but only with respect to liability arising out of your ongoing operations performed for that insured.

B. With respect to the insurance afforded to these additional insureds, the following exclusion is added:

2. **Exclusions**

This insurance does not apply to **bodily injury** or **property damage** occurring after:

(1) All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the site of the covered operations has been completed; or

(2) That portion of **your work** out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

Named Insured			Endorsement Number
Lake Lemon Conservancy District			
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CPW		03/01/2019 **to** 03/01/2020	03/01/2019
Issued By (Name of Insurance Company)			
Westchester Surplus Lines Insurance Company			

Insert the policy number. The remainder of the information is to be completed only when this endorsement is issued subsequent to the preparation of the policy.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED ENDORSEMENT - OWNERS, LESSEES OR CONTRACTORS (PRIMARY AND NON-CONTRIBUTORY)

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE
CONTRACTOR'S POLLUTION LIABILITY COVERAGE

SCHEDULE:

Name of Person or Organization:
Any person or organization that is an owner of real property or personal property on which you are performing operations, or a contractor on whose behalf you are performing operations, and only at the specific written request of such person or organization to you, wherein such request is made prior to commencement of operations.

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

SECTION II - WHO IS AN INSURED is amended to include:

A. **SECTION II - WHO IS AN INSURED** is amended to include as an insured the person or organization shown in the Schedule, but only with respect to liability arising out of your ongoing operations performed for that insured.

B. With respect to the insurance afforded to these additional insureds, the following exclusion is added:

2. Exclusions

This insurance does not apply to **bodily injury** or **property damage** occurring after:

(1) All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the site of the covered operations has been completed; or

(2) That portion of **your work** out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

C. The coverage provided hereunder shall be primary and not contributing with any other insurance available to those designated above under any other third party liability policy.

Named Insured			Endorsement Number
Lake Lemon Conservancy District			
Policy Symbol	Policy Number	Policy Period	Effective Date of Endorsement
CPW		03/01/2019 **to** 03/01/2020	03/01/2019
Issued By (Name of Insurance Company)			
Westchester Surplus Lines Insurance Company			

Insert the policy number. The remainder of the information is to be completed only when this endorsement is issued subsequent to the preparation of the policy.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

DESIGNATED OPERATIONS EXCLUSION

SCHEDULE OF OPERATIONS:

All operations except for Environmental Permitting, Environmental Sampling, Soil Removal and Remediation, and Geotechnical services.

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

This insurance does not apply to **bodily injury** or **property damage** arising out of any operations shown in the Schedule of Operations above.

All other terms and conditions remain the same.

Named Insured			Endorsement Number
Lake Lemon Conservancy District			
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CPW		03/01/2019 **to** 03/01/2020	03/01/2019
Issued By (Name of Insurance Company)			
Westchester Surplus Lines Insurance Company			

Insert the policy number. The remainder of the information is to be completed only when this endorsement is issued subsequent to the preparation of the policy.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

SEPARATE DEFENSE LIMIT ENDORSEMENT - CONTRACTOR'S POLLUTION LIABILITY

This endorsement modifies insurance provided under the following:

CONTRACTORS POLLUTION LIABILITY COVERAGE PART

SECTION I - COVERAGES, C. Supplementary Payments is deleted in its entirety and replaced by the following:

C. Supplementary Payments

We will pay, with respect to any **claim(s)** we investigate or settle, or any **suit(s)** against an insured we defend:

1. All expenses we incur.

2. All premiums on appeal bonds or bonds to release attachments, but only for bond amounts within the applicable Limit of Insurance. The company does not have the obligation to apply for or furnish these bonds.

3. All reasonable expense(s) incurred by the insured at our request to assist us in the investigation or defense of the **claim(s)** or **suit(s)**, including actual loss of earnings up to $250 per day because of time off from work.

4. All costs taxed against the insured in the **suit(s)**.

5. Prejudgment interest awarded against the insured on that part of the judgment we pay. If we make an offer to pay the applicable Limit of Insurance, we will not pay any prejudgment interest based on that period of time after the offer.

6. All interest on the full amount of any judgment that accrues after entry of the judgment and before we have paid, offered to pay, or deposited in court the part of the judgment that is within the applicable Limit of Insurance.

These payments will not reduce the Limits of Insurance shown in the Declarations until we have paid **$**1,000,000 in total Supplementary Payments, after which these payments will reduce the Limits of Insurance shown in the Declarations.

Named Insured			Endorsement Number
Lake Lemon Conservancy District			
Policy Symbol	Policy Number	Policy Period	Effective Date of Endorsement
CPW		03/01/2019 **to** 03/01/2020	03/01/2019
Issued By (Name of Insurance Company)			
Westchester Surplus Lines Insurance Company			

Insert the policy number. The remainder of the information is to be completed only when this endorsement is issued subsequent to the preparation of the policy.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

WAIVER OF TRANSFER OF RIGHTS OF RECOVERY AGAINST OTHERS TO US

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
CONTRACTORS POLLUTION LIABILITY COVERAGE PART

SCHEDULE

Name of Person or Organization:
Any person or organization that is an owner of real property or personal property on which you are performing operations, or a contractor on whose behalf you are performing operations, and only at the specific written request of such person or organization to you, wherein such request is made prior to commencement of operations.

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

The **TRANSFER OF RIGHTS OF RECOVERY AGAINST OTHERS TO US Condition** is amended by the addition of the following:

We waive any right of recovery we may have against the person or organization shown in the Schedule above because of payments we make for injury or damage arising out of your ongoing operations or **your work** done under a contract with that person or organization and included in the **products-completed operations hazard**. This waiver applies only to the person or organization shown in the Schedule above.

All other terms and conditions remain the same.

TRANSPORTATION POLLUTION LIABILITY COVERAGE ENDORSEMENT

Named Insured			Endorsement Number
Lake Lemon Conservancy District			
Policy Symbol	Policy Number	Policy Period	Effective Date of Endorsement
CPW		03/01/2019 **to** 03/01/2020	03/01/2019
Issued By (Name of Insurance Company)			
Westchester Surplus Lines Insurance Company			

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

THIS ENDORSEMENT MODIFIES INSURANCE PROVIDED UNDER THE FOLLOWING:

CONTRACTORS POLLUTION LIABILITY COVERAGE PART

COVERAGES - CONTRACTORS POLLUTION LIABILITY, Section **B.**, **Exclusions**, **16. Vehicles** is deleted in its entirety and replaced with the following:

16. Vehicles

Bodily injury or **property damage** arising from the use, maintenance, entrustment to others, or operation of any **auto**, aircraft, watercraft or other conveyance. However, this exclusion does not apply to:

a. B**odily injury** or **property damage** resulting from a **pollution condition** that commences during the transportation of **your product** by a **carrier**; or

b. **Bodily injury** or **property damage** resulting from a **pollution condition** arising out of the ownership, maintenance or use of any **autos** or watercraft used in the operations performed by or on behalf of the insured.

With respect to item **b.** above, the following Limits of Insurance apply:

Limits of Insurance:	$1,000,000	Each Occurrence
	$1,000,000	Transportation Pollution Aggregate Limit (serves to reduce the General Aggregate shown on the Declarations page)

The Limits of Insurance are subject to the terms and conditions of the **LIMITS OF INSURANCE** section of the policy to which this endorsement is attached.

All other terms and conditions remain the same.

GLOBAL PROGRAM SOLUTIONS AMENDATORY (Foreign Indemnity) ENDORSEMENT

Named Insured			Endorsement Number
Lake Lemon Conservancy District			
Policy Symbol	Policy Number	Policy Period	Effective Date of Endorsement
CPW		03/01/2019 **to** 03/01/2020	03/01/2019
Issued By (Name of Insurance Company)			
Westchester Surplus Lines Insurance Company			

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

THIS ENDORSEMENT MODIFIES INSURANCE PROVIDED UNDER THE FOLLOWING:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

CONTRACTOR'S POLLUTION LIABILITY COVERAGE PART

PROFESSIONAL LIABILITY COVERAGE PART

THIRD-PARTY PREMISES POLLUTION LIABILITY COVERAGE PART

ONSITE CLEANUP PREMISES POLLUTION LIABILITY COVERAGE PART

SUDDEN AND ACCIDENTAL PREMISES POLLUTION LIAIBLITY COVERAGE PART

PRODUCTS POLLUTION LIABILITY COVERAGE PART

Notwithstanding anything in this policy that might be construed otherwise, including any definitions or provisions governing Defense and Claims Expense that discuss the geographic scope of coverage to be provided herein, the Coverage Territory of this policy shall include the following:

1. The United States of America, including its territories and possessions, and Puerto Rico;
2. International waters or airspace, but only if the injury or damage occurs in the course of travel or transportation between any of the places included in Item **1.,** above; and
3. All other parts of the world, except:
   a. The People's Republic of China; and
   b. Any of the former member states of the Union of Soviet Socialist Republics, including Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

This policy shall not afford coverage for any risk which would otherwise be in violation of the laws of the United States of America, including, but not limited to, economic or trade sanction laws or export control laws administered by the government of the United States of America.

I. FOREIGN COVERAGE

When a **foreign occurrence** arising out of one or more otherwise covered exposures of the insured or **foreign entity** causes injury or damage to which this insurance applies, rather than directly pay on behalf of the insured or **foreign entity**, we shall indemnify the insured for the **foreign loss** or **foreign entity loss** caused by a **foreign occurrence** subject to the following provisions.

II. WHO IS AN INSURED

The **WHO IS AN INSURED** provisions of this policy and any other associated definitions or schedules are hereby amended to confirm that **foreign entities** *are not insureds* on whose behalf we have a direct duty to pay settlements or judgments or to whom we owe any duty to defend.

III. DEFENSE AND SUPPLEMENTARY PAYMENTS

Rather than directly defend an insured or **foreign entity**, we shall indemnify the insured for defense costs incurred in defending a **suit** brought against it or its **foreign entity**, provided that the insured complies with Section **V.**, **ADDITIONAL CONDITIONS**, of this Endorsement, below, and all other policy terms, conditions and limitations.

IV. LIMITS OF INSURANCE

The insurance provided by this Endorsement is subject to all applicable limits of insurance, limits of liability, deductibles and self-insured retentions (if any) identified in the Declarations of, or elsewhere in, this policy, including any aggregate limits and sublimits (collectively "limits"). Any **foreign loss** or **foreign entity loss** for which we pay indemnity shall erode and be counted against such limits. Such limits apply on the same basis (e.g., per **occurrence**, per **claim**, in the aggregate etc.) with respect to the insureds as would apply if the **foreign occurrence** had taken place within the United States of America, including its territories and possessions, or Puerto Rico.

The applicability of limits to Supplementary Payments or **allocated loss adjustment expense** applies on the same basis (pursuant to the applicable coverage part) as would apply if the **foreign occurrence** had taken place directly with respect to an insured within the United States of America, including its territories and possessions, or Puerto Rico.

V. ADDITIONAL CONDITIONS

The following conditions apply in addition to the conditions and limitations provided elsewhere in this policy.

A. Claims Made and/or Reported Coverage (to the extent applicable)

Any requirements in this policy that a **claim** be first made and/or reported, or deemed made and/or reported, during the policy period, or any discovery or extended reporting period, shall also apply to all **claims** made against a **foreign entity** for which an insured seeks indemnification. Any provisions regarding notice of circumstances which may become a **claim** pursuant to this policy shall apply to circumstances known or which reasonably should have been known by the insured.

B. Additional Duties of the Insured

1. With respect to a **foreign occurrence** which may result in a **claim** to which this insurance applies, the insured assumes the duty to notify us, and must notify us in accordance with the conditions in the applicable coverage part or endorsement of this policy.
2. The insured shall, when directed by us:
   - **a.** Retain in its own name, but, subject to any relevant retention or deductible obligations herein, a loss adjusting expert approved by us that is authorized in the jurisdiction in which the **foreign loss** or **foreign entity loss** occurred;
   - **b.** Where permitted by applicable law, grant us the full right to collaborate with such loss adjusting expert;
   - **c.** Grant us full access to any records produced by such loss adjusting expert; and
   - **d.** Obtain the right to control the investigation, adjustment, defense and settlement of the **foreign loss** or **foreign entity loss** using experts approved by us, including access to books, records, bills, invoices, vouchers and other information.

C. Payment as Discharge of Liability

With respect to any **foreign loss** or **foreign entity loss**, payment to the insured shall, in all circumstances, to the extent of such payment, discharge us from any liability or alleged liability to any other person or entity, whether or not such person or entity is named as an insured pursuant to this policy.

D. Truthfulness and Accuracy of Information

1. The insured shall make a good faith effort to provide truthful and accurate information to us with respect to the applicable **foreign entity**, **foreign occurrence**, **claim**, **suit**, **foreign loss** or **foreign entity loss**; and
2. The insured shall not, at any time, intentionally conceal or misrepresent facts concerning any **foreign entity**; any **foreign loss**; any **foreign entity loss**; any **claim** or **suit**; or any **foreign occurrence**.

VI. Additional Definitions

The following definitions apply to this Endorsement in addition to definitions set forth elsewhere in this policy:

A. Allocated loss adjustment expense means any:

1. Expenses, costs and interest provided for pursuant to this policy that responds to a **loss**, **claim**, suit or demand; and
2. Other expenses, costs, or interest incurred in connection with the investigation, administration, adjustment, settlement or defense of any **loss**, **claim**, **suit** or demand arising pursuant to this policy that we directly allocate to a particular **claim**, whether or not a payment indemnifying the claimant(s) is made by any person or entity. Such expenses shall include: subrogation; all court costs, fees and expenses; fees for service of process; fees and expenses to attorneys for legal services; the cost of services of undercover operations and detectives; fees to obtain medical cost containment services; the cost of employing experts for the purpose of preparing maps, photographs, diagrams, or chemical or physical analysis, or for expert advice or opinion; the cost of obtaining copies of any public records; and the cost of obtaining depositions and court reporters or recorded statements.

However, **allocated loss adjustment expense** does not include:

1. The salaries of the employees of any **foreign entity** or of the insured;
2. Fees, expenses and interest for legal services not provided to or for the benefit of the insured; and
3. Amounts otherwise reimbursed to the insured or **foreign entity**.

B. Foreign entity means any person or entity which would otherwise qualify as an insured or additional insured as defined in or identified in any coverage part, endorsement or schedule attached to this policy, but for the fact that such person or entity is domiciled or its principal place of business is located within a jurisdiction outside of the United States of America, including its territories and possessions, or Puerto Rico.

C. Foreign loss means:

1. Damages or other amounts to which this insurance applies, that an insured has incurred or becomes legally obligated to pay within a jurisdiction outside of the United States of America, including its territories and possessions, or Puerto Rico, as the result of injury, damage, **loss**, or liability to which this insurance would apply if the **foreign occurrence** had taken place within the United States of America, including its territories and possessions, or Puerto Rico; and
2. Any reasonable and necessary expenses or costs incurred by the insured to which this insurance would apply if we defended the **claim** or **suit**,

which have not been paid, indemnified or reimbursed pursuant to any other insurance.

D. Foreign entity loss means:

1. Damages, or other amounts to which this insurance applies, that a **foreign entity** has incurred or becomes legally obligated to pay because of injury, damage, **loss**, or liability to which this insurance would apply if the insured were directly liable for such amounts with respect to covered exposures located within the United States of America, including its territories and possessions, or Puerto Rico; and
2. Any reasonable and necessary expenses or costs incurred by a **foreign entity** to which this insurance would apply if we defended the **claim** or **suit**,

which have not been paid, indemnified or reimbursed pursuant to any other insurance.

E. Foreign occurrence means an accident, **occurrence**, **pollution condition**, **loss**, act, error or omission (as any of these terms may be defined in the applicable coverage parts), which may result in a **foreign loss** or **foreign entity loss**.

All other terms and conditions of this policy remain unchanged.

MOLD SUBLIMIT ENDORSEMENT – CONTRACTORS POLLUTION LIABILITY

Named Insured			Endorsement Number
Lake Lemon Conservancy District			
Policy Symbol	Policy Number	Policy Period	Effective Date of Endorsement
CPW		03/01/2019 **to** 03/01/2020	03/01/2019
Issued By (Name of Insurance Company)			
Westchester Surplus Lines Insurance Company			

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

THIS ENDORSEMENT MODIFIES INSURANCE PROVIDED UNDER THE FOLLOWING:

CONTRACTORS POLLUTION LIABILITY COVERAGE PART

CONTRACTORS POLLUTION LIABILITY COVERAGE PART, DEFINITIONS, Pollution Condition, is deleted in its entirety and replaced with the following:

Pollution condition means the discharge, dispersal, release, escape, migration, or seepage of any solid, liquid, gaseous or thermal, material matter, irritant or contaminant, including smoke, soot, vapors, fumes, acids, alkalis, chemicals, hazardous substances, hazardous materials, low level radiological material, or waste materials including medical, infectious, or pathological wastes, on, in, into, or upon land and structures thereupon, the atmosphere, surface water or groundwater. **Pollution condition** includes:

a. electromagnetic fields, virus(es), and bacteria including Legionella pneumophila

b. **mold**

With respect to item **b.** above, the following Limits of Insurance and Deductible apply:

Limits of Insurance:	$ 1,000,000	Each Pollution Condition
	$ 1,000,000	Mold Aggregate Limit (serves to reduce the General Aggregate Limit shown on the Declarations page)
Deductible:	$ 10,000	Each Pollution Condition

The above Limits of Insurance and Deductible are subject to the terms and conditions of the **LIMITS OF INSURANCE** section of the policy to which this endorsement is attached.

All other terms and conditions remain the same.

ADDITIONAL INSURED ENDORSEMENT – PRODUCTS-COMPLETED OPERATIONS HAZARD

Named Insured			Endorsement Number
Lake Lemon Conservancy District			
Policy Symbol	Policy Number	Policy Period	Effective Date of Endorsement
CPW		03/01/2019 **to** 03/01/2020	03/01/2019
Issued By (Name of Insurance Company)			
Westchester Surplus Lines Insurance Company			

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

THIS ENDORSEMENT MODIFIES INSURANCE PROVIDED UNDER THE FOLLOWING:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
CONTRACTOR'S POLLUTION LIABILITY COVERAGE PART

SCHEDULE

Any person or organization that is an owner of real property or personal property on which you are performing operations, or a contractor on whose behalf you are performing operations, and only at the specific written request of such person or organization to you, wherein such request is made prior to commencement of operations.

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for **bodily injury** or **property damage** caused, in whole or in part, by **your work** performed for that additional insured and included in the **products-completed operations hazard**.

All other terms and conditions remain the same.

ADDITIONAL INSURED ENDORSEMENT – PRODUCTS-COMPLETED OPERATIONS HAZARD
PRIMARY & NON-CONTRIBUTORY

Named Insured			Endorsement Number
Lake Lemon Conservancy District			
Policy Symbol	Policy Number	Policy Period	Effective Date of Endorsement
CPW		03/01/2019 **to** 03/01/2020	03/01/2019
Issued By (Name of Insurance Company)			
Westchester Surplus Lines Insurance Company			

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

THIS ENDORSEMENT MODIFIES INSURANCE PROVIDED UNDER THE FOLLOWING:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
CONTRACTOR'S POLLUTION LIABILITY COVERAGE PART

SCHEDULE

Any person or organization that is an owner of real property or personal property on which you are performing operations, or a contractor on whose behalf you are performing operations, and only at the specific written request of such person or organization to you, wherein such request is made prior to commencement of operations.

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for **bodily injury** or **property damage** caused, in whole or in part, by **your work** performed for that additional insured and included in the **products-completed operations hazard**.

Furthermore, the coverage provided hereunder shall be primary and not contributing with any other insurance available to those designated above under any other third party liability policy.

All other terms and conditions remain the same.

POLICY CHANGES ENDORSEMENT

Named Insured			Endorsement Number
Lake Lemon Conservancy District			
Policy Symbol	Policy Number	Policy Period	Effective Date of Endorsement
CPW		03/01/2019 **to** 03/01/2020	03/01/2019
Issued By (Name of Insurance Company)			
Westchester Surplus Lines Insurance Company			

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

THIS ENDORSEMENT MODIFIES INSURANCE PROVIDED UNDER THE FOLLOWING:

CONTRACTOR'S POLLUTION LIABILITY INSURANCE POLICY (ENV-1200 (03-10))

I. The last sentence of Section **I., COVERAGES - CONTRACTORS POLLUTION LIABILITY,** Subsection **A., Insuring Agreement,** of this policy is hereby deleted in its entirety.

II. Section **III., LIMITS OF INSURANCE,** of this policy is hereby deleted in its entirety and replaced with the following:

A. Subject to the Paragraph **C.**, below, the Each Pollution Condition Limit shown in the Declarations is the most we will pay for: **1)** the sum of all damages because of **loss; 2) emergency response expense** and **3)** Supplementary Payments, arising out of the same, continuous, repeated, or related **pollution condition** under this policy. The most we will pay with respect to any **pollution condition** that continues during successive policy periods of more than one occurrence-based Contractors Pollution Liability coverage issued by the Insurer or an affiliate is the Each Pollution Condition Limit shown in the Declarations applicable to the first policy period during which the **pollution condition** commenced.

B. Indivisible, progressive **bodily injury** or **property damage** over multiple policy periods caused by the same, continuous, repeated or related **pollution condition** shall be deemed to have occurred only in the policy period of the date of the first exposure to the **pollution condition**. If the Insurer or an affiliate has issued occurrence-based Contractors Pollution Liability coverage to the insured over successive policy periods, and, if the date of such first exposure cannot be conclusively determined, but the indivisible, progressive **bodily injury** or **property damage** continues to exist during the Insurer's successive periods of coverage, the **bodily injury** or **property damage** shall be deemed to have occurred only on the effective date of the first, relevant contractors pollution coverage issued by the Insurer.

C. The General Aggregate Limit shown in the Declarations will be the most we will pay pursuant under all Coverage Parts of this policy, including payments damages, **emergency response expense** and Supplementary Payments afforded by this policy.

D. The Limits of Insurance apply to the policy period shown in the Declarations or as amended by endorsement.

E. The deductible amount stated on the Declarations is applicable to each **pollution condition** or **emergency response expense**. The deductible amount applies once to each **pollution condition** or **emergency response expense** and applies to defense expenses, investigation, settlement, compromise, or indemnification.

F. We, at our sole election and option, may either:

1. Pay any part of the deductible amount to effect settlement or expense of any **claim**, and upon notification of the action taken, you shall promptly reimburse us for such part of the deductible amount that has been paid by us; or

2. Simultaneously upon receipt of notice of any **claim** or at any time thereafter, call upon you to pay or deposit with us all or any part of the deductible amount, to be held and applied by us at our sole discretion.

G. If a **claim** has not entered into litigation, and we and the **Named Insured** mutually agree to **mediation** as a means to settle a **claim** made against the insured, and if such **claim** is settled as a direct result of and during the **mediation**, the deductible stated in the Declarations or applicable endorsement(s) shall be waived up to a maximum of $25,000. When this occurs, we will reimburse the **Named Insured** as soon as practical for any qualifying deductible amount which was already paid by the **Named Insured** prior to the **mediation**.

All other terms and conditions remain the same.

Westchester
A Chubb Company

CATASTROPHE MANAGEMENT COVERAGE ENDORSEMENT

Named Insured			Endorsement Number
Lake Lemon Conservancy District			
Policy Symbol	Policy Number	Policy Period	Effective Date of Endorsement
CPW		03/01/2019 **to** 03/01/2020	03/01/2019
Issued By (Name of Insurance Company)			
Westchester Surplus Lines Insurance Company			

Insert the policy number. The remainder of the information is to be completed only when this endorsement is issued subsequent to the preparation of the policy.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

This endorsement modifies insurance provided under the following:

CONTRACTORS POLLUTION LIABILITY INSURANCE POLICY (ENV-1200 (03-10))

SCHEDULE

Sublimit of Insurance:	**$250,000**	Aggregate Catastrophe Management Sublimit of Insurance for all Pollution Conditions (serves to reduce the Limits of Insurance shown on the Declarations page)
Deductible:	**$25,000**	Per **Pollution Condition**

I. Section **I., COVERAGES – CONTRACTORS POLLUTION LIABLITY,** Subsection **A., Insuring Agreement,** of this policy is hereby amended by addition of the following:

Supplemental Coverage – Catastrophe Management Costs

We will pay those sums for **catastrophe management costs,** in excess of the deductible shown in the SCHEDULE set forth on the Catastrophe Management Coverage Endorsement, incurred by an **insured** during the **policy period,** provided that such **catastrophe management costs**:

1. Are directly attributable to a **pollution condition** to which this policy more generally applies, that, in the good faith opinion of a **responsible insured,** has or will result in:

a. **Loss, emergency response expense** and Supplementary Payments (exclusive of the **catastrophe management costs**) that will exceed the deductible; and

b. A need for **catastrophe management services** as a result of adverse media coverage; and

2. Are approved by the Insurer, in writing, except for those **catastrophe management costs** incurred during the same seven (7) day period associated with **emergency response expense**.

II. Section **I., COVERAGES – CONTRACTORS POLLUTION LIABLITY,** Subsection **B., Exclusions,** of this policy is hereby amended by addition of the following:

This insurance also does not apply to **catastrophe management costs** arising out of or related to any of the individually excluded exposures identified herein.

III. For the purposes of this endorsement, Section **III., LIMITS OF INSURANCE,** of this policy is hereby amended by addition of the following:

The amount we shall pay for **catastrophe management costs** is limited by the Aggregate Catastrophe Management Sublimit of Insurance and deductible set forth on the Catastrophe Management Coverage Endorsement.

The Aggregate Catastrophe Management Sublimit of Insurance identified in the SCHEDULE set forth on the Catastrophe Management Coverage Endorsement shall be the maximum amount the Insurer shall pay for all **catastrophe management costs** arising out of all **pollution conditions**. This Aggregate Sublimit of Insurance shall be subject to and payments made pursuant to this Aggregate Sublimit of Insurance shall erode, the Limits of Insurance identified on the Declarations to this policy.

IV. For purposes of this endorsement, Section **III., LIMITS OF INSURANCE,** Subsection **E.,** of this policy is hereby amended by addition of the following:

Notwithstanding the foregoing, the Catastrophe Management Costs-Specific deductible amount identified in the Catastrophe Management Coverage Endorsement is the obligation of the **named insured** and applies once to **catastrophe management costs** arising from the same, related or continuous **pollution condition(s)**. Amounts within any such Catastrophe Management-Specific deductible shall be independent of, and shall not otherwise erode, the single largest deductible that is applicable to all other covered exposures arising out of that same **pollution condition**.

V. Section **IV., DEFINITIONS**, of the policy is hereby amended by addition of the following:

Catastrophe Management Costs means reasonable and necessary fees and expenses for the following:

1. Responsive consulting services rendered by a **catastrophe management firm;**
2. Printing, advertising, mailing of public relations materials; and
3. Travel by directors, officers, employees of a **named insured** or the **catastrophe management firm** incurred at the recommendation or direction of the **catastrophe management firm.**

Catastrophe management firm means any firm that is approved, in writing, except for firms retained to respond during the same seven (7) day period associated with **emergency response expense**, by the Insurer to perform **catastrophe management services** in connection with a **pollution condition.**

Catastrophe management services means advising a **named insured** with respect to minimizing potential harm to a **named insured** from a covered **pollution condition** by consulting with a **named insured** with respect to maintaining and restoring its public image or reputation.

All other terms and conditions remain the same.

_____
Authorized Representative

DISCLOSURE PURSUANT TO TERRORISM RISK INSURANCE ACT

Named Insured Lake Lemon Conservancy District			Endorsement Number
Policy Symbol CPW	Policy Number	Policy Period 03/01/2019 **to** 03/01/2020	Effective Date of Endorsement 03/01/2019
Issued By (Name of Insurance Company) Westchester Surplus Lines Insurance Company			

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

Disclosure Of Premium

In accordance with the federal Terrorism Risk Insurance Act, we are required to provide you with a notice disclosing the portion of your premium, if any, attributable to coverage for terrorist acts certified under the Terrorism Risk Insurance Act. The portion of your premium attributable to such coverage is shown in this endorsement or in the policy Declarations.

Disclosure Of Federal Participation In Payment Of Terrorism Losses

The United States Government, Department of the Treasury, will pay a share of terrorism losses insured under the federal program. The federal share equals 85% for year 2015, 84% beginning on January 2016; 83% beginning on January 1 2017, 82% beginning on January 1, 2018; 81% beginning on January 1, 2019 and 80% beginning on January 1, 2020 of that portion of the amount of such insured losses that exceeds the applicable insurer retention. However, if aggregate insured losses attributable to terrorist acts certified under the Terrorism Risk Insurance Act exceed $100 billion in a calendar year , the Treasury shall not make any payment for any portion of the amount of such losses that exceeds $100 billion.

Cap On Insurer Participation In Payment Of Terrorism Losses

If aggregate insured losses attributable to terrorist acts certified under the Terrorism Risk Insurance Act exceed $100 billion in a calendar year and we have met our insurer deductible under the Terrorism Risk Insurance Act, we shall not be liable for the payment of any portion of the amount of such losses that exceeds $100 billion, and in such case insured losses up to that amount are subject to pro rata allocation in accordance with procedures established by the Secretary of the Treasury.

Terrorism Risk Insurance Act premium: $250 .

_____
Authorized Representative

Lake Lemon Conservancy District

Board Meeting Agenda Item

Presenter	**Adam Casey, District Manager**
Action Requested	**Approval**
Item/Subject	**Financial Council - Scope of Services**- Umbaugh
Dollar Amount	$27,500.00 to $32,500.00
Meeting Date	**February 28, 2019**
Summary	**Scope of services and agreement for the utili**zation of Umbaugh & Associates as a financial advisor throughout the sediment management project financing process.
Staff Recommendation	**Approval of Scope of Services and Agreement** with Umbaugh & Associates.

UMBAUGH

H. J. Umbaugh & Associates
Certified Public Accountants, LLP
8365 Keystone Crossing
Suite 300
Indianapolis, IN 46240-2687
Phone: 317-465-1500
Fax: 317-465-1550
www.umbaugh.com

February 1, 2019

Mr. Adam W. Casey, District Manager
Lake Lemon Conservancy District
7599 North Tunnel Road
Unionville, IN 47468

Re: Lake Lemon Conservancy District – Proposed Municipal Advisory and Accounting Services – Proposed Improvement Project SRF Financing

Dear Mr. Casey:

Thank you for requesting that H.J. Umbaugh & Associates, Certified Public Accountants, LLP (the "Firm") provide to the Lake Lemon Conservancy District (the "Client") those services more fully set forth in Exhibit A hereto (the "Services").

Fees and Costs

Fees charged for work performed are generally based on hourly rates, as set forth in Exhibit B, for the time expended, a fixed amount or other arrangement as mutually agreed upon as more appropriate for a particular matter. Hourly rates for work performed by our professionals vary by individual and reflect the complexity of the engagement.

Disclosure of Conflicts of Interest with Various Forms of Compensation

The Municipal Securities Rulemaking Board (MSRB) requires us, as your municipal advisor, to provide written disclosure to you about the actual or potential conflicts of interest presented by various forms of compensation. Exhibit C sets forth the potential conflicts of interest associated with various forms of compensation. By signing this letter of engagement, the signee acknowledges that he/she has received Exhibit C and that he/she has been given the opportunity to raise questions and discuss the matters contained within the exhibit with the municipal advisor.

Billing Procedures

Normally, you will receive a monthly statement showing fees and costs incurred in the prior month. Occasionally, we may bill on a less frequent basis if the time involved in the prior month was minimal or if arrangements are made for the payment of fees from bond proceeds. The account balance is due and payable on receipt of the statement. Once our representation has been concluded or terminated, a final billing will be sent to you. If requested to provide an estimate of our fees for a given matter, we will endeavor in good faith to provide our best estimate, but unless there is a mutual agreement to a fixed fee, the actual fees incurred on any project may be less than or exceed the estimate. Any questions or errors in any fee statement should be brought to our attention in writing within sixty (60) days of the billing date.

Termination

Both the Client and the Firm have the right to terminate the engagement at any time after reasonable advance written notice. On termination, all fees and charges incurred prior to termination shall be paid promptly. Unless otherwise agreed to by the Client and the Firm, the scope of services provided in Exhibit A will terminate 60 days after completion of the services in each Article.

Accountants' Opinion

In performing our engagement, we will be relying on the accuracy and reliability of information provided by Client personnel. The services provided may include financial advisory services, consulting services, and accounting report services such as compilation, preparation, and agreed upon procedures reports. Please see Exhibit A and Exhibit D. We will not audit, review, or examine the information. Please also note that our engagement cannot be relied on to disclose errors, fraud, or other illegal acts that may exist. However, we will inform you of any material errors and any evidence or information that comes to our attention during the performance of our procedures that fraud may have occurred. In addition, we will report to you any evidence or information that comes to our attention during the performance of our procedures regarding illegal acts that may have occurred, unless they are clearly inconsequential. We have no responsibility to identify and communicate significant deficiencies or material weaknesses in your internal control as part of this engagement.

The procedures we perform in our engagement will be heavily influenced by the representations that we receive from Client personnel. Accordingly, false representations could cause material errors to go undetected. The Client, therefore, agrees to indemnify and hold us harmless for any liability and all reasonable costs (including legal fees) that we may incur in connection with claims based upon our failure to detect material errors resulting from false representations made to us by any Client personnel and our failure to provide an acceptable level of service due to those false representations.

The responsibility for auditing the records of the Client rests with the Indiana State Board of Accounts and the work performed by the Firm shall not include an audit or review of the records or the expression of an opinion on financial data.

Client Responsibilities

It is understood that the Firm will serve in an advisory capacity with the Client. The Client is responsible for management decisions and functions, and for designating an individual with suitable skill, knowledge or experience to oversee the services we provide. The Client is responsible for evaluating adequacy and results of the services performed and accepting responsibility for such services. The Client is responsible for establishing and maintaining internal controls, including monitoring ongoing activities.

Additional Services

Exhibit A sets forth the scope of the Services to be provided by the Firm. From time to time, additional services may be requested by the Client beyond the scope of Exhibit A. The Firm may provide these additional services and be paid at the Firm's customary fees and costs for such services. In the alternative, the Firm and the Client may complete a revised and supplemented Exhibit A to set forth the additional services (including revised fees and costs, as needed) to be provided. In either event, the terms and conditions of this letter shall remain in effect.

E-Verify Program

The Firm participates in the E-Verify program. For the purpose of this paragraph, the E-Verify program means the electronic verification of the work authorization program of the Illegal Immigration Reform and Immigration Responsibility Act of 1996 (P.L. 104-208), Division C, Title IV, s.401(a), as amended, operated by the United States Department of Homeland Security or a successor work authorization program designated by the United States Department of Homeland Security or other federal agency authorized to verify the work authorization status of newly hired employees under the Immigration Reform and Control Act of 1986 (P.L. 99-603). The Firm does not employ any "unauthorized aliens" as that term is defined in 8 U.S.C. 1324a(h)(3).

Investments

The Firm certifies that pursuant to Indiana Code 5-22-16.5 *et seq*. the Firm is not now engaged in investment activities in Iran. The Firm understands that providing a false certification could result in the fines, penalties, and civil action listed in I.C. 5-22-16.5-14.

Municipal Advisor Registration

The Firm is a Municipal Advisor registered with the Securities and Exchange Commission and the Municipal Securities Rulemaking Board. As such, the Firm is providing certain specific municipal advisory services to the Client. The Firm is neither a placement agent to the Client nor a broker/dealer.

The offer and sale of any Bonds shall be made by the Client, in the sole discretion of the Client, and under its control and supervision. The Client agrees that the Firm does not undertake to sell or attempt to sell the Bonds, and will take no part in the sale thereof.

Mediation Provision

The Client and the Firm agree that if any dispute (other than our efforts to collect any outstanding invoice(s)) arises out of or relates to this engagement, or any prior engagement we may have performed for you, and if the dispute cannot be settled through informal negotiation, the parties agree first to try in good faith to settle the dispute by mediation administered by the American Arbitration Association under its Commercial Mediation Procedures (or such other administrator or rules as the parties may mutually agree) before resorting to litigation. The parties agree to engage in the mediation process in good faith once a written request to mediate has been given by any party to the engagement. Any mediation initiated as a result of this engagement shall take place in Indianapolis, Indiana, or such other location as the parties may mutually agree. If the parties are unable to mutually agree on the selection of a mediator, the mediator shall be determined in accordance with the American Arbitration Association's Commercial Mediation Procedures. The results of any such mediation shall be binding only upon a written settlement agreement executed by each party to be bound. Each party shall bear its own costs and fees, including attorneys' fees and expenses, in connection with the mediation. The costs of the mediation, including without limitation the mediator's fees and expenses, shall be shared equally by the participating parties. Any ensuing litigation shall be initiated and maintained exclusively before any state or federal court having appropriate subject matter jurisdiction located in Indianapolis, Indiana.

Other Financial Industry Activities and Affiliations

Umbaugh Cash Advisory Services, LLC ("UCAS") is a wholly-owned subsidiary of the Firm. UCAS is registered as an investment adviser with the Securities and Exchange Commission under the federal Investment Advisers Act. UCAS provides non-discretionary investment advice with the purpose of helping clients create and maintain a disciplined approach to investing their funds prudently and effectively. UCAS may provide advisory services to the clients of the Firm.

UCAS has no other activities or arrangements that are material to its advisory business or its clients with a related person who is a broker-dealer, an investment company, other investment adviser or financial planner, bank, law firm or other financial entity.

If the foregoing accurately represents the basis upon which we may provide Services to the Client, we ask that you execute this letter, in the space provided below setting forth your agreement. Execution of this letter can be performed in counterparts each of which will be deemed an original and all of which together will constitute the same document.

If you have any questions, please let us know. We appreciate this opportunity to be of service to you and the Lake Lemon Conservancy District.

Very truly yours,

H.J. Umbaugh & Associates
Certified Public Accountants, LLP

By: _____
Douglas L. Baldessari, Partner

The undersigned hereby acknowledges and agrees to the foregoing letter of engagement.

Lake Lemon Conservancy District

Date: _____ By: _____

Exhibit A

Services Provided

Scope of Services

The Firm agrees to furnish and perform the following Services with respect to the financial analysis and the issuance of the proposed bonds (the "Bonds") through the Indiana State Revolving Fund ("SRF") for the proposed improvement project (the "Project").

Article I. Preliminary Planning and Development Services (Municipal Advisory Services)

A. Financial Feasibility and Analysis

Based upon discussions with Client officials and members of the working group, such as local counsel and bond counsel, the Firm will develop a preliminary estimate of project costs and provide a financial feasibility study to assist the Client in its determination of what type of financing is most suitable to meet the needs of the Client. Considerations in the preliminary planning stage will include, but not be limited to:

1. The general obligation debt limit of the Client, and available debt margin.

2. Internal Revenue Code restrictions for arbitrage and bank qualification.

3. Anticipated future capital needs.

4. Assessment provisions or other legislative changes.

B. Discussion of the Funding Options

The findings of the financial feasibility study will be discussed with the Client and other members of the working group. Items to be considered will include but not be limited to:

1. Maturity schedule of the proposed financing.

2. Total interest cost over the term of the Bond issue.

3. Effect upon the Client's debt service tax rate, and interrelationship of overlapping taxing units, if applicable.

4. Effect on debt service coverage of revenue supported debt, if applicable.

5. Consideration of the Client's expected trends in net assessed value, if applicable.

6. Method of sale of the Client's Bonds (e.g., competitive/negotiated, multiple series of bonds, Indiana Bond Bank, etc.)

7. Alternative sources of funding, grant funding, contributions, etc.

Exhibit A

Services Provided (cont'd)

Article II. Analysis of Costs and Revenues (Rate Analysis) (Municipal Advisory and Consulting Services)

A. Analyze from available records historical balance sheets and/or historical recorded financial information for a period of three (3) calendar years and the most recent twelve (12) month period available (the "test year").

B. Detail from available records a schedule of flow of funds for the past three (3) calendar years and the test year for the purpose of determining trends, amounts of revenue, cash operation and maintenance expenses, debt service requirements and expenditures for improvements to the property and plant.

C. Analyze expenses of the test year in order to locate and adjust items which should be properly capitalized, expensed or reclassified.

D. Analyze accounts, invoices and pertinent documents and interview Client personnel and/or consulting engineers made available by the Client to determine possible changes in expenses and the possible effects of those changes.

E. Obtain information from Client officials, engineers and/or other available sources to suggest to the Client adjustments to test year cash operating expenses such as additional labor, power costs, chemical costs, additional taxes and other fixed, known and measurable expense changes.

F. Schedule monthly revenues of the test year in order to locate and adjust unusual and significant fluctuations in such revenue.

G. Prepare amortization schedules of presently outstanding funded debt of the District extending over the life of the remaining years of payment and obtain information from bond ordinances or other documents relating to such funded debt.

H. Assist in the development of a capital improvements program and determine alternative financial programs leading to the obtaining of funds necessary to meet the capital improvement requirements through funds now available and/or future revenues of the system and/or the use of debt financing.

I. Provide alternative estimates of future annual revenue requirements for consideration by the Client.

BOND ISSUE

Article III. Financial Planning (Municipal Advisory Services)

A. Confer, as deemed appropriate, with representatives of the State Budget Agency and the Indiana Department of Environment Management ("IDEM").

B. Prepare a written report for submission by the Client to the Indiana Finance Authority ("IFA") and/or SRF as a part of the Client's documentation of its compliance with loan conditions.

Exhibit A

Services Provided (cont'd)

C. Establish, in conjunction with the Client's other professionals, a budget of project costs including bond issuance expenses.

D. Recommend a financial plan or plans in connection with the funding of such improvements in light of market conditions for tax-exempt bonds, availability of funds from IFA and/or SRF and other considerations.

E. Suggest for consideration of the Client, sources of financing the Project including such sources as available funds on hand, customer contributions, revenue bonds or other sources.

F. Suggest terms and conditions of borrowing such as redemption privileges, maximum interest rates, allocation of net revenue to funds and debt service reserve requirements.

G. Meet, as needed, with the officials of the Client to discuss findings and recommendations.

H. Provide financial information to the Client's attorney for preparation of resolutions and ordinances.

I. Provide a bond amortization schedule resulting from the sale of the Bonds.

J. After the sale of the Bonds, advise the Client on the establishment of accounts and account balances in order to comply with the requirements of the Bond Ordinance and provide a schedule of transfers to the necessary accounts.

Article IV. State Revolving Fund (SRF) Application (Municipal Advisory Services and Compilation Accounting Services)

A. Assist with the preparation of the financial portions of the application to the SRF disclosing technical date, information and schedules concerning the Bonds and the Client needed by the SRF.

B. Issue an accounting report in connection with the issuance of the Bonds compiling a financial projection resulting from the first full year of operation of the newly constructed improvements. The report will be prepared in accordance with standards established by the American Institute of Certified Public Accountants for inclusion in the SRF Financial Due Diligence if the SRF is the funding source of the improvements.

C. Provide additional information to the SRF or others as may be needed throughout the period between filing the application and closing the Bonds.

D. Analyze the terms proposed by the SRF and, when appropriate, suggest modifications of such terms for the Bonds.

E. Make recommendations to the Client for options to finance non-eligible project costs.

F. Prepare and submit at pre-closing, on behalf of the Client, the initial disbursement request form and supporting documentation.

Exhibit A

Services Provided (cont'd)

Article V. Sale of Bonds (Municipal Advisory Services)

The offer and sale of the Bonds shall be made by the Client, at the sole discretion of the Client, and under its control and supervision. The Client agrees that the Firm does not undertake to sell or attempt to sell the Bonds, and will take no part in the sale thereof. The Client agrees that the Firm's compensation hereunder shall be due and payable upon delivery of the SRF Financial Due Diligence materials by the Firm to the Client or the distribution thereof on its behalf regardless of whether the Bonds are sold by the Client.

Article VI. Multi-Year Capital Asset Financial Planning (Municipal Advisory and Preparation Accounting Services) (If Necessary)

A. Using historical and projected financial information developed as part of services provided under Article I, prepare a future multi-year financial model (the "Model") covering a period established by the Client (the "Projected Period").

B. Assist the Client with the establishment of policies regarding maintaining minimum cash and investment balances over the Projected Period (the "Minimum Balance Requirements") that are consistent with legal requirements as well as good business practices.

C. Assist the Client with the development of assumptions regarding changes to revenue during the Projected Period derived from changes to the base revenues.

D. Assist the Client with the development of estimates of operating expenses for the Projected Period using:

1. Data generated as part of the services provided under Article II.
2. Changes due to inflation that may have an impact during the Projected Period.
3. Other increases or decreases in costs due to factors that may materialize during the Projected Period.

E. Analyze the impact of debt service payments on the financial results of the Utility taking into account:

1. Existing annual debt service payments by debt issue.
2. The potential impact of refinancing and/or restructuring existing debt.
3. The potential impact of issuance of new debt.

F. Based on information from the Client and/or the consulting engineer, identify the estimated capital asset investment cost by year for the Projected Period, and develop potential funding plans for capital taking into consideration:

1. Scenarios developed for cash funding and debt financing.
2. Scenarios developed that assume various sources for borrowed funds including Federal and State loan programs and the use of open market financing.

Exhibit A

Services Provided (cont'd)

G. Using the data generated from services defined in Article VI, C, D, E and F above, create inputs for the Model to produce estimated cash and investment fund balances. Analyze the resulting cash and investment balances occurring during the Projected Period to the Minimum Balance Requirements; and,

1. Identify periods when the Client may not be in compliance with their Minimum Balance Requirements.

2. Identify actions the Client may need to implement to keep in compliance with their Minimum Balance Requirements including, but not limited to, implementing adjustments to revenue sources.

H. Meet with officials of the Client to discuss findings and recommendations.

I. Furnish a financial report summarizing the results of the Asset Management study.

Article VII. Arbitrage Compliance Services (Consulting Services)

Section 148 of the Internal Revenue Code requires issuers of tax-exempt bonds that meet certain criteria to have arbitrage rebate and/or yield reduction payment calculations performed on a periodic basis. Our services will be limited to utilizing available information to calculate the arbitrage yield on the bond issues, the yield on non-purpose investments, the amount of excess earnings, if any, of the non-purpose investments at the calculated arbitrage yield, and the rebatable arbitrage and/or yield reduction payment, if any, due as of the five-year anniversary date or more frequently as necessary. If eligible, we will prepare spend-down calculations in lieu of rebate calculations. Our services for the arbitrage compliances services computations include:

A. Obtaining information from bond offering documents, information returns filed upon issuance (Form 8038 and 8038 G), arbitrage certificate, legal documents and statements or summaries of transactions for the funds subject to rebate and/or yield restriction defined in the documents.

B. Providing a report which will be addressed to the Client. The report will summarize the results of the calculations performed.

C. Assistance in preparing the IRS from 8038-T, if necessary.

Calculation and payment of any arbitrage rebate liability and/or yield reduction due is the responsibility of the Client. The Client is responsible for notifying the Firm of any additional or subsequent bond issues that would require arbitrage compliance services. Our engagement will not include verifying that: proceeds were used for purpose expenditures; investments were purchased at market price; no amounts were paid to any party in order to reduce the yield on any investment; the bond issue was appropriately structured or qualified as a tax-exempt offering; or information provided to us is complete and accurate.

Exhibit B

Fees

The Firm's fees for services set forth in Exhibit A are estimated to range as follows:

	Service	Fee Range
Article I - V	Preliminary Planning and Development Services, Analysis of Costs and Revenues (Rate Analysis), Financial Planning, State Revolving Fund (SRF) and Application and Sale of Bonds	$27,500 – $32,500*
Article VI	Multi-Year Capital Asset Financial Planning (If Necessary)	Time & Expense*
Article VII	Arbitrage Compliance Services	Time & Expense*

*The Firm's fees will be billed at the Firm's standard billing rates based on the actual time and expenses incurred.

Standard Hourly Rates by Job Classification
1/1/2019

Partners / Principals / Directors	$240.00	to	$550.00
Managers	$200.00	to	$325.00
Senior Consultants	$150.00	to	$250.00
Consultants	$135.00	to	$200.00
Municipal Bond Disclosure Specialists	$120.00	to	$190.00
Support Personnel	$110.00	to	$150.00
Interns	$90.00	to	$110.00

- *Billing rates are subject to change periodically due to changing requirements and economic conditions. Actual fees will be based upon experience of the staff assigned and the complexity of the engagement.*

The above fees shall include all expenses incurred by the Firm with the exception of expenses incurred for mileage which will be billed on a separate line item. No such expenses will be incurred without the prior authorization of the Client. The fees do not include the charges of other entities such as rating agencies, bond and official statement printers, couriers, newspapers, bond insurance companies, bond counsel and local counsel, and electronic bidding services, including Parity®. Coordination of the printing and distribution of Official Statements or any other Offering Document are to be reimbursed by the Client based upon the time and expense for such services.

Exhibit C

Disclosure Statement of Municipal Advisor

PART A – Disclosures of Conflicts of Interest

MSRB Rule G-42 requires that municipal advisors provide to their clients disclosures relating to any actual or potential material conflicts of interest, including certain categories of potential conflicts of interest identified in Rule G-42, if applicable. If no such material conflicts of interest are known to exist based on the exercise of reasonable diligence by the municipal advisor, municipal advisors are required to provide a written statement to that effect.

***Material Conflicts of Interest* –** The Firm makes the disclosures set forth below with respect to material conflicts of interest in connection with the Scope of Services under this Agreement, together with explanations of how the Firm addresses or intends to manage or mitigate each conflict.

***General Mitigations* –** As general mitigations of the Firm's conflicts, with respect to all of the conflicts disclosed below, the Firm mitigates such conflicts through its adherence to its fiduciary duty to Client, which includes a duty of loyalty to Client in performing all municipal advisory activities for Client. This duty of loyalty obligates the Firm to deal honestly and with the utmost good faith with Client and to act in Client's best interests without regard to the Firm's financial or other interests. The disclosures below describe, as applicable, any additional mitigations that may be relevant with respect to any specific conflict disclosed below.

I. **Affiliate Conflict.** UCAS, an affiliate of the Firm (the "Affiliate"), has or is expected to provide certain advice to or on behalf of Client that is directly related to the Firm's activities within the Scope of Services under this Agreement. In particular, providing advice to Client regarding investment of bond proceeds. The Affiliate's business with Client could create an incentive for the Firm to recommend to Client a course of action designed to increase the level of Client's business activities with the Affiliate or to recommend against a course of action that would reduce or eliminate Client's business activities with the Affiliate. Furthermore, this potential conflict is mitigated by the fact that the Affiliate is subject to its own comprehensive regulatory regime as a registered investment adviser with the Securities and Exchange Commission under the federal Investment Advisers Act.

II. **Compensation-Based Conflicts.** The fees due under this Agreement are based on hourly fees of the Firm's personnel, with the aggregate amount equaling the number of hours worked by such personnel times an agreed-upon hourly billing rate. This form of compensation presents a potential conflict of interest if Client and the Firm do not agree on a reasonable maximum amount at the outset of the engagement, because the Firm does not have a financial incentive to recommend alternatives that would result in fewer hours worked. This conflict of interest is mitigated by the general mitigations described above.

III. **Other Municipal Advisor Relationships.** The Firm serves a wide variety of other clients that may from time to time have interests that could have a direct or indirect impact on the interests of Client. For example, the Firm serves as municipal advisor to other municipal advisory clients and, in such cases, owes a regulatory duty to such other clients just as it does to Client under this Agreement. These other clients may, from time to time and depending on the specific circumstances, have competing interests, such as accessing the new issue market with the most advantageous timing and with limited competition at the time of the offering. In acting in the interests of its various clients, the Firm could potentially face a conflict of interest arising from these competing client interests. This conflict of interest is mitigated by the general mitigations described above.

Exhibit C

Disclosure Statement of Municipal Advisor (cont'd)

PART B – Disclosures of Information Regarding Legal Events and Disciplinary History

MSRB Rule G-42 requires that municipal advisors provide to their clients certain disclosures of legal or disciplinary events material to its client's evaluation of the municipal advisor or the integrity of the municipal advisor's management or advisory personnel.

Accordingly, the Firm sets out below required disclosures and related information in connection with such disclosures.

I. **Material Legal or Disciplinary Event.** There are no legal or disciplinary events that are material to Client's evaluation of the Firm or the integrity of the Firm's management or advisory personnel disclosed, or that should be disclosed, on any Form MA or Form MA-I filed with the SEC.

II. **How to Access Form MA and Form MA-I Filings.** The Firm's most recent Form MA and each most recent Form MA-I filed with the SEC are available on the SEC's EDGAR system at http://www.sec.gov/cgi-bin/browse-edgar?action=getcompany&CIK=0001610268.

III. **Most Recent Change in Legal or Disciplinary Event Disclosure.** The Firm has not made any material legal or disciplinary event disclosures on Form MA or any Form MA-I filed with the SEC.

PART C – Future Supplemental Disclosures

As required by MSRB Rule G-42, this Disclosure Statement may be supplemented or amended, from time to time as needed, to reflect changed circumstances resulting in new conflicts of interest or changes in the conflicts of interest described above, or to provide updated information with regard to any legal or disciplinary events of the Firm. The Firm will provide Client with any such supplement or amendment as it becomes available throughout the term of the Agreement.

PART D – Rule G-10: Investor and Municipal Advisory Client Education and Protection

MSRB Rule G-10 requires that municipal advisors to notify their clients of the availability of a client brochure on the MSRB's website that provides information on the processes for filing a client complaint. Accordingly, the Firm sets out below the required information.

I. The Firm is registered as a Municipal Advisor with the Securities and Exchange Commission (867-00278) and the Municipal Securities Rulemaking Board (K0171).

II. The website address for the Municipal Securities Rulemaking Board is www.msrb.org.

III. The website for the Municipal Securities Rulemaking Board has a link to a brochure that describes (i) the protections that may be provided by the Municipal Securities Rulemaking Board rules and (ii) describes how to file a complaint with an appropriate regulatory authority.

Exhibit D

Compilation and Preparation Accounting Services

Compilation of Historical Financial Statements

Our Responsibilities:

The objective of our engagement is to apply accounting and financial reporting expertise to assist you in the presentation of financial statements without undertaking to obtain or provide any assurance that there are no material modifications that should be made to the financial statements in order for them to be in accordance with accounting principles generally accepted in the United States of America or the cash basis of accounting based on information provided by you.

We will conduct our compilation engagement in accordance with the Statements on Standards for Accounting and Review Services (SSARS) promulgated by the Accounting and Review Services Committee of the AICPA and comply with the AICPA's *Code of Professional Conduct*, including the ethical principles of integrity, objectivity, professional competence, and due care when performing the compilation engagement.

We are not required to, and will not, verify the accuracy or completeness of the information you will provide to us for the engagement or otherwise gather evidence for the purpose of expressing an opinion or a conclusion. Accordingly, we will not express an opinion or a conclusion nor provide any assurance on the financial statements.

Our engagement cannot be relied upon to identify or disclose any financial statement misstatements, including those caused by fraud or error, or to identify or disclose any wrongdoing within the entity or noncompliance with laws and regulations.

We in our sole professional judgement, reserve the right to refuse any procedure or take any action that could be construed as assuming management responsibilities.

Your Responsibilities:

The engagement to be performed is conducted on the basis that you acknowledge and understand that our role is to assist you in the presentation of the financial statements in accordance with accounting principles generally accepted in the United States of America or with the cash basis of accounting. You have the following overall responsibilities that are fundamental to our undertaking the engagement in accordance with SSARS:

1. The selection of the cash basis of accounting or accounting principles generally accepted in the United States of America as the financial reporting framework to be applied in the preparation of the financial statements.

2. The preparation and fair presentation of financial statements in accordance with the cash basis of accounting or accounting principles generally accepted in the United States of America.

3. The election to omit substantially all disclosures normally included in the financial statements in accordance with the cash basis of accounting or accounting principles generally accepted in the United States of America.

Exhibit D

Compilation and Preparation Accounting Services (cont'd)

4. The design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of the financial statements.

5. The prevention and detection of fraud.

6. To ensure that the Client complies with the laws and regulations applicable to its activities.

7. The accuracy and completeness of the records, documents, explanations, and other information, including significant judgments, you provide to us for the engagement.

8. To provide us with –

    - access to all information of which you are aware is relevant to the preparation and fair presentation of the financial statements, such as records, documentation, and other matters.

    - additional information that we may request from you for the purpose of the compilation engagement.

    - unrestricted access to persons within the Client of whom we determine it necessary to make inquiries.

You are also responsible for all management decisions and responsibilities and for designating an individual with suitable skills, knowledge, and experience to oversee our compilation of your financial statements. You are also responsible for evaluating the adequacy and results of the services performed and accepting responsibility for such services.

Our Report:

As part of our engagement, we will issue a report that will state that we did not audit or review the financial statements and that, accordingly, we do not express an opinion, a conclusion, nor provide any assurance on them. If, for any reason, we are unable to complete the compilation of your financial statements, we will not issue a report on such statements as a result of this engagement.

You agree to include our accountant's compilation report in any document containing financial statements that indicates that we have performed a compilation engagement on such financial statements and, prior to the inclusion of the report, to ask our permission to do so.

Exhibit D

Compilation and Preparation Accounting Services (cont'd)

Preparation Accounting Services

Our Responsibilities:

The objective of our engagement is to prepare financial statements in accordance with accounting principles generally accepted in the United States of America or the cash basis of accounting based on information provided by you. We will conduct our preparation engagement in accordance with the Statements on Standards for Accounting and Review Services (SSARS) promulgated by the Accounting and Review Services Committee of the AICPA and comply with the AICPA's *Code of Professional Conduct,* including the ethical principles of integrity, objectivity, professional competence, and due care when performing the bookkeeping services or preparing financial statements.

We are not required to, and will not, verify the accuracy or completeness of the information you will provide to us for the engagement or otherwise gather evidence for the purpose of expressing an opinion or a conclusion. Accordingly, we will not express an opinion or a conclusion nor provide any assurance on the financial statements.

Our engagement cannot be relied upon to identify or disclose any financial statement misstatements, including those caused by fraud or error, or to identify or disclose any wrongdoing within the entity or noncompliance with laws and regulations.

We in our sole professional judgement, reserve the right to refuse any procedure or take any action that could be construed as assuming management responsibilities.

Your Responsibilities:

The engagement to be performed is conducted on the basis that management acknowledges and understands that our role is the preparation of financial statements in accordance with accounting principles generally accepted in the United States of America or in accordance with the cash basis of accounting. Management has the following overall responsibilities that are fundamental to our undertaking the engagement to prepare your financial statements in accordance with SSARS:

1. The selection of the cash basis of accounting or accounting principles generally accepted in the United States of America as the financial reporting framework to be applied in the preparation of the financial statements.

2. The election to omit substantially all disclosures normally included in the financial statements in accordance with the cash basis of accounting or accounting principles generally accepted in the United States of America.

3. The design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of the financial statements.

4. The prevention and detection of fraud.

5. To ensure that the Client complies with the laws and regulations applicable to its activities.

Exhibit D

Compilation and Preparation Accounting Services (cont'd)

6. The accuracy and completeness of the records, documents, explanations, and other information, including significant judgments, you provide to us for the engagement.

7. To provide us with –

    - access to all information of which you are aware is relevant to the preparation and fair presentation of the financial statements, such as records, documentation, and other matters.

    - additional information that we may request from you for the purpose of the preparation engagement.

    - unrestricted access to persons within the Client of whom we determine it necessary to make inquiries.

You are also responsible for all management decisions and responsibilities and for designating an individual with suitable skills, knowledge, and experience to oversee our bookkeeping services and the preparation of your financial statements. You are also responsible for evaluating the adequacy and results of the services performed and accepting responsibility for such services.

The financial statements may not be accompanied by a report. However, you agree that the financial statements will clearly indicate that no assurance is provided on them.

Our Report:

As part of our engagement, we may issue a report that will state that we did not audit, review or compile the financial statements and that, accordingly, we do not express an opinion, a conclusion, nor provide any assurance on them. If, for any reason, we are unable to complete the preparation of your financial statements, we will not issue a report on such statements as a result of this engagement.

Lake Lemon Conservancy District

Board Meeting Agenda Item

Presenter	**Adam Casey, District Manager**
Action Requested	**Approval**
Item/Subject	**Bond Council** - Scope of Services - IceMiller
Dollar Amount	$25,000.00 - $30,000.00
Meeting Date	**February 28, 2019**
Summary	**Scope of services and agreement for the utilization of** IceMiller **as Bond Council throughout the Sediment Management Project financing process.**
Staff Recommendation	**Approval of Bond Council scope of services and agreement** with IceMiller

IceMiller
LEGAL COUNSEL

One American Square | Suite 2900 | Indianapolis, IN 46282-0200

February 7, 2019

SOUTH BEND NUMBER: (574) 298-2744
INDIANAPOLIS NUMBER: (317) 236-2487
DIRECT FAX: (317) 592-4801
INTERNET: PATRICIA.ZELMER@ICEMILLER.COM

CONFIDENTIAL ATTORNEY/CLIENT PRIVILEGED COMMUNICATION

VIA U.S. MAIL AND E-MAIL

Lake Lemon Conservancy District
Attn: Adam Casey, District Manager
7599 North Tunnel Rd.
Unionville, Indiana 47468
E-Mail: Manager@lakelemon.org

Re: Lake Lemon Conservancy District ("District")
Conservancy District Bonds - Letter of Engagement of Ice Miller LLP

Dear Adam:

We are pleased the District has asked us to serve as bond counsel on the engagement described in this letter, and appreciate the opportunity to serve the Lake Lemon Conservancy District ("Issuer"). Please take a moment to review this letter with the Board (and the enclosed standard Ice Miller terms and conditions) to confirm our mutual understanding regarding the retention of Ice Miller, the scope of the engagement and the basis on which we will provide legal services. Please let us know if there is anything you or the Issuer do not understand or would like to discuss changing.

Client and Nature and Scope of the Relationship

We understand that we will be serving as bond counsel to the Issuer with respect to the issuance of its bonds. We understand that the Issuer will be financing the cost of improvements to Lake Lemon by the issuance of bonds currently planned to be sold to the Indiana Finance Authority ("Authority") through its State Revolving Loan Fund Program ("SRF Program"). It is expected that the Issuer will be issuing one series of bonds that will include a fixed rate issue payable from a special benefits tax levied in the District. In this transaction, our job as bond counsel is principally to render an approving opinion on behalf of the Issuer regarding the validity of the bonds under applicable state and federal laws and to render certain opinions concerning tax status and other matters. Our engagement is limited to performance of the services related to this matter. Except to the extent otherwise specifically agreed and confirmed by us in writing, this engagement does not extend to advice or representation beyond the scope

of the services described herein. We may agree with you and the Issuer to further limit or to expand the scope of our representation from time to time, provided that any such change is confirmed by us in writing. No other party is being represented by us. Please understand that while we cannot, and do not, guarantee the outcome or success of this or any other engagement or professional undertaking, we will earnestly strive to represent and serve the Issuer's interests in this engagement effectively, efficiently, and responsibly while endeavoring to accomplish the Issuer's objectives in this engagement.

Our engagement is for legal services, and it is understood that you and the Issuer are not relying on us for business, investment or accounting advice or decisions, nor to investigate the character or credit of any person with whom you or the Issuer may be dealing in connection with this matter. We have not been engaged to review the financial condition of the Issuer, the feasibility of the project, or the adequacy of the security provided to bond owners, and we will express no opinion related thereto. We will not prepare an official statement or other disclosure document with respect to the bonds, but will provide certain information to the Issuer's financial advisor. If the Issuer participates in the SRF Program, the Issuer will sell its bonds to the Authority. In this case, an official statement will not need to be prepared, but application forms for the program will need to be completed and submitted. These forms are generally prepared by the financial advisor. We are not financial advisors or municipal advisors as contemplated by the Dodd-Frank Act.

I will be the primary contact as to this relationship with Ice Miller LLP. Any questions or concerns that may arise in this regard may always be directed to me. Debra Passmore, paralegal, will also provide services on the engagement.

Compensation; Other Important Terms and Conditions

We estimate that our bond counsel fee for this financing will be in an amount ranging from $25,000 to $30,000, based upon what we know about the financing, time to be expended by us and our experience in working on similar transactions. None of our fees will be based upon, or related in any way to, the costs of a capital project. If, at any time, we believe that circumstances require an adjustment of our original fee estimate, we will consult with you.

In addition to fees that we charge for our legal services, we also charge for ancillary services and expenses. Such charges and expenses may include long distance telephone charges, photocopying, facsimile transmission, computer research, mileage, travel expenses and other similar charges specifically applicable to the engagement. Our charges and expenses for such ancillary services are pursuant to a schedule of charges, as the same is revised from time to time. A copy of current charges and expenses is available to you and the Issuer upon request. We estimate that these expense charges will not exceed $600.

Ice Miller's standard Terms and Conditions of Engagements for Legal Services is enclosed. These terms and conditions, which cover various other aspects of this engagement, including a waiver of future conflicts of interest and provisions regarding termination and withdrawal are important and are to be read as part of this letter, as they apply to this

engagement to the same extent as if they were typed as part of this letter. Unless a different engagement letter is executed in the future, the basic terms of this engagement letter will also be applicable to, and govern our professional relationship on any subsequent matters, on or in which we may become involved or engaged on behalf of the Issuer.

Acceptance

We hope that this letter and the enclosed Terms and Conditions are helpful and accurately state the scope of the representation. If you or the Issuer has any questions or wish to discuss any portion of this letter, please call me. Please confirm for our records the Issuer's acceptance of these terms and conditions by having an officer of the Issuer sign the copy of this letter in the space provided, and return the same to me.

Sincerely yours,

ICE MILLER LLP

Patricia A. Zelmer

PAZ:DKP
Attachment Terms and Conditions of Engagements for Legal Services
cc: Angela Parker via e-mail: angela@carminparker.com
Mike Blackwell via e-mail: mjblackwell93@comcast.net

ACKNOWLEDGED AND AGREED:

LAKE LEMON CONSERVANCY DISTRICT

Date: _____ By: _____

Title: _____

ICE MILLER LLP

Terms and Conditions of Engagements for Legal Services

Ice Miller LLP has prepared this statement of the terms and conditions that are generally applicable to its legal services representations of its clients, in the absence of an express agreement specifically to the contrary. These terms and conditions, together with the letter or other document that references them, are the Terms and Conditions applicable to our engagement by you. When used in this document, "we" or "us" or "our" and similar terms refer to Ice Miller LLP, a limited liability partnership, and "you" or "your" and similar terms refer to the person or persons specifically identified in this statement as the client or clients of Ice Miller LLP.

Our Responsibilities

We are responsible to provide legal services to you in accordance with these Terms and Conditions and with our express understandings with you concerning the nature and scope of our representation.

Your Responsibilities

You are responsible for paying our statements for services and expenses. You also are responsible for being candid and cooperative with us and for keeping us informed with complete and accurate information, documents and other communications relevant to the subject matter of our representation or otherwise requested by us. Because it is important that we be able to contact our clients at all times in order to consult with them regarding our representation, we expect that you will inform us, in writing, of any changes in the name, address, telephone number, contact person, e mail address, state of incorporation or other relevant changes regarding you and your business or affairs. If you affiliate with, acquire or your company is acquired by or merged with another company, you will provide us with sufficient notice to permit us to withdraw as your attorneys if we determine that such an affiliation, acquisition or merger creates a conflict of interest between any of our clients and the other party to such affiliation, acquisition or merger, or if we determine that it is not in the best interests of the Firm with respect to the resulting association with the new entity. Your failure to communicate and cooperate with us in these respects could have an adverse effect on our ability to effectively and efficiently represent your interests in this matter and may require that we suspend the rendition of further services in respect of or entirely withdraw from this engagement.

Client(s) Represented

The client or clients for this engagement are as specifically identified in the engagement letter. Our client(s) do not include natural persons or entities that are not identified as a client in the engagement letter. For clients that are companies, unless otherwise specified or agreed, this does not include individuals or persons who are shareholders, partners, members or owners of the company, or its officers, directors, managers or other representatives, or family members, nor does it include affiliates of the company. Our representation of you for the matter described in the engagement letter does not give rise to a lawyer client relationship with any such other individual, person or affiliate. Accordingly our representation of you will not give rise to a conflict of interest in the event other clients of ours are or become adverse to any such other individual, person or affiliate. For clients that are trade associations or other group type organizations, our clients would not include their members or other constituents.

How We Will Work For You

We provide services to you through our attorneys and other professionals. We will designate a mutually agreeable partner whom you may contact should you have any questions or concerns at any time about our representation of you or your interests. You will keep us advised of the name(s) and contact information of the person(s) who are authorized to instruct us as to the performance of our legal services for you.

Our engagement is for legal services. While from time to time we may share with you as part of our legal advice information and insights based on our experience with respect to certain market, industry or business practices, structures, or the like, it is understood that you will be solely responsible for determining the extent to which other professional services and advice are obtained and for making all decisions concerning business, investment and accounting matters. In addition, it is understood that we will not have any responsibility to investigate the character or credit of any person with whom you may be dealing in connection with any matter directly or indirectly related to our engagement.

How We May Communicate With You

Unless you instruct otherwise in writing, we may communicate with you using unencrypted e mail, facsimile transmission and cellular telephone with the understanding that these methods carry an inherent risk of interception.

About Our Fees

We will charge you fees based upon the time expended and other factors applicable to legal fees that are specified by applicable professional rules and standards. Unless otherwise specifically agreed, our fees are based on our hourly rates as applied to the amount of time that we expend in providing services. Our base hourly rates for

work performed by our attorneys, absent special engagements or circumstances, are established effective January 1 of each calendar year. Hourly rates may change periodically without prior notice to clients, typically after the end of each calendar year, but a current schedule for anyone working on your engagement is available at any time upon request.

Payment of our fees and other charges is in no way contingent on the outcome of any matter, unless and to the extent that there is a mutual written agreement to the contrary.

Other Charges and Expenses

Our charges for ancillary services and expenses, such as photocopying, computer research, electronic data discovery services, mileage, travel expenses and other similar charges are pursuant to a schedule of charges and expenses, as the same is revised from time to time, a copy of which is available to you upon request.

Estimates

The total amount of fees and costs relating to this matter are difficult to predict. Accordingly, we have made no commitment to you concerning the maximum fees and costs that will be necessary to resolve or complete this matter. If requested to provide an estimate of our fees for a given matter, we will endeavor in good faith to provide our best estimate, but unless there is a mutual written agreement to a fixed fee, the actual fees incurred on any project will likely differ from the estimate.

Billing Procedures

Unless we agree to an alternative billing arrangement, you will receive a statement on a monthly basis for services rendered, and for costs and other charges posted to your account, in the prior month. Payment is due upon receipt of our billing statement or within 30 days thereafter. If your account becomes more than 30 days past due, our Billing and Collection Committee will decide whether additional legal work will be performed while the account remains past due, taking into account obligations we owe to you under applicable professional conduct rules. While we typically do not charge interest on past due amounts, we reserve the right to charge interest on any amount invoiced that remains unpaid after 30 days at the rate of 1% per month until paid in full, plus all costs of collection (including reasonable attorneys' fees). Any questions or disagreements should be brought to our attention in writing within 60 days of the billing date.

Retainers

As a matter of standard practice for new clients and/or new matters, we typically request a retainer deposit before we begin work, and we may request retainers or additional retainers from time to time with respect to existing clients and existing matters. Unless there is a mutual written agreement to the contrary, we will hold any such retainers in our firm's agency account until disbursed in accordance with these terms and conditions or other mutual written agreement. We may apply funds held as retainers to any past due account balance of your account. We will return any unapplied excess of your retainers to you within a reasonable period of time following the conclusion of the related engagement. Unless we determine in our discretion to apply all or a portion of the retainers sooner, we will apply the retainers to the final invoice for the related engagement. If we determine for any client or matter to initially waive the required retainer deposit, we nonetheless reserve the right at a later date to require a retainer deposit if conditions concerning either the extent or nature of the matter in our discretion so warrant, or should our statements not be timely paid as expected.

Your Consent to Future Conflicts of Interest

You are aware that the Firm has grown geographically and represents many other entities and individuals. Thus, during the time that we are representing you, some of our present or future clients may have disputes or transactions with you or other interests that may be adverse to yours. As part of this engagement, you agree that we may undertake in the future to represent existing or new clients in any matter that is not substantially related to any matter as to which we have represented or advised you, even if the interests of such clients in those other matters are directly or indirectly adverse to yours, and you agree not to disqualify our Firm for those conflicting representations. Of course, we agree that we will keep confidential any information of a nonpublic nature provided to us as a result of our representation of you. You acknowledge that we may obtain confidential information as a result of our representation of other clients that might be of interest to you but for the same reasons cannot be shared with you.

Document Retention

Unless you indicate otherwise to us in writing, we will assume that all papers and property that you provide to us are duplicates and that you retain all originals, so that we do not need to return them to you. When the representation concludes, we will (if you request) return any papers and property that you have provided to us (or that we have obtained for you and that belong to you) if we have them in our possession. Our drafts and work product that we create in relation to our work for you, however, belong to us. We reserve the right, subject to any applicable laws or rules of professional responsibility to the contrary, to apply records retention policies and procedures to these items and also to destroy within a reasonable time any items described in this paragraph that are retained by us.

Personal Data from the European Economic Area

If you will be providing the Firm with the personal data of individuals in the European Economic Area during the course of the engagement, then it is your responsibility to obtain all appropriate consents, make any necessary

disclosures, and take all other required steps to comply with any applicable data privacy and protection laws and regulations in connection with your use of the Firm's services. As used herein, "personal data" means any information relating to an identified or identifiable natural person, to the extent that such personal data are associated with individuals in the European Economic Area or are otherwise within the scope of the General Data Protection Regulation (EU) 2016/679.

Response to Audit Inquiries

If you ask that we do so, we will respond to your auditors concerning certain "loss contingencies" as defined by accounting standards by preparing a letter to your auditors. To assist us in responding timely to your auditors, please direct all audit inquiries to:

Audit Letter Coordinator
Ice Miller LLP
One American Square, Suite 2900
Indianapolis, Indiana 46282 0200.

If there are any questions presented by your audit inquiry letter, our Audit Letter Coordinator will contact you. Absent special circumstances, our current fee structure for the preparation of these letters is a minimum of $300 and a maximum of $700, depending on the extent and number of any matters reported. However, the fee may exceed $700 if there are many matters to be reported upon, or if the letter requires extensive substantive attention to disclosure or other related issues. This charge will appear on your statement as a line item for "Services rendered in connection with preparation of response to audit inquiry."

Termination or Withdrawal

Both you and we have the right to terminate any engagement at any time after providing reasonable advance written notice, and our withdrawal or termination is further subject to applicable rules of professional responsibility. In the event that we terminate the engagement, we will, subject to the terms hereof, take such steps as are reasonably practicable to protect your interests in the above matter and, if you so request, we will suggest to you possible successor counsel and provide that counsel with whatever papers you have provided to us. If permission for withdrawal is required by a court, we will promptly apply for such permission, and you agree to engage successor counsel to represent you. Otherwise, this representation will terminate (a) once the specific services covered within the scope of the representation have been completed and we have sent you our final statement for services rendered in this matter, or (b) if the engagement is open ended without any specific services being described, when more than six months have elapsed from the last time you requested and we furnished legal services to you. We are not obligated to provide advice or other legal services concerning this representation to you after our representation of you is completed, or has terminated. After completion of a matter in which we have represented you, changes may occur in the applicable laws or regulations that could have an impact upon your future rights and liabilities. Even though we may send you newsletters or the like after the date of termination of our engagement, we will have no responsibility to provide you with updates or advice concerning any changes in the law or regulations or future legal developments on any matter, including those matters that may have been the subject of a prior representation, unless you and we have expressly agreed that we will provide this service.

Certain Limitations

Any opinions or views, formal or informal, that we may express to you or to third parties about the outcome of a legal matter are only our best professional estimates. Those opinions or views are necessarily limited by our knowledge of facts at the time that we express them and the law and regulations that are then in effect. You understand and agree that we cannot – and will not – promise to you, or guarantee to you, that any particular outcome will result from your legal matters.

Identification of Relationship

We are pleased that you have chosen Ice Miller LLP as your legal advisor and would like to have your permission to share this with others. By signing the acknowledgement, you hereby grant us the authority to use your name and logo in connection with Ice Miller LLP's marketing activities, including, without limitation, identification of you as a client of Ice Miller LLP on its website and other printed marketing materials and publications issued by Ice Miller LLP. You may revoke the consent granted in this paragraph at any time by contacting our marketing department at enews@icemiller.com.

Revised: July 2018

Lake Lemon Conservancy District

Board Meeting Agenda Item

Presenter	**Adam Casey, District Manager**
Action Requested	**Approval of recommended bid**
Item/Subject	**Sediment transport Study** - Bid review
Dollar Amount	$37,000.00- $43,000.00
Meeting Date	**February 28, 2019**
Summary	**Based on a request for Proposal from LLCD, three bids were received for the implementation of a sediment transport study for Bean Blossom Creek. Companies who Bid include KCI, Christopher Burke, and Tetra Tech. A recommendation will be provided at the Board meeting based on task group review.**
Staff Recommendation	**Approval of management recommended bid**

Christopher B. Burke Engineering, LLC

115 West Washington Street Suite 1368 South Indianapolis, IN 46204 317.266.8000 cbbel-in.com

February 18, 2019

Adam Casey
Lake Lemon Conservancy District
7599 N. Tunnel Rd.
Unionville, IN 47468

Subject: **Bean Blossom Creek Sediment Transport Study**
Professional Services Proposal

Dear Mr. Casey:

As a leading provider of water resources engineering services in Indiana, we at Christopher B. Burke Engineering, LLC (CBBEL) understand the importance of managing sediment to preserve the water quality as well as the aesthetic value of our waterways. Every lake is affected by the streams feeding into it, and understanding the magnitude of a problem is the first step to creating solutions that will have a lasting and meaningful impact. Our intimate understanding and in-depth knowledge of Indiana's waterways is what makes us stand apart. We offer:

Extensive technical expertise

We recently authored the Indiana Fluvial Erosion Hazard Manual, which discusses the principles of erosion and sedimentation and provides guidance on how to address issues along Indiana streams. The amount of sediment coming to Lake Lemon through Bean Blossom Creek is a perfect example of where using the upcoming manual would be beneficial. We haven't just read up on how to address your issues, we are literally writing the book.

Unmatched modeling experience

The need for in-depth information and analysis is usually incompatible with a limited budget. Our extensive hydrologic and hydraulic modeling experience helps us to pinpoint ways to maximize the available budget and to provide the necessary information in creative ways, reducing the need for extensive and costly data collection. Our plan for the Bean Blossom Creek Sediment Transport Study leverages public and private datasets to maximize the accuracy of the analysis while minimizing the budget.

Dedication to 'doing it right'

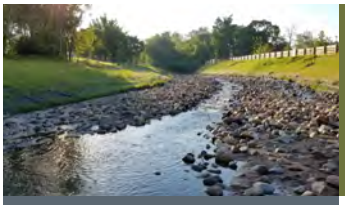
Being up-front and honest with our clients is what we do. We let the facts of a project drive our conclusions and recommendations, not the other way around. CBBEL has been guided by these tenants for more than 30 years. We have been successful since that time because of the repeat business we have earned through our dedication to truthfully guiding our clients to the best possible solutions.

We appreciate your consideration and we look forward to discussing this opportunity with you. Please contact us at the numbers or address noted above or by email as noted below if you have any questions.

Sincerely,

FOR

Jon D. Stolz, PE
Managing Vice President
jstolz@cbbel-in.com



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BURKE

BRIAN MEUNIER, PE, CFM

PROJECT MANAGER

Since joining CBBEL's design department seven years ago, Brian has gained experience in hydrologic and hydraulic analysis and design, including levee, dam and spillway design, analysis, and inspection; stream erosion and sedimentation analysis and bank protection design; flood model development and flood profile determination; and stormwater infrastructure design and analysis. He currently serves as the hydrology and hydraulics section head, managing multiple water resource engineers. Brian is proficient in several hydrologic and hydraulic modeling software applications including HEC-RAS, HEC-HMS, xpswmm, HY8, and ICPR. He is also well-versed in several CAD and GIS packages such as AutoCAD, MicroStation, ArcGIS, HEC-GeoHMS, and HEC-GeoRAS. In addition to his technical expertise, Brian is an active member of CBBEL's bike to work program and one of the founders of canoe to work day.

EDUCATION

Master of Science
Civil Engineering,
Hydrology & Hydraulics
Purdue University

Bachelor of Science
Civil Engineering
University of Evansville

REGISTRATIONS

Professional Engineer
IN, 11300321

CERTIFICATIONS

Certified Floodplain Mgr.

RELEVANT EXPERIENCE

- IUPUI CEES Fluvial Erosion Hazards - Phase 3, Statewide, IN
- Grandview Lake Sediment Management, Bartholomew County, IN
- Lake DeTurk Dam Maintenance and Repairs, Morgan County, IN
- Yellow River Stream Restoration Pilot Project, Starke County, IN
- Yellow River System Assessment, Starke County, IN
- Lake Lemon Incident and Emergency Action Plan, Monroe County, IN
- Bean Creek Interceptor Erosion Mitigation, Indianapolis, IN
- Columbus Riverfront Master Plan, Bartholomew County, IN
- Upper Berlowitz Stormwater Regional Detention, Tippecanoe County, IN
- Whitelick Creek Systems Assessment, Hendricks County, IN
- Dry Run Diversion - Channel Reconstruction, Speedway, IN
- Beaver Creek Lake Dam Rehabilitation, Jasper, IN

Bean Creek Interceptor Erosion Mitigation

Yellow River Stream Restoration Pilot Project

CBBEL BURKE

JENNY LESHNEY, PE

PRINCIPAL IN CHARGE

Jenny draws on more than 25 years of experience in the engineering world in her role as CBBEL's design department director. She is passionate about creating safe, beautiful spaces for our communities that are also sustainable for the long term. Prior to joining CBBEL, Jenny served as the city engineer in Lafayette, leading a variety of projects ranging from drainage and streetscape improvements, to pedestrian bridges and sewer tunnels. Her public sector experience translates to a better understanding of clients' needs and a comprehensive approach to devising solutions. As the director of engineering, Jenny leads a creative and outgoing team of engineers well-versed in civil- and water resources-based projects.

EDUCATION

Bachelor of Science
Civil Engineering
Purdue University

REGISTRATIONS

Professional Engineer
IN, 1950049

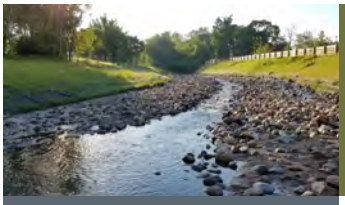
RELEVANT EXPERIENCE

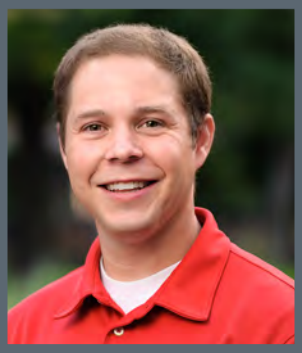
- Eagle Creek Reservoir Dam Standard Operation Procedure Update, Indianapolis, IN
- IDNR-initiated Dam Incident and Emergency Action Plans, Brown County, IN
- Indianapolis Levee LEC-04 Improvements, Indianapolis, IN
- Griffith Levee Extension Design, Griffith, IN
- Tippecanoe Lake Outlet Structure Replacement, Kosciusko County, IN
- IUPUI Fluvial Erosion Hazard Mitigation Program - Phase III, Statewide, IN
- Third Street Storm Sewer Improvements, Zionsville, IN
- Conner Prairie Master Plan, Fishers, IN
- Westenedge Drive Improvements, Columbus, IN
- Lawrence Ditch Restoration, Lawrence, IN
- South Main Street Streetscape Improvements, Elkhart, IN
- On-call Engineering and Technical Assistance, Lafayette, IN

Eagle Creek Reservoir Dam SOP

Fluvial Erosion Hazard Mitigation Program

CBB BURKE





JEFF FOX, PE, CFM

CIVIL ENGINEER

Jeff as been an integral part of CBBEL's design department for nearly a decade. His primary focus has been on dams and levees, streambank stabilization, pipe rehabilitation, bicycle and pedestrian plans, and other drainage-related design projects. His responsibilities include project research, site inspection, hydraulic and hydrologic modeling, and determination of quantities and cost estimates. In addition to his love of engineering, Jeff is an avid cyclist, commuting hundreds of miles each year to work on two tires.

EDUCATION

Bachelor of Science
Civil Engineering
Purdue University

Bachelor of Science
Land Surveying and
Geomatics Engineering
Purdue University

REGISTRATIONS

Professional Engineer
IN, PE11100632
Surveyor in Training
ST40700079

CERTIFICATIONS

Certified Floodplain Mgr.
INDOT Certified Tech:
- Constr. Earthworks
- Hot Mix Asphalt

INDOT LPA Project Dev.

RELEVANT EXPERIENCE

- Grandview Lake Sediment Management, Bartholomew County, IN
- Lake Edgewood Sediment Management Program, Martinsville, IN
- Lake DeTurk Dam Maintenance and Repairs, Morgan County, IN
- Yellow River Stream Restoration Pilot Project, Starke County, IN
- IUPUI CEES Fluvial Erosion Hazards - Phase 3, Statewide, IN
- Dry Run Diversion - Channel Reconstruction, Speedway, IN
- Lick Creek Bank Stabilization, Beech Grove, IN
- Prairie Creek Dam, Muncie, IN
- Kokomo Waterworks Reservoir Nos. 1 & 2 Dams, Kokomo, IN
- Lake DeTurk Conservancy District Plan, Morgan County, IN
- Upper Kirkpatrick Regulated Drain Extension Design, Tippecanoe County, IN
- S.W. Elliott Regulated Drain Branch 11 Reconstruction, Tippecanoe County, IN

Lake DeTurk Dam Maintenance & Repairs

Lick Creek Bank Stabilization

CBB BURKE

HEATHER FINFROCK, PE, CFM

CIVIL ENGINEER

As a member of CBBEL's design department, Heather is responsible for the planning, analysis, review, and management of a variety of projects. She regularly performs hydrologic and hydraulic engineering tasks including land use characterization, watershed delineation, outlet structure evaluation, culvert sizing, and floodplain/floodway analysis and delineation. Typical project types include drainage studies, floodway projects, watershed studies, and flood reduction projects which may require a 1-D, 2-D, or 1-D/2-D coupled analysis. She is proficient in multiple hydrologic and hydraulic modeling software programs including HEC-1, HEC-2, HEC RAS, HEC-HMS, HY-8, TR-20 and xpswmm. She is also proficient in GIS packages such as ArcGIS, HEC-GeoRAS and HEC-GeoHMS. Heather also teaches a nationwide HEC-HMS course through the American Society of Civil Engineers. She is also an active member in CBBEL's bike to work program, logging miles nearly every day no matter the weather.

EDUCATION

Master of Science
Civil Engineering
Purdue University

Bachelor of Science
Civil Engineering
Purdue University

REGISTRATIONS

Professional Engineer
IN, 10707490

CERTIFICATIONS

Certified Floodplain Manager

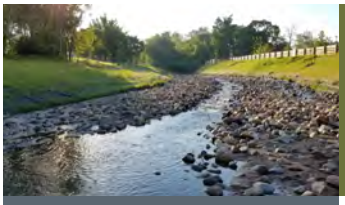
RELEVANT EXPERIENCE

- IUPUI CEES Fluvial Erosion Hazards - Phase 3, Statewide, IN
- Floodplain Management Plan, Columbus, IN
- USACE 1-D/2-D Little Calumet River Model Review, Lake County, IN and Cook County, IL
- Goeller Road Flood Assessment, Columbus, IN
- Haw Creek FIS Modeling, Columbus, IN
- Little Eagle Creek Watershed Master Plan, Hamilton County, IN
- Flood Insurance Study Models, Randolph and Brown Counties, IN
- Elliot Ditch and Otter Creek Flood Insurance Studies, Tippecanoe County, IN
- Maumee River Basin Floodplain Mapping, Northeast IN
- White Lick Creek Watershed Master Plan, Hendricks County, IN
- Sand Creek Two-stage Ditch Design, Hamilton County, IN
- Todds Creek Realignment and Hydraulic Analysis, Tippecanoe County, IN

White Lick Creek Watershed Master Plan

Todds Creek Realignment

CBB BURKE



SARAH WRIGHT, CERTIFIED ARBORIST, TRAQ

ENVIRONMENTAL SPECIALIST

Sarah has been an outdoor girl her entire life; it was only natural for her to study biology and work hard to preserve our environment so she could continue to play in the dirt. Here at CBBEL, Sarah coordinates and completes wetland and natural area assessments and delineations, as well as mitigation design and monitoring. She has also been responsible for vegetative monitoring and flora inventories for environmental assessments. Sarah has managed many different large scale restoration/ preservation and native landscaping projects, providing bidding assistance, cost estimating, project coordination and construction supervision.

EDUCATION

Bachelor of Science
Biology
Indiana University

CERTIFICATIONS

Certified Arborist
Indiana Pesticide
Registered Applicator
National Environmental
Policy Act Certification
Wetland Professional
in Training
ISA Tree Risk
Assessment Qualified

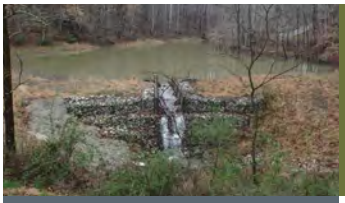
RELEVANT EXPERIENCE

- Grandview Lake Sediment Management, Bartholomew County, IN
- Lake DeTurk Dam Maintenance and Repairs, Morgan County, IN
- Yellow River Stream Restoration Pilot Project, Starke County, IN
- Arvin Sango, Inc. Wetland Mitigation and IP Permitting, Jefferson County, IN
- Berlowitz Drain Wetland Assessment and Mitigation, Tippecanoe County, IN
- Monarch Beverages Wetland Monitoring, Lawrence, IN
- Todds Creek Realignment and Monitoring, Tippecanoe County, IN
- Upper Beaver Lake East Lateral Ditches, Newton County, IN
- Lower Wildwood Lake Dam Wetland Mitigation, Camby, IN
- Wabash River Central Reach Concept & Schematic Design, Tippecanoe County, IN
- State Road 56 Harbin Creek Wetland Mitigation, Pike County, IN
- NIPSCO East Winamac SWPPP / Wetland Delineation / Permitting, Winamac, IN

Todds Creek Monitoring

Grandview Lake Sediment Management

CBB BURKE



CLIENT
Grandview Lake
Lot Owners Assoc.
John Cord
lakemanager@
grandviewlake.org

TIME PERIOD
2017

DESIGN FEE
$40,000

PROJECT TEAM
Aaron Fricke
Jeff Fox
Brian Meunier
Sarah Wright

GRANDVIEW LAKE SEDIMENT MANAGEMENT

Bartholomew County, IN

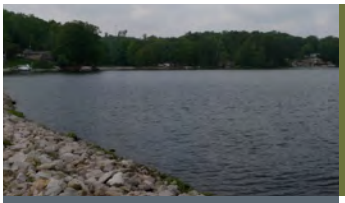
PROJECT HIGHLIGHTS

- Sediment control measures to improve water quality
- Design with minimal impact to environmentally-sensitive areas
- Wetland delineation
- Hydrologic and hydraulic analysis
- Sediment analysis
- Preliminary sediment basin design

The Grandview Lake Lot Owners Association had noticed the declining quality of the lake within the neighborhood. Not only was the water quality poor, but the lake was experiencing access issues and the aesthetics were diminished due to accumulated sediment. In an effort to reduce sediment entering the lake, the association hired CBBEL to help them implement sediment control measures on two tributaries that were contributing to the issues.

CBBEL performed a wetland delineation, hydrologic and hydraulic analysis, and a sediment analysis, and prepared a preliminary sediment basin design. The team determined a feasible solution to reduce the sediment by modifying an existing basin. This would maximize the sediment removal from the tributary and minimize the overall construction footprint and impacts to environmentally-sensitive areas.

CBB BURKE



CLIENT
Lake Edgewood
Conservancy District
Jesse Hubbard
317.966.3873

TIME PERIOD
2014

COST
$350,000

PROJECT TEAM
Jeff Fox

LAKE EDGEWOOD SEDIMENT MANAGEMENT PROGRAM

Martinsville, IN

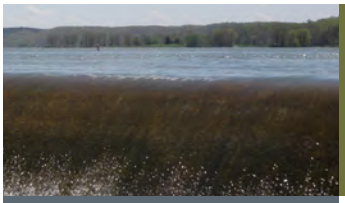
PROJECT HIGHLIGHTS

- Phased program to remove sediment from specific portions of the lake
- Sediment basins to control future sediment from entering the lake
- Bidding and contract documents
- Contractor selection assistance
- Technical specifications for dredging and construction

Located in Martinsville, Lake Edgewood is known for its beauty and recreational amenities. In an effort to maintain these features and improve the lake's overall quality, the Lake Edgewood Conservancy District wanted to implement a sediment management program to remove existing sediment and prevent future sediment from entering the lake.

The District hired CBBEL to prepare technical specifications for dredging and sediment basin construction, which was initiated as a phased program. CBBEL also facilitated the bidding process and assisted in contractor selection.

CBB BURKE



CLIENT

Indiana Department of Homeland Security
Mary Moran
mmoran@idhs.IN.gov

Indiana Department of Natural Resources
Ken Smith
kesmith@dnr.IN.gov

PROJECT TEAM

Aaron Fricke
Brian Meunier

LAKE LEMON DAM INCIDENT AND EMERGENCY ACTION PLAN

Monroe County, IN

PROJECT HIGHLIGHTS

- Developed an IEAP, complete with a dam breach inundation map
- Verified field conditions during site visit
- Conducted a two-hour training session with the dam owner
- Conducted a full-day tabletop exercise/workshop (for multiple dams in the vicinity)
- Distributed copies of the final deliverables to the dam owner
- Provided the dam owner with editable copies of digital source material to be used for updates

An Incident and Emergency Action Plan (IEAP) is a safety plan for dam owners that lists the actions that the owner needs to take to inform others of an incident or emergency and to communicate to potential impact areas downstream. An IEAP helps to facilitate timely responses to smaller incidents so that they do not develop into emergencies.

The Indiana Department of Homeland Security (IDHS) received a grant to develop dam safety plans for high hazard dams in Indiana in partnership with the Indiana Department of Natural Resources (IDNR). CBBEL worked with both IDHS and IDNR to develop IEAPs for several high hazard dams and conduct training sessions and county-wide workshops to increase awareness of dam safety and to familiarize plan holders with the IEAPs so they can be used effectively. As part of this project, CBBEL inspected the dam at Lake Lemon and also prepared an IEAP for the dam.

CBB BURKE

LAKE DeTURK DAM MAINTENANCE AND REPAIRS

Morgan County, IN

CLIENT
Lake DeTurk
Conservancy District
Anna Radue
aradue@iu.edu

TIME PERIOD
2016

COST
$165,000

PROJECT TEAM
Jeff Fox
Brian Meunier
Dave Walker
Sarah Wright

PROJECT HIGHLIGHTS

- High-hazard dam and spillway improvements
- Sediment basin design and construction
- Environmental services
- Permitting
- Bidding assistance
- Construction observation

Over time, the dam at Lake DeTurk began to lose integrity and the lake suffered from accumulating sediment, which affected not only the water quality but also the safety and usability of the lake. In an effort to improve the dam's Indiana Department of Natural Resources safety rating and the lake's water quality, the Lake DeTurk Conservancy District hired CBBEL to design dam and spillway improvements, as well as sediment basins to reduce future accumulation.

CBBEL designed repairs for the dam's noted deficiencies and prepared technical specifications and contract documents, and also provided bidding assistance and construction observation for the project. The improvements helped restore the integrity of the dam embankment and spillway system, while the sediment basins helped restore the lake's quality. CBBEL also provided environmental services related to the future spoil site for dredged material from the lake.

CBB BURKE

YELLOW RIVER STREAM RESTORATION PILOT PROJECT

Starke County, IN

CLIENT
Starke County
Bill Crase, County Surveyor
574.772.9135

TIME PERIOD
2016 - Present

COST
$497,000

PROJECT TEAM
Brian Meunier
Jeff Fox
Siavash Beik
Sarah Wright
Jamie Furgason
Dave Walker

Before

After

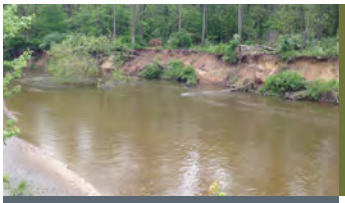
PROJECT HIGHLIGHTS

- Stream restoration design
- Toe wood (or brush wood) method to stabilize banks
- Environmental permitting
- Regulatory agency and stakeholder coordination
- Bidding assistance
- Construction observation

Over the years, the Yellow River in Starke County has experienced significant sediment issues, primarily due to the eroding streambanks. The pilot project is intended to implement a more natural, sustainable, environmentally-sensitive method of restoring the streambanks. Starke County's aim is to prove that the unconventional method works as intended, reducing land and property loss as well as risk, while providing a long-term solution.

CBBEL provided restoration design, extensive regulatory agency and project stakeholder coordination, and bidding and construction observation services. The design incorporated the two wood (or brush toe) method, which has not yet been used anywhere else in the state. By burying available trees in the bank on the outside of a bend and adjusting the shape of the channel to change how flow happens, CBBEL was able to reduce the amount of man-made materials in the river and also keep costs to a minimum. Now adjacent landowners have stable banks and the Kankakee River Basin Commission has a model for improvements along the Kankakee River, into which the Yellow River flows.

CBB BURKE



CLIENT
Starke County Surveyor
Dennis Estok
574.772.9135

TIME PERIOD
2014 - 2016

PROJECT TEAM
Brian Meunier
Siavash Beik

YELLOW RIVER SYSTEM ASSESSMENT

Starke County, IN

PROJECT HIGHLIGHTS

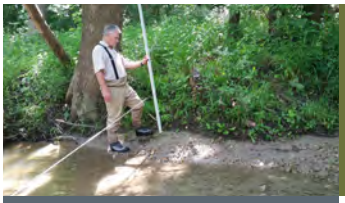
- Review and consolidation of multiple previous studies ranging from 1960 to the present
- Extensive site visits to visually observe the stream conditions
- Data analysis to support visual observations to identify root causes of stream instability
- Conceptual solutions to mitigate sedimentation and erosion issues
- Holisitic approach to fully understand the river and how it flowed and moved sediment

Located in northwestern Indiana, the Kankakee and Yellow rivers have historically experienced severe erosion and sedimentation. Since the 1950s, the county has conducted major investigations with little sucess in finding long-term solutions.

CBBEL conducted an assessment to determine the root cause of the river's instability and to better develop solutions to address the issue. Using a holistic approach, the project team considered the entire watershed and stream instead of focusing only on the river. Sediment monitoring in the stream was instrumental to proving the project team's theories on the root causes. The information and accompanying analyses provided a scientific explanation of the things happening in the stream.

The project provided a clear understanding of what has been causing the issues and the process that will need to occur to fix the issues. The proposed improvements will benefit Starke County and farmers adjacent to the stream by reducing drainage maintenance costs as well as improving water quality and habitat.

CBB BURKE



FLUVIAL EROSION HAZARD MITIGATION PROGRAM - PHASE III

Statewide, IN

CLIENT
IUPUI Center for Earth & Env. Science
Robert Barr
317.332.5463

TIME PERIOD
2014 - 2018

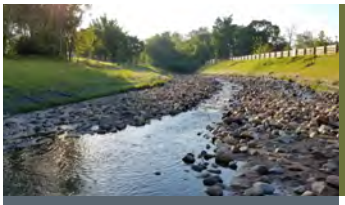
PROJECT TEAM
Siavash Beik
Jeff Fox
Brian Meunier

PROJECT HIGHLIGHTS

- Continuation of Indiana Silver Jackets fluvial erosion hazard mitigation program
- Manual to select, categorize and address hazards
- Preliminary engineering reports as pilot studies
- Regional workshop assistance
- Transportation flood vulnerability assessment assistance

The fluvial erosion hazard mitigation program is a continuation of the Indiana Silver Jackets fluvial erosion hazard mitigation program in cooperation with the Indiana Office of Community and Rural Affairs. The program's purpose is to develop a manual for selecting, categorizing and addressing hazards related to fluvial erosion, prepare preliminary engineering reports to serve as pilot studies, assist with presentations at regional workshops, and support in developing a method to evaluate the vulnerability of transportation infrastructure.

CBB BURKE



Since its construction in 1953, Lake Lemon has experienced significant sediment deposition originating from its primary tributary, Bean Blossom Creek. The continued accumulation of sediment in the lake has taken a toll on the lake's utility and accessibility for the residents, as well as the lake's overall health.

In September 2018 Shrewsberry and Associates completed the 2018 Lake Lemon Sediment Mitigation Conceptual Design Report on behalf of the Lake Lemon Conservancy District (District). The plan provided various project elements that could be implemented to manage the sediment currently in the reservoir and future sediment inflow from Bean Blossom Creek.

It is our understanding that the District would like to complete a sediment transport study for Bean Blossom Creek to quantify the anticipated sediment loading from the stream. The sediment loading information will then be used to verify and/or enhance the preliminary design of the project elements.

To assist you with meeting project objectives, making prudent decisions, and being cost efficient, CBBEL proposes that our services be divided into the following successive phases:

Phase 1 – Sediment Loading Evaluation
Phase 2 – Sediment Management Design Evaluation and Enhancement

Please note that the scope and fee provided for Phase 2 is provided for planning purposes only. A new proposal with updated scope and fee for this subsequent phase will be prepared following the completion of Phase 1.

Phase 1: Sediment Loading Evaluation

Task 1 – Data Gathering and Project Management: CBBEL staff will conduct an initial site visit to verify field conditions and gather additional information needed to support the sediment loading evaluation. CBBEL will enter into a subcontract with a qualified fluvial geomorphologist to obtain flow data and sediment samples from Bean Blossom Creek. A monitoring location will be established by measuring the dimensions of the channel, analyzing the bed and sub-pavement material, and installing a stream gage that measures the depth of the flow continuously. Field measurements of flow velocity will be taken during storm events to develop a relationship between the depth of flow and the flow rate. The bedload and suspended sediment load (i.e. sediment being transported and not yet deposited) will be also sampled to gain an understanding of the current sediment loading from Bean Blossom Creek. The flow measurements and sediment sampling will be collected during a minimum of five storm events of varying severity to gain a firm understanding of how much, and under what conditions sediment is entering the lake. The collected samples will be tested to determine the quantity and composition of the material moved by the stream for each of the flow events. A sampling location map is shown in Exhibit A.

Task 1 also includes project coordination, management, and administration throughout this phase the project. A monthly progress report will be provided to update the District on the status of the tasks outlined in this scope of work, with particular focus on events captured in the flow and sediment observations.

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Task 2 – Hydrologic and Hydraulic Analysis: CBBEL will develop a hydrologic model for Bean Blossom Creek using HEC-HMS. The hydrologic model will be calibrated to the observed events from Task 1. The calibrated model to simulate the runoff from many years of rainfall data collected at a nearby rain gage, as well as the 2-, 10-, 100-, and 500-year events.
A hydraulic model will be created for the downstream portion of Bean Blossom Creek to evaluate the flow characteristics during various wet-weather events using HEC-RAS. The hydraulic model will be calibrated using the observations from Task 1. The sediment transport module of the software will be used to evaluate the sediment capacity of the stream for flows ranging from baseflow to the 500-year flow. The sediment transport parameters will be calibrated to the observed sediment load for each storm event from Task 1.

Task 3 – Sediment Load Analysis: The results from the calibrated hydrologic model will be used to develop a flow-duration curve. A flow-duration curve provides the relationship between the magnitude of flow and the probability that it occurs in a given year. A sediment rating curve will be developed for the stream reach using the results of the field observations and the output from the calibrated HEC-RAS sediment transport model. The flow-duration curve and the sediment rating curve will be combined to produce a statistical relationship that describes the amount of sediment conveyed to the reservoir for the full range of flows over a given year, which is also referred to as the effective discharge curve. The annualized sediment load to Lake Lemon will be determined by calculating the cumulative sediment contribution using the effective discharge curve.

Task 4 – Summary Report: CBBEL will prepare a brief written report that documents the data gathering, hydrologic and hydraulic analysis, and sediment load evaluation. The key findings and information that will be helpful for completing a detailed design of the sediment management elements proposed in the 2018 Lake Lemon Sediment Mitigation Conceptual Design Report. The report will be the final deliverable for this phase of the project. A meeting with the District and Shrewsberry and Associates will be held to review the findings of the sediment transport study and the implications for the project element design process.

Phase 1 Estimated Fee: $42,000

Phase 2: Sediment Management Design Evaluation and Enhancement

The scope and estimated fees associated with the tasks in Phase 2 represent work that may be necessary to fully support the sediment management element design process. The work and deliverables are not included in the current phase of the work. An updated scope of work and estimated fees will be developed under and amendment to the contract to cover the work described below, should the services become necessary:

Task 1 – Additional Flow and Sediment Monitoring: CBBEL will amend the fluvial geomorphologist subconsultant agreement to include additional event observations. Additional observations will be provided on an a-la-carte basis for $2,000 per event. The measurements and observation location will be the same as that described in Phase 1, Task 1. It is estimated that up to 5 additional events would be collected.

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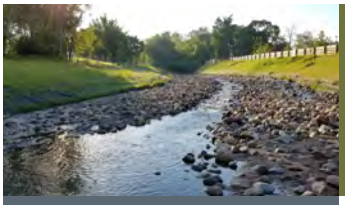

Task 2 – Hydrologic and Hydraulic Model Recalibration: CBBEL will adjust the calibration of the hydrologic and hydraulic models with the data from the additional observations after all additional observations have been made. The re-calibrated models will then be used to update the flow-duration curve, sediment rating curve, and effective discharge curve. The annualized sediment load to Lake Lemon will be updated based on the revised effective discharge curve. Revisions to the summary report will also be included to document the additional data collection and modeling effort, as well as to describe significant differences in the findings in light of the additional data.

Task 3 – Design Evaluation and Enhancement: Additional modeling and analysis will be completed to evaluate the effectiveness of the solutions to assist Shrewsberry and Associates enhance the design of the project elements. It has been assumed that project element design details will be provided by Shrewsberry and Associates for the initial design evaluation modeling. It is anticipated that information from the analysis will be used to determine appropriate design flow rates, adjust the design layout, evaluate the ability of the project elements to capture the target particle sizes, and better understand anticipated dredging needs. Recommended adjustments to the project elements will be coordinated with Shrewsberry and Associates. Due to the fact that the no details currently exist for the proposed project elements, it has been assumed that a total of 64 - 96 staff hours would be sufficient for this task.

Phase 2 Estimated Fee: TBD after Phase 1
(Approximate Range of Costs: $25,000 - $35,000)

Excluded Services

Based on information available at this time, CBBEL does not believe that the services listed below will be required to complete the project. If conditions change and any of the services listed below (or other services not described above) are required, CBBEL will prepare a contract amendment for the required services. Services not incorporated in this contract include:

1. Environmental mitigation
2. Additional meetings not specifically described herein
3. Installation and monitoring of scour chains. Scour chains allow for evaluation of the maximum amount of scour at a single location. Scour depth varies by event and location in the stream and does not provide information critical to determining the quantity of sediment being conveyed into Lake Lemon.
4. Work described under the tasks in Phase 2

Estimated Fee

We have estimated the total fee for completing Phase 1 of this project should not exceed **$42,000**. We will bill you monthly, on a time and material basis, for assigned tasks in accordance with our attached standard charges for professional services. At the discretion of the District, CBBEL will prepare amendments to contract to proceed with the additional phases of the work at a later date.

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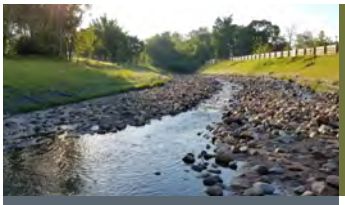

In addition, our contract will be established in accordance with the attached general terms and conditions, which are expressly incorporated into and are an integral part of this contract for professional services. It should be emphasized that any requested additional meetings or additional services that are not included in the preceding fee will be billed at the attached hourly rates.

If this proposal meets with your approval, please sign where indicated and return an executed original to us as our notice to proceed. The executed proposal, along with the estimated fee, attached standard charges for professional services, and the general terms and conditions constitute the whole of our agreement. Any modification to any part of this agreement without prior acknowledgement and consent by CBBEL will make null and void this agreement. Any time commitment made by CBBEL as part of the agreement does not begin until CBBEL has received an executed original.

We appreciate the opportunity to submit this proposal and look forward to working with you on this project. Please contact me or project manager Brian Meunier, PE at the number listed above if you have any questions.

Sincerely,

Jon D. Stolz, PE
Managing Vice President

THIS PROPOSAL, ESTIMATED FEE, STANDARD CHARGES FOR PROFESSIONAL SERVICES AND GENERAL TERMS AND CONDITIONS ARE ACCEPTED BY THE LAKE LEMON CONSERVANCY DISTRICT:

Signature: _____

Name (Printed): _____

Title: _____

Date: _____

Enclosures:
Proposed Timeline
Exhibit A
Standard Charges for Professional Services
General Terms and Conditions

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PROPOSED TIMELINE

Task #	Task Name	2019 Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2020 Jan	Feb	Mar
Phase 1	**Data Gathering**		**Phase 1**												
1.1	Project Management & Administration														
1.2	Data Gathering for Hydrologic & Hydraulic Analysis														
1.3	Field Measurement (Flow & Sediment)[1]														
Phase 2	**Hydrologic & Hydraulic Analysis**			**Phase 2**											
2.1	Hydrologic Model Development & Calibration														
2.2	Hydraulic Model Development & Calibration														
Phase 3	**Sediment Load Analysis**						**Phase 3**								
3.1	Develop Flow Duration Curve														
3.2	Develop Sediment Rating Curve														
3.3	Determine Annual Sediment Load														
Phase 4	**Technical Report**								**Phase 4**						
4.1	Draft Summary Memorandum & Exhibits														
4.2	Review Results with Owner & Design Team														
Phase 5	**Phase 2 Analysis[2]**										**Phase 5 (Not in Current Scope)**				
5.1	Recalibrate Hydrologic & Hydraulic Models w/ Additional Data														
5.2	Adjust Sediment Rating Curve & Sediment Load Calculation														
5.3	Revise Modeling to Include Design Components[3]														
5.4	Evaluate Effectiveness of Design														

[1] Flow monitoring period in Fall 2019 will likely occur at additional cost; the flow/sediment sampling target is sampling during 5 events of varying severity.

[2] Work shown under Phase 2 Analysis is not included in the current proposal; timeframes are approximate.

[3] Specific revisions to modeling or alternative/additional analyses will be dependent on the design components.

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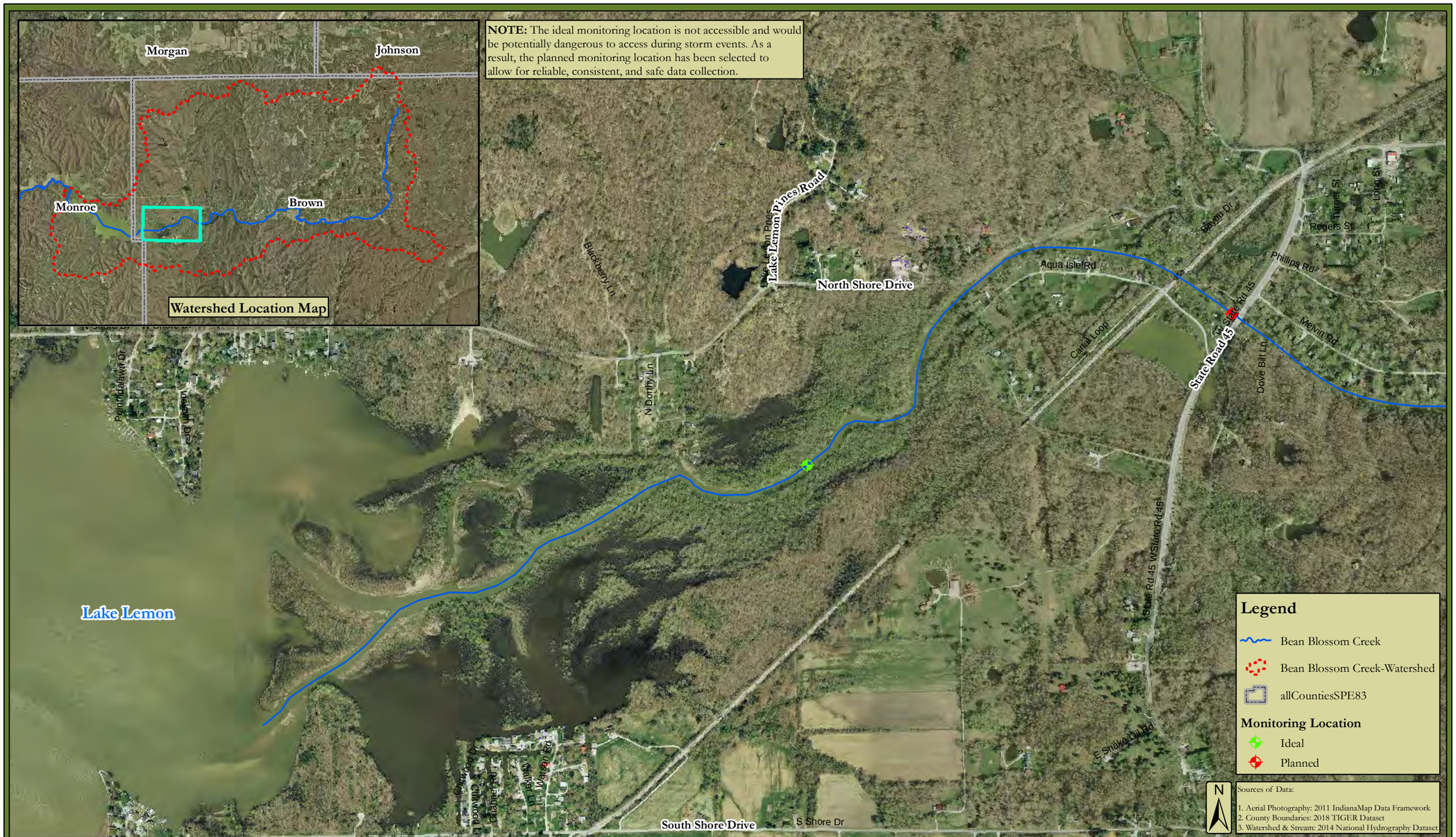

Christopher B. Burke Engineering, LLC
PNC Center, Suite 1368 South
115 West Washington Street
Indianapolis, Indiana 46204
(t) 317.266.8000 (f) 317.632.3306

PROJECT:	PROJECT NO.	APPROX. SCALE
Bean Blossom Creek Sediment Transport Study	19-0086	1"=700'
TITLE: Project and Monitoring Location Map		DATE: 02/2019
		EXHIBIT A

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2019 STANDARD CHARGES FOR PROFESSIONAL SERVICES

Personnel	($/Hr)
Engineer VI	216
Engineer V	197
Engineer IV	172
Engineer III	144
Engineer I/II	113
Resource Planner V	160
Resource Planner IV	150
Resource Planner III	130
Resource Planner I/II	105
Engineering Technician IV	155
Engineering Technician III	139
Engineering Technician I/II	105
CAD II	130
CAD I	107
GIS Specialist IV	155
GIS Specialist III	139
GIS Specialist I/II	100
Environmental Resource Specialist V	151
Environmental Resource Specialist IV	139
Environmental Resource Specialist III	125
Environmental Resource Specialist I/II	105
Environmental Resource Technician	99
Administrative	75
Engineering Intern	60
Information Technician I/II	75

Direct Costs	
Outside Copies, Blueprints, Messenger, Delivery Services, Mileage	Cost + 12%

**Charges include overhead and profit*

Christopher B. Burke Engineering, LLC reserves the right to increase these rates and costs by 5% if the contract is executed after December 31, 2019.

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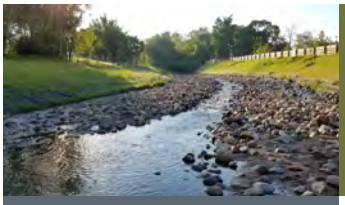

1. **Relationship Between Engineer and Client:** Christopher B. Burke Engineering, LLC (Engineer) shall serve as Client's professional engineer consultant in those phases of the Project to which this Agreement applies. This relationship is that of a buyer and seller of professional services and as such the Engineer is an independent contractor in the performance of this Agreement and it is understood that the parties have not entered into any joint venture or partnership with the other. The Engineer shall not be considered to be the agent of the Client. Nothing contained in this Agreement shall create a contractual relationship with a cause of action in favor of a third party against either the Client or Engineer.

   Furthermore, causes of action between the parties to this Agreement pertaining to acts or failures to act shall be deemed to have accrued and the applicable statute of limitations shall commence to run not later than the date of substantial completion.

2. **Responsibility of the Engineer:** Engineer will strive to perform services under this Agreement in accordance with generally accepted and currently recognized engineering practices and principles, and in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. No other representation, express or implied, and no warranty or guarantee is included or intended in this Agreement, or in any report, opinion, document, or otherwise.

   Notwithstanding anything to the contrary which may be contained in this Agreement or any other material incorporated herein by reference, or in any Agreement between the Client and any other party concerning the Project, the Engineer shall not have control or be in charge of and shall not be responsible for the means, methods, techniques, sequences or procedures of construction, or the safety, safety precautions or programs of the Client, the construction contractor, other contractors or subcontractors performing any of the work or providing any of the services on the Project. Nor shall the Engineer be responsible for the acts or omissions of the Client, or for the failure of the Client, any architect, engineer, consultant, contractor or subcontractor to carry out their respective responsibilities in accordance with the Project documents, this Agreement or any other agreement concerning the Project. Any provision which purports to amend this provision shall be without effect unless it contains a reference that the content of this condition is expressly amended for the purposes described in such amendment and is signed by the Engineer.

3. **Changes:** Client reserves the right by written change order or amendment to make changes in requirements, amount of work, or engineering time schedule adjustments, and Engineer and Client shall negotiate appropriate adjustments acceptable to both parties to accommodate any changes, if commercially possible.

4. **Suspension of Services:** Client may, at any time, by written order to Engineer (Suspension of Services Order), require Engineer to stop all, or any part, of the services required by this Agreement. Upon receipt of such an order, Engineer shall immediately comply with its terms and take all reasonable steps to minimize the costs associated with the services affected by such order. Client, however, shall pay all costs incurred by the suspension, including all costs necessary to maintain continuity and for the resumptions of the services upon expiration of the

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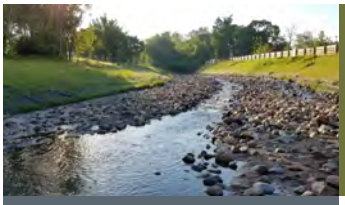

Suspension of Services Order. Engineer will not be obligated to provide the same personnel employed prior to suspension, when the services are resumed, in the event that the period of suspension is greater than thirty (30) days.

5. **Termination:** This Agreement may be terminated by either party upon thirty (30) days written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof through no fault of the terminating party. This Agreement may be terminated by Client, under the same terms, whenever Client shall determine that termination is in its best interests. Cost of termination, including salaries, overhead and fee, incurred by Engineer either before or after the termination date shall be reimbursed by Client.

6. **Documents Delivered to Client:** Drawings, specifications, reports, and any other Project Documents prepared by Engineer in connection with any or all of the services furnished hereunder shall be delivered to the Client for the use of the Client. Engineer shall have the right to retain originals of all Project Documents and drawings for its files. Furthermore, it is understood and agreed that the Project Documents such as, but not limited to reports, calculations, drawings, and specifications prepared for the Project, whether in hard copy or machine readable form, are instruments of professional service intended for one-time use in the construction of this Project. These Project Documents are and shall remain the property of the Engineer. The Client may retain copies, including copies stored on magnetic tape or disk, for information and reference in connection with the occupancy and use of the Project.

   When and if record drawings are to be provided by the Engineer, Client understands that information used in the preparation of record drawings is provided by others and Engineer is not responsible for accuracy, completeness, nor sufficiency of such information. Client also understands that the level of detail illustrated by record drawings will generally be the same as the level of detail illustrated by the design drawing used for project construction. If additional detail is requested by the Client to be included on the record drawings, then the Client understands and agrees that the Engineer will be due additional compensation for additional services.

   It is also understood and agreed that because of the possibility that information and data delivered in machine readable form may be altered, whether inadvertently or otherwise, the Engineer reserves the right to retain the original tapes/disks and to remove from copies provided to the Client all identification reflecting the involvement of the Engineer in their preparation. The Engineer also reserves the right to retain hard copy originals of all Project Documentation delivered to the Client in machine readable form, which originals shall be referred to and shall govern in the event of any inconsistency between the two.

   The Client understands that the automated conversion of information and data from the system and format used by the Engineer to an alternate system or format cannot be accomplished without the introduction of inexactitudes, anomalies, and errors. In the event Project Documentation provided to the Client in machine readable form is so converted, the Client agrees to assume all risks associated therewith and, to the fullest extent permitted by law, to hold harmless and indemnify the Engineer from and against all claims, liabilities, losses, damages, and costs, including but not limited to attorney's fees, arising therefrom or in connection therewith.

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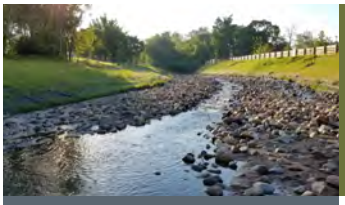

The Client recognizes that changes or modifications to the Engineer's instruments of professional service introduced by anyone other than the Engineer may result in adverse consequences which the Engineer can neither predict nor control. Therefore, and in consideration of the Engineer's agreement to deliver its instruments of professional service in machine readable form, the Client agrees, to the fullest extent permitted by law, to hold harmless and indemnify the Engineer from and against all claims, liabilities, losses, damages, and costs, including but not limited to attorney's fees, arising out of or in any way connected with the modification, misinterpretation, misuse, or reuse by others of the machine readable information and data provided by the Engineer under this Agreement. The foregoing indemnification applies, without limitation, to any use of the Project Documentation on other projects, for additions to this Project, or for completion of this Project by others, excepting only such use as may be authorized, in writing, by the Engineer.

7. **Reuse of Documents:** All Project Documents including but not limited to reports, opinions of probable costs, drawings and specifications furnished by Engineer pursuant to this Agreement are intended for use on the Project only. They cannot be used by Client or others on extensions of the Project or any other project. Any reuse, without specific written verification or adaptation by Engineer, shall be at Client's sole risk, and Client shall indemnify and hold harmless Engineer from all claims, damages, losses, and expenses including attorney's fees arising out of or resulting therefrom.

   The Engineer shall have the right to include representations of the design of the Project, including photographs of the exterior and interior, among the Engineer's promotional and professional materials. The Engineer's materials shall not include the Client's confidential and proprietary information if the Client has previously advised the Engineer in writing of the specific information considered by the Client to be confidential and proprietary.

8. **Standard of Practice:** The Engineer will strive to conduct services under this agreement in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as of the date of this Agreement.

9. **Compliance with Laws:** The Engineer will strive to exercise usual and customary professional care in his/her efforts to comply with those laws, codes, ordinance and regulations which are in effect as of the date of this Agreement.

   With specific respect to prescribed requirements of the Americans with Disabilities Act of 1990 or certified state or local accessibility regulations (ADA), Client understands ADA is a civil rights legislation and that interpretation of ADA is a legal issue and not a design issue and, accordingly, retention of legal counsel (by Client) for purposes of interpretation is advisable. As such and with respect to ADA, Client agrees to waive any action against Engineer, and to indemnify and defend Engineer against any claim arising from Engineer's alleged failure to meet ADA requirements prescribed.

   Further to the law and code compliance, the Client understands that the Engineer will strive to provide designs in accordance with the prevailing Standards of Practice as previously set forth, but that the Engineer does not warrant that any reviewing agency having jurisdiction will not for its own purposes comment, request changes and/or additions to such designs. In the event such

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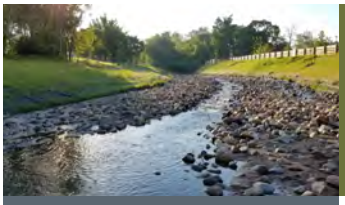

design requests are made by a reviewing agency, but which do not exist in the form of a written regulation, ordinance or other similar document as published by the reviewing agency, then such design changes (at substantial variance from the intended design developed by the Engineer), if effected and incorporated into the project documents by the Engineer, shall be considered as Supplementary Task(s) to the Engineer's Scope of Service and compensated for accordingly.

10. **Indemnification:** Engineer shall indemnify and hold harmless Client up to the amount of this contract fee (for services) from loss or expense, including reasonable attorney's fees for claims for personal injury (including death) or property damage to the extent caused by the sole negligent act, error or omission of Engineer.

    Client shall indemnify and hold harmless Engineer under this Agreement, from loss or expense, including reasonable attorney's fees, for claims for personal injuries (including death) or property damage arising out of the sole negligent act, error or omission of Client.

    In the event of joint or concurrent negligence of Engineer and Client, each shall bear that portion of the loss or expense that its share of the joint or concurrent negligence bears to the total negligence (including that of third parties), which caused the personal injury or property damage.

    Engineer shall not be liable for special, incidental or consequential damages, including, but not limited to loss of profits, revenue, use of capital, claims of customers, cost of purchased or replacement power, or for any other loss of any nature, whether based on contract, tort, negligence, strict liability or otherwise, by reasons of the services rendered under this Agreement.

11. **Opinions of Probable Cost:** Since Engineer has no control over the cost of labor, materials or equipment, or over the Contractor(s) method of determining process, or over competitive bidding or market conditions, his/her opinions of probable Project Construction Cost provided for herein are to be made on the basis of his/her experience and qualifications and represent his/her judgment as a design professional familiar with the construction industry, but Engineer cannot and does not guarantee that proposal, bids or the Construction Cost will not vary from opinions of probable construction cost prepared by him/her. If prior to the Bidding or Negotiating Phase, Client wishes greater accuracy as to the Construction Cost, the Client shall employ an independent cost estimator Consultant for the purpose of obtaining a second construction cost opinion independent from Engineer.

12. **Governing Law and Dispute Resolutions:** This Agreement shall be governed by and construed in accordance with Articles previously set forth by (Item 9 of) this Agreement, together with the laws of the State of Indiana.

    Any claim, dispute or other matter in question arising out of or related to this Agreement, which cannot be mutually resolved by the parties of this Agreement, shall be subject to mediation as a condition precedent to arbitration (if arbitration is agreed upon by the parties of this Agreement) or the institution of legal or equitable proceedings by either party. If such matter relates to or is the subject of a lien arising out of the Engineer's services, the Engineer may proceed in accordance with applicable law to comply with the lien notice or filing deadlines prior to resolution of the matter by mediation or by arbitration.

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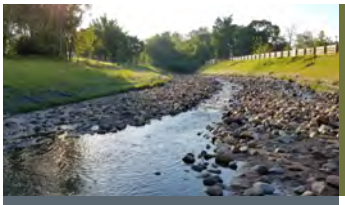

The Client and Engineer shall endeavor to resolve claims, disputes and other matters in question between them by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Requests for mediation shall be filed in writing with the other party to this Agreement and with the American Arbitration Association. The request may be made concurrently with the filing of a demand for arbitration but, in such event, mediation shall proceed in advance of arbitration or legal or equitable proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

13. **Successors and Assigns:** The terms of this Agreement shall be binding upon and inure to the benefit of the parties and their respective successors and assigns, provided, however, that neither party shall assign this Agreement in whole or in part without the prior written approval of the other.

14. **Waiver of Contract Breach:** The waiver of one party of any breach of this Agreement or the failure of one party to enforce at any time, or for any period of time, any of the provisions hereof, shall be limited to the particular instance, shall not operate or be deemed to waive any future breaches of this Agreement and shall not be construed to be a waiver of any provision, except for the particular instance.

15. **Entire Understanding of Agreement:** This Agreement represents and incorporates the entire understanding of the parties hereto, and each party acknowledges that there are no warranties, representations, covenants or understandings of any kind, matter or description whatsoever, made by either party to the other except as expressly set forth herein. Client and the Engineer hereby agree that any purchase orders, invoices, confirmations, acknowledgments or other similar documents executed or delivered with respect to the subject matter hereof that conflict with the terms of the Agreement shall be null, void and without effect to the extent they conflict with the terms of this Agreement.

16. **Amendment:** This Agreement shall not be subject to amendment unless another instrument is duly executed by duly authorized representatives of each of the parties and entitled "Amendment of Agreement."

17. **Severability of Invalid Provisions:** If any provision of the Agreement shall be held to contravene or to be invalid under the laws of any particular state, county or jurisdiction where used, such contravention shall not invalidate the entire Agreement, but it shall be construed as if not containing the particular provisions held to be invalid in the particular state, country or jurisdiction and the rights or obligations of the parties hereto shall be construed and enforced accordingly.

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18. **Force Majeure:** Neither Client nor Engineer shall be liable for any fault or delay caused by any contingency beyond their control including but not limited to acts of God, wars, strikes, walkouts, fires, natural calamities, or demands or requirements of governmental agencies.

19. **Subcontracts:** Engineer may subcontract portions of the work, but each subcontractor must be approved by Client in writing.

20. **Access and Permits:** Client shall arrange for Engineer to enter upon public and private property and obtain all necessary approvals and permits required from all governmental authorities having jurisdiction over the Project. Client shall pay costs (including Engineer's employee salaries, overhead and fee) incident to any effort by Engineer toward assisting Client in such access, permits or approvals, if Engineer performs such services.

21. **Designation of Authorized Representative:** Each party (to this Agreement) shall designate one or more persons to act with authority in its behalf in respect to appropriate aspects of the Project. The persons designated shall review and respond promptly to all communications received from the other party.

22. **Notices:** Any notice or designation required to be given to either party hereto shall be in writing, and unless receipt of such notice is expressly required by the terms hereof shall be deemed to be effectively served when deposited in the mail with sufficient first class postage affixed, and addressed to the party to whom such notice is directed at such party's place of business or such other address as either party shall hereafter furnish to the other party by written notice as herein provided.

23. **Limit of Liability:** The Client and the Engineer have discussed the risks, rewards, and benefits of the project and the Engineer's total fee for services. In recognition of the relative risks and benefits of the Project to both the Client and the Engineer, the risks have been allocated such that the Client agrees that to the fullest extent permitted by law, the Engineer's total aggregate liability to the Client for any and all injuries, claims, costs, losses, expenses, damages of any nature whatsoever or claim expenses arising out of this Agreement from any cause or causes, including attorney's fees and costs, and expert witness fees and costs, shall not exceed the total Engineer's fee for professional engineering services rendered on this project as made part of this Agreement. Such causes included but are not limited to the Engineer's negligence, errors, omissions, strict liability or breach of contract. It is intended that this limitation apply to any and all liability or cause of action however alleged or arising, unless otherwise prohibited by law.

24. **Client's Responsibilities:** The Client agrees to provide full information regarding requirements for and about the Project, including a program which shall set forth the Client's objectives, schedule, constraints, criteria, special equipment, systems and site requirements.

    The Client agrees to furnish and pay for all legal, accounting and insurance counseling services as may be necessary at any time for the Project, including auditing services which the Client may require to verify the Contractor's Application for Payment or to ascertain how or for what purpose the Contractor has used the money paid by or on behalf of the Client.

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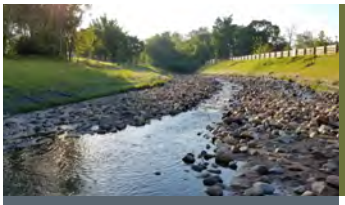

The Client agrees to require the Contractor, to the fullest extent permitted by law, to indemnify, hold harmless, and defend the Engineer, its consultants, and the employees and agents of any of them from and against any and all claims, suits, demands, liabilities, losses, damages, and costs ("Losses"), including but not limited to costs of defense, arising in whole or in part out of the negligence of the Contractor, its subcontractors, the officers, employees, agents, and subcontractors of any of them, or anyone for whose acts any of them may be liable, regardless of whether or not such Losses are caused in part by a party indemnified hereunder. Specifically excluded from the foregoing are Losses arising out of the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs, or specifications, and the giving of or failure to give directions by the Engineer, its consultants, and the agents and employees of any of them, provided such giving or failure to give is the primary cause of Loss. The Client also agrees to require the Contractor to provide to the Engineer the required certificate of insurance.

The Client further agrees to require the Contractor to name the Engineer, its agents and consultants as additional insureds on the Contractor's policy or policies of comprehensive or commercial general liability insurance. Such insurance shall include products and completed operations and contractual liability coverages, shall be primary and noncontributing with any insurance maintained by the Engineer or its agents and consultants, and shall provide that the Engineer be given thirty days, unqualified written notice prior to any cancellation thereof.

In the event the foregoing requirements, or any of them, are not established by the Client and met by the Contractor, the Client agrees to indemnify and hold harmless the Engineer, its employees, agents, and consultants from and against any and all Losses which would have been indemnified and insured against by the Contractor, but were not.

When Contract Documents prepared under the Scope of Services of this contract require insurance(s) to be provided, obtained and/or otherwise maintained by the Contractor, the Client agrees to be wholly responsible for setting forth any and all such insurance requirements. Furthermore, any document provided for Client review by the Engineer under this Contract related to such insurance(s) shall be considered as sample insurance requirements and not the recommendation of the Engineer. Client agrees to have their own risk management department review any and all insurance requirements for adequacy and to determine specific types of insurance(s) required for the project. Client further agrees that decisions concerning types and amounts of insurance are specific to the project and shall be the product of the Client. As such, any and all insurance requirements made part of Contract Documents prepared by the Engineer are not to be considered the Engineer's recommendation, and the Client shall make the final decision regarding insurance requirements.

25. **Information Provided by Others:** The Engineer shall indicate to the Client the information needed for rendering of the services of this Agreement. The Client shall provide to the Engineer such information as is available to the Client and the Client's consultants and contractors, and the Engineer shall be entitled to rely upon the accuracy and completeness thereof. The Client recognizes that it is impossible for the Engineer to assure the accuracy, completeness and sufficiency of such information, either because it is impossible to verify, or because of errors or omissions which may have occurred in assembling the information the Client is providing. Accordingly, the Client agrees, to the fullest extent permitted by law, to indemnify and hold the Engineer and the Engineer's subconsultants harmless from any claim, liability or cost (including

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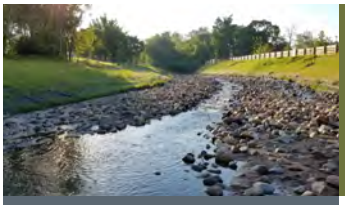

reasonable attorneys' fees and cost of defense) for injury or loss arising or allegedly arising from errors, omissions or inaccuracies in documents or other information provided by the Client to the Engineer.

26. **Payment:** Client shall be invoiced once each month for work performed during the preceding period. Client agrees to pay each invoice within thirty (30) days of its receipt. The Client further agrees to pay interest on all amounts invoiced and not paid or objected to for valid cause within said thirty (30) day period at the rate of eighteen (18) percent per annum (or the maximum interest rate permitted under applicable law, whichever is the lesser) until paid. Client further agrees to pay Engineer's cost of collection of all amounts due and unpaid after sixty (60) days, including court costs and reasonable attorney's fees, as well as costs attributed to suspension of services accordingly and as follows:

    Collection Costs. In the event legal action is necessary to enforce the payment provisions of this Agreement, the Engineer shall be entitled to collect from the Client any judgment or settlement sums due, reasonable attorneys' fees, court costs and expenses incurred by the Engineer in connection therewith and, in addition, the reasonable value of the Engineer's time and expenses spent in connection with such collection action, computed at the Engineer's prevailing fee schedule and expense policies.

    Suspension of Services. If the Client fails to make payments when due or otherwise is in breach of this Agreement, the Engineer may suspend performance of services upon five (5) calendar days' notice to the Client. The Engineer shall have no liability whatsoever to the Client for any costs or damages as a result of such suspension caused by any breach of this Agreement by the Client. Client will reimburse Engineer for all associated costs as previously set forth in (Item 4 of) this Agreement.

27. **Indemnity Clause:** When construction observation tasks are part of the service to be performed by the Engineer under this Agreement, the Client will include the following clause in the construction contract documents and the Client agrees not to modify or delete it:

    Contractor (and any subcontractor into whose subcontract this clause is incorporated) agrees and acknowledges that Engineer shall be considered a third party beneficiary of those contracts into which this clause has been incorporated; and agrees to assume the entire liability for all personal injury claims suffered by its employees, including without limitation, claims asserted by persons allegedly injured on the Project; waives any limitation of liability defense based on the Workers' Compensation Act, court interpretations of said Act or otherwise; and to the fullest extent permitted by law, agrees to indemnify and hold harmless and defend Owner and Engineer and their agents, employees, and consultants (the "Indemnitees") from and against any such loss, expense, damage or injury, including attorneys' fees and costs that the Indemnitees may sustain as a result of such claims.

28. **Job Site Safety/Supervision and Construction Observation:** The Engineer shall neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences of procedures, or for safety precautions and programs in connection with the Work since they are solely the Contractor's rights and responsibilities. The Client agrees that the Contractor shall supervise and direct the work efficiently with his/her best skill and attention;

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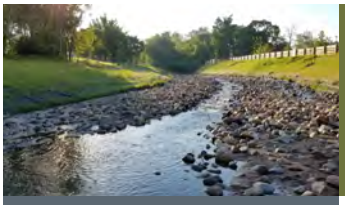

and that the Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction and safety at the job site. The Client agrees and warrants that this intent shall be carried out in the Client's contract with the Contractor. The Client further agrees that the Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work; and that the Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to all employees on the subject site and all other persons who may be affected thereby. The Engineer shall have no authority to stop the work of the Contractor or the work of any subcontractor on the project.

When construction observation services are included in the Scope of Services, the Engineer shall visit the site at intervals appropriate to the stage of the Contractor's operation, or as otherwise agreed to by the Client and the Engineer to: 1) become generally familiar with and to keep the Client informed about the progress and quality of the Work; 2) to strive to bring to the Client's attention defects and deficiencies in the Work and; 3) to determine in general if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Engineer shall not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. If the Client desires more extensive project observation, the Client shall request that such services be provided by the Engineer as Additional and Supplemental Construction Observation Services in accordance with the terms of this Agreement.

The Engineer shall not be responsible for any acts or omissions of the Contractor, subcontractor, any entity performing any portions of the Work, or any agents or employees of any of them. The Engineer does not guarantee the performance of the Contractor and shall not be responsible for the Contractor's failure to perform its Work in accordance with the Contract Documents or any applicable laws, codes, rules or regulations.

When municipal review services are included in the Scope of Services, the Engineer (acting on behalf of the municipality), when acting in good faith in the discharge of its duties, shall not thereby render itself liable personally and is, to the maximum extent permitted by law, relieved from all liability for any damage that may accrue to persons or property by reason of any act or omission in the discharge of its duties. Any suit brought against the Engineer which involves the acts or omissions performed by it in the enforcement of any provisions of the Client's rules, regulation and/or ordinance shall be defended by the Client until final termination of the proceedings. The Engineer shall be entitled to all defenses and municipal immunities that are, or would be, available to the Client.

29. **Insurance and Indemnification:** The Engineer and the Client understand and agree that the Client will contractually require the Contractor to defend and indemnify the Engineer and/or any subconsultants from any claims arising from the Work. The Engineer and the Client further understand and agree that the Client will contractually require the Contractor to procure commercial general liability insurance naming the Engineer as an additional named insured with respect to the work. The Contractor shall provide to the Client certificates of insurance evidencing that the contractually required insurance coverage has been procured. However, the Contractor's failure to provide the Client with the requisite certificates of insurance shall not constitute a waiver of this provision by the Engineer.

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The Client and Engineer waive all rights against each other and against the Contractor and consultants, agents and employees of each of them for damages to the extent covered by property insurance during construction. The Client and Engineer each shall require similar waivers from the Contractor, consultants, agents and persons or entities awarded separate contracts administered under the Client's own forces.

30. **Hazardous Materials/Pollutants:** Unless otherwise provided by this Agreement, the Engineer and Engineer's consultants shall have no responsibility for the discovery, presence, handling, removal or disposal of or exposure of persons to hazardous materials/pollutants in any form at the Project site, including but not limited to mold/mildew, asbestos, asbestos products, polychlorinated biphenyl (PCB) or other toxic/hazardous/pollutant type substances.

    Furthermore, Client understands that the presence of mold/mildew and the like are results of prolonged or repeated exposure to moisture and the lack of corrective action. Client also understands that corrective action is an operation, maintenance and repair activity for which the Engineer is not responsible.

February 23, 2010-INDIANA

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KCI TECHNOLOGIES

ISO 9001:2015 CERTIFIED

ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS

6983 Corporate Circle • Indianapolis, IN 46278 • Phone 317-243-9200 • Fax 317-243-9201

February 18, 2019

Adam Casey
Lake Lemon Office
7599 North Tunnel Road
Unionville, IN 47468

RE: Solicitation of Proposals – Bean Blossom Creek Sediment Transport Study

Dear Mr. Casey,

Thank you for sending us the Solicitation for Proposals for the work at Lake Lemon. KCI is pleased to submit our Project Approach, Qualifications and proposed Fee.

KCI has extensive training and proven skills in all aspects of environmental analysis, natural resources inventory, site assessment, design and documentation. KCI view partnership and responsiveness as absolutely essential to the delivery of quality services. KCI is committed to working as true partners with our clients in achieving their specific goals and objectives. Our commitment to responsiveness, quality and consistency of our project deliverables and project budgets has resulted in the receipt of excellent performance evaluations from both public and private clients.

KCI's approach to consistently excelling in the execution of projects is built upon a foundation of quality personnel, proven experience, a dedication to understanding our client's needs, and a commitment to achieving their goals.

As highlighted in the enclosed information, we ultimately believe the reasons to select KCI include:

- Specialized expertise and training in the analysis, assessment, restoration, and monitoring of reservoirs and lakes.
- Specific and localized experience in complicated lake restoration projects (Grand Lake St. Marys).
- Ability to offer solution-oriented and cost effective approaches using creative and innovative methods tailored to meet specific objectives.
- Specific experience in evaluating sediment transport in sand bed and gravel bed systems.
- Strong reputation for quality and innovation.
- Specific experience with Lake Lemon (Sediment Alternatives Analysis)

The KCI Team stands ready to meet your natural resource investigation and mitigation needs. Upon review of these qualifications, we trust you will find our staffing, qualifications and experience meet your requirements. We appreciate the opportunity to submit this letter of interest and look forward to developing a working relationship with you for environmental services in the future.

Sincerely,

Joseph Pfeiffer, PWS
Ecosystem Dynamics Practice Leader
Vice President

1. FIRM NARRATIVE

Project Understanding

Sediment Transport Analysis – Sediment loading from Bean Blossom Creek has had significant influence on the development of the delta occupying the western extent of Lake Lemon. Various elements have been developed to both mitigate the existing sediment in the delta and manage the incoming sediment. A more defined understanding of the distribution, volume and frequency of incoming sediment loads is desired to aid in the development of detailed designs and management planning.

Project Approach

1.0 **Sediment Characterization and Transport** – Sediment characteristics of Bean Blossom creek will be evaluated by selecting an analysis reach upstream of the backwater influence of the lake. Within this reach, the following will be conducted:

- 1.1 *Pebble Count* - Collect and analyzing bed material/pavement samples using a modified Wolman pebble count methodology
- 1.2 *Bulk Sampling* - Collect and analyzing sub pavement bulk /bar samples through sieve and weight field measurements
- 1.3 *Shear Stress* - Develop critical shear stress calculations based on the tabulated sediment distribution

In addition, monitoring stations will be installed to evaluate the in-situ conditions of sediment transport under various discharge conditions. This will include:

- 1.4 *Scour Chains* - Installation of (4) four scour chains
- 1.5 *Gage Station* - Installation of stage gaging station (surveyed cross section and (2) pressure transducers to document stage and water surface slope)
- 1.6 *Monitoring and Analysis* - After each precipitation event, the installed scour chains will be monitored to determine scour depth and material transport by measuring depth of inflection on chains and material distribution above the chain respectively. Discharge will be calculated for each event based on stage and water surface slope. An estimate of sediment transport and material size distribution will be made for each sampled event (The cost of one event is included in the fee estimate; the final value for this work will be determined based on number of events and level of assistance that can be provided by LLCD Staff).

2.0 Watershed Hydrology Assessment

- 2.1 *HEC-HMS* - A HEC-HMS Model will be developed for the Bean Blossom Creek watershed representing the major drainages and utilizing NOAA Atlas 14 rainfall data and Huff distributions for the design storm events. The model will be calibrated based on stage data collected and developed in task 1.6 and observed rainfall data as available. The calibrated model will be used to estimate the discharge rates for 2, 10, 100 and 500-year storm events.
- 2.2 *HEC-RAS* - A HEC-RAS model will be developed for Bean Blossom Creek based on available Lidar and GIS data. The model will use the discharge rates for 2, 10, 100 and 500 year storm events determined from the HEC-HMS model.

3.0 **Annualized Sediment Load (Phase III)** – The annual sediment loading into Lake Lemon will be estimated based on the collected and developed data.

- 3.1 *Annual Sediment Loading* - using the data in Tasks 1.0 and 2.0, a sediment rating curve will be developed to predict sediment transport at the point of deposition of Bean Blossom Creek into Lake Lemon. An estimate of lifespan of the proposed design elements will be made based on information provided by the designers as to capacity and removal rates anticipated.
- 3.2 *Detailed Design Model** - Develop a detailed design model to access capture efficiency of preliminary detailed design.
- 3.3 *Detailed Design Model Updates* - Revise detailed design model one time based on Owners' comments and provide a final model.

*Note – The models developed for the watershed would be ineffective to evaluate the design and sediment deposition within the designed elements in the lake. Specific detailed modeling would need to be developed to model the sediment transport effects once the sediment load intersects the backwater created by the lake. Task 3.0 will provide a net volume of sediment entering the lake from the Bean Blossom Watershed and estimate settling based on retention time provided by the designed elements in conjunction with the sediment size distribution anticipated. However, a modeled effect/efficiency of those elements would require a significantly larger modeling effort not included in this scope.

TASKS	LABOR	DIRECTS	TOTAL COST
1.0 Sediment Characterization	**$ 19,688.00**	**$ 3,450.00**	**$ 23,138.00**
1.1 Bed Sampling	$ 3,788.00	$ 250.00	$ 4,038.00
1.2 Sub-Pavement Bar Sample	$ 3,788.00	$ 250.00	$ 4,038.00
1.3 Critical Shear Stress Calculations	$ 1,468.00	$ -	$ 1,468.00
1.4 Install Scour Chains	$ 2,540.00	$ 200.00	$ 2,740.00
1.5 Install Gaging Station	$ 3,788.00	$ 2,500.00	$ 6,288.00
1.6 Monitoring and Analysis (ea)	$ 4,316.00	$ 250.00	$ 4,566.00
2.0 Watershed Hydrology Assessment	**$ 78,608.00**	**$ 1,000.00**	**$ 79,608.00**
2.1 Develop HEC HMS Model	$ 34,496.00	$ 500.00	$ 34,996.00
2.2 Develop HEC RAS Model	$ 35,744.00	$ 500.00	$ 36,244.00
2.3 Calibrate Model from Field Data	$ 8,368.00	$ -	$ 8,368.00
3.0 Annualized Sediment Load	**$ 14,160.00**	**$ 500.00**	**$ 14,660.00**
3.1 Average Annual Sediment Load	$ 8,364.00	$ -	$ 8,364.00
3.2 Model Updates	$ 5,356.00	$ 250.00	$ 5,606.00
3.3 Address Comments and Revise Model	$ 440.00	$ 250.00	$ 690.00
TOTALS	**$112,456.00**	**$ 4,950.00**	**$ 117,406.00**

Alternative Project Approach

Alternative Scope of Services – the requested scope of services provides a holistic approach to both defining the sediment transport in the watershed and loading/distribution into Lake Lemon. Its development to a level that would be consistent with its scale, would require significant modelling efforts within the watershed and specialized modelling in the delta area of the Lake and a significant length of time to collect a range of representative storm events. As such, this alternative Scope of Services is offered as a means to provide the necessary data, without excessive costs or time.

1.0 **Sediment Characterization and Transport** – Sediment characteristics of Bean Blossom creek will be evaluated by selecting an analysis reach upstream of the backwater influence of the lake. Within this reach the following will be conducted:

- 1.1 *Pebble Count* - Collect and analyzing bed material/pavement samples using a modified Wolman pebble count methodology
- 1.2 *Bulk Sampling* - Collect and analyzing sub pavement/bar bulk samples through sieve and weight field measurements
- 1.3 *Shear Stress* - Develop critical shear stress based on the sediment distribution

In addition, monitoring stations will be installed to evaluate the in-situ conditions of sediment transport under various discharge conditions. This will include:

- 1.4 *Scour Chains* - Installation of (4) four scour chains
- 1.5 *Gage Station* - Installation of stage gaging station (surveyed cross section and (2) pressure transducers to document stage and water surface slope)
- 1.6 *Monitoring and Analysis* - After each precipitation event, the installed scour chains will be monitored to determine scour depth and material transport by measuring depth of inflection on chains and material distribution above the chain respectively. Discharge will be calculated for each event based on stage and water surface slope. An estimate of sediment transport and material size distribution will be made for each sampled event. (The cost of one event is included in the fee estimate, the final value for this work will be determined based on number of events and level of assistance that can be provided by LLCD Staff)

2.0 **Watershed Hydrology Assessment** – A HEC RAS model will be developed for the analysis reach based on available GIS data. The model will estimate the discharge rates for 2, 10 and 100 year storm events. The model will be calibrated based on stage data collected and developed in task 1.6. In addition historical weather data will be collected and analyzed to classify the return intervals of discharge.

3.0 **Sediment Loading Analysis** – The annual sediment loading into Lake Lemon will be estimated based on the collected and developed data.

3.1 *Sediment Rating Curve* - using the data in Tasks 1.1, 1.2, 1.3 and 1.6 a sediment rating curve will be developed to predict sediment transport through the analysis reach. ***Note, the accuracy of this rating curve is dependent on the number and variance of flow events collected in task 1.6.**

3.2 *Historical Loading Rate* - The historical weather data developed in 2.0 will be applied to the sediment rating curve to estimate the annual range of sediment loading rates.

TASKS	LABOR	DIRECTS	TOTAL COST
1.0 Sediment Characterization	**$ 19,688.00**	**$ 3,450.00**	**$ 23,138.00**
1.1 Bed Sampling	$ 3,788.00	$ 250.00	$ 4,038.00
1.2 Sub-Pavement Bar Sample	$ 3,788.00	$ 250.00	$ 4,038.00
1.3 Critical Shear Stress Calculations	$ 1,468.00	$ -	$ 1,468.00
1.4 Install Scour Chains	$ 2,540.00	$ 200.00	$ 2,740.00
1.5 Install Gaging Station	$ 3,788.00	$ 2,500.00	$ 6,288.00
1.6 Monitoring and Analysis 1.6 (ea)	$ 4,316.00	$ 250.00	$ 4,566.00
2.0 Watershed Hydrology Assessment	**$ 14,856.00**	**$ -**	**$ 14,856.00**
2.1 Develop HEC RAS Model	$ 14,856.00	$ -	$ 14,856.00
3.0 Sediment Rating Curve	**$ 10,200.00**	**$ -**	**$ 10,200.00**
3.1 Average Annual Sediment Load	$ 3,964.00	$ -	$ 3,964.00
3.2 Historical Loading Rates	$ 6,236.00	$ -	$ 6,236.00
TOTALS	**$ 34,544.00**	**$ 3,450.00**	**$ 37,994.00**

3. RESUMES OF KEY PERSONNEL TO BE ASSIGNED TO THIS PROJECT

JOSEPH PFEIFFER, JR., PWS
Project Manager

Education:
MA / 1993 / Environmental Planning /Towson University
BS / 1988 / Natural Science /Towson University

Registrations/Certifications:
Rosgen River Assessment and Monitoring Level III
Rosgen River Morphology and Applications Level II
Rosgen Natural Channel Design and River Restoration Level IV
Rosgen Applied Fluvial Geomorphology Level I
Professional Wetland Scientist (PWS)

Years Experience: 34

Years with KCI: 30

Mr. Pfeiffer is a regional practice leader for KCI's Ecosystem Dynamics practice. Since joining KCI in 1988, Mr. Pfeiffer has been responsible for coordinating all aspects of environmental/engineering projects for both public and private clients. With 32 years of professional experience, he uses his diverse background to integrate engineering and environmental planning to develop a comprehensive project approach facilitating effective working relationships among stakeholders and design teams. He has been responsible for wetland/stream restoration, bioengineering design, NPDES permit processing, and BMP identification and development. His experience includes GIS database development and analysis, water quality analysis, biological inventories and wetland delineation, mitigation and permitting.

Grand Lake St. Marys Strategic Restoration Plan, OH. Principal-in-Charge. KCI developed a strategic plan to provide a framework and timeline for restoration of the lake ecosystem utilizing various projects and economic management tools to implement solutions for current and future lake improvements and revitalization. The strategic plan was prefaced on developing economic opportunities and activities that stem directly and/or indirectly from restoring degraded natural resources within Grand Lake St. Marys (GLSM).
Phase I Lake Diagnostic Assessments: Conducted diagnostic assessment of lake to define spatial and functional extent of critical functions being performed by the lake and the geomorphic forces acting upon the lake.

- *Sediment Transport Analysis*: Conducted sediment transport characteristics for eight drainages contributing to the lake: 1) collecting and analyzing bed material/pavement samples using a modified Wolman pebble count methodology, 2) collecting and analyzing sub pavement/bar bulk samples through sieve and weight field measurements, and 3) by conducting critical shear stress calculations, developed estimate of sediment transport for each drainage.
- *Littoral Fringe Functional Assessment*: Assessment of littoral/riparian fringe of the lake conducted to determine functional value for water quality, wildlife habitat, flood tolerance and general species composition. Rankings developed to qualitatively compare zones and critical stressors, which may be limiting function. This assessment determined the spatial extents of littoral/riparian features that can be restored, enhanced, ecological engineered to aid in the natural processing of phosphorus from the lake water.
- *Littoral Process Analysis*: Conducted through collection and analysis of data on wind speed, direction, duration and period of occurrence and in conjunction with lake depths to determine anticipated wave energies acting on the system. The information was extrapolated to predict critical areas of wave action on the littoral/riparian zone, loading and distribution of suspended load from the contributing drainages, and defining focus areas.

Prairie Creek Ecosystem Delta Restoration, Littoral Wetland, Grand Lake St. Marys, OH. Principal-in-Charge. KCI provided a field run topographic survey, shoreline protection design, wetland development design, wetland protection berms and geotechnical investigation of the 95-acre water body to develop Wetland Restoration Design and construction recommendations. Mr. Pfeiffer is principal point of contact for the daily execution of work. He will also perform a final QC check of all documents prior to submittal to the client or reviewing agencies.

Prairie Creek Treatment Train, Grand St. Marys, OH. Project Manager. The Prairie Creek Treatment Train is an engineered ecosystem which addresses water quality degradation in Grand Lake St. Marys, through removal of dissolved and particulate nutrients via a series of linked engineered, biotechnical and natural treatment systems. KCI provided concept development, 319 grant application development and administration, environmental documentation, ecological restoration design, engineering studies/design, construction oversight, and system commissioning and monitoring. Also assisted with land acquisition support and community relations.

James H. Kerr Reservoir Shoreline Stabilization, North Carolina Division of Parks and Recreation, James H. Kerr Reservoir, NC. Project Manager. KCI designed and managed construction of a $4 million shoreline stabilization program for Kerr Lake State Park Recreation Area that encompassed 71 sites of 25,500 LF of eroded shoreline in seven state parks. Structural and bioengineering techniques were used to stabilize the eroding shoreline severely damaged by Hurricane Fran. A littoral analysis of the lake was conducted to determine natural stressors affecting shoreline erosion and degree of severity (energy) impacting system. This information was evaluated to develop restoration options in context with engineering requirements and environmental sustainability. Shoreline stabilization options ranged from re-establishment of littoral communities to structural / bioengineering techniques. Mr. Pfeiffer provided management, design, technical oversight, and construction management services for the execution of bioengineering, biotechnical, and structural stabilization of five miles of eroding shoreline on Kerr Lake.

GARY MRYNCZA, PE, LEED AP

Principal Engineer

Education:
M Eng / 2010 / Civil Engineering / Vanderbilt University
BSET / 2006 / Civil Engineering/ Old Dominion University
MS / 2001/ Water Resources / University of Birmingham (UK)
BS / 1996 / Natural Science / Towson University

Registrations/Certifications:
PE / IN / 10810121
OSHA 10-Hour
CPESC / 4314
TDEC Erosion and Sediment Control Level I
TDEC Erosion and Sediment Control Level II
NC Urban Storm Water BMP Training Workshop
Rosgen Applied Fluvial Geomorphology Level I
Rosgen River Morphology and Applications Level II
Rosgen River Assessment and Monitoring Level III
Rosgen Natural Channel Design and River Restoration Level IV

Years Experience: 23

Years with KCI: 22

Mr. Mryncza is a vice president and resource management discipline head. His 21 years of project experience includes watershed and site-specific hydrologic analysis, stream assessment, feasibility and restoration design, water quality assessment/stream monitoring, and water resources management. He is proficient in the application of Geographic Information Systems (GIS) for the analysis of natural resources, particularly involving watershed-based studies. Mr. Mryncza is versed in the use of hydrologic/hydraulic models such as HEC-HMS and HEC-RAS, and has extensive training and experience applying the Rosgen Stream Classification System and fluvial geomorphic principles.

Littoral Process Analysis, Grand Lake St. Marys, OH. H&H Engineer. In response to a decline in the ecological health of the lake, a partnership was established to develop a blueprint for the sustainable renewal of this resource. As part of the study, KCI was tasked with an assessment of the "near shore" or littoral zone, in the context of characterizing lake processes, as well investigating factors that may be significant with respect to future restoration activities. Mr. Mryncza utilized coastal engineering methodologies to analyze wind generated waves and their effects on the near shore areas. An understanding of these processes was important in conceptualizing restorative work opportunities and enhancements to benefit the water quality in Grand Lake St. Marys.

Richland Creek Stream Restoration, Town of Wake Forest, NC. Design Engineer. The project involved assessment, design and construction for more than 10,000 LF of stream restoration. Services included stream assessment, topographic surveying, H&H modeling, flood plain delineation, restoration design, and construction. Developed grant application on behalf of the town for completing the stream restoration project on both private and town-owned land securing $556,000 in funding. Additional work included acquiring all appropriate conservation easements, negotiating property settlements, and preparing grant proposals. Mr. Mryncza conducted morphological assessments, existing conditions and reference reach, and developed design criteria for the restoration of two sections of Richland Creek. Performed mixed-bed sediment transport and hydraulic analyses. Supervised design of a rock ramp fish passage structure to connect the project reach with a restored reach, downstream. Prepared conceptual through final design drawings and permit documents.

Pavilion Branch Stream Restoration, Tennessee Stream Mitigation Program, Nashville, TN. Project Manager. Provided assessment, design and construction management services for the restoration of Pavilion Branch and two tributaries (T1 & T2). Primary project goals were improving water quality and restoring in-stream and riparian habitat. The project also intended to mitigate municipal storm water effects and accompanying pollutants in the watershed. The project also included the development of the SWPPP, the design and implementation of two stormwater BMPs, and the monitoring and inspection of EPSC devices during construction. Mr. Mryncza provided assessment and design services for restoration of over 5,000 feet of urban stream channel. This included surveying channel morphology, sediment transport and H&H analyses, and evaluating urban constraints. He also was lead investigator on a special study investigating habitat associations of federally-endangered Nashville Crayfish.

New Hanover County, Local Watershed Restoration Plan, Wilmington, NC. Environmental Scientist. KCI completed a multi-phase study including watershed characterization through identification of causes and sources of water quality degradation, selection of projects to include water quality, alternatives analysis of long-term impacts and proposed alternatives, and feasibility studies of proposed restoration sites. Mr. Mryncza served in the capacity of technical manager for all hydrology and hydraulics modeling, land use trend analysis, nutrient loading and predictive post-restoration removal. In addition, he completed his master's thesis entitled, "The Effects of Land Use Change on the Hydrologic Response of Developing Watershed in Southeastern North Carolina," utilizing data from this study.

MARK HARRISON, PE, LEED AP

Senior Project Manager

Education:
BS / 1978 / Environmental Engineering / Purdue University

Registrations/Certifications:
PE / IN / 20709
PE / IL / 062-050157
PE / OH / 61438
PE / KY / 24069

Years Experience: 37

Years with KCI: 2

Mark Harrison is a senior project manager with KCI and focuses on the planning, design, and management of water, wastewater and stormwater treatment projects for KCI. Mark has over 36 years of experience in wastewater treatment and has focused on constructed wetland technology and green infrastructure or the past 25 years. He has been responsible for the planning and design of over 80 projects using constructed wetlands for private, municipal and industrial wastewater, groundwater and stormwater treatment. Several of these projects have received both state and national awards for engineering excellence.

Prairie Creek Ecosystem Delta Restoration, Littoral Wetland, Grand Lake St. Marys, OH. Designer. KCI provided a field run topographic survey, shoreline protection design, wetland development design, wetland protection berms and geotechnical investigation of the 95-acre water body to develop Wetland Restoration Design and construction recommendations. Mr. Harrison is serving as a designer on this job.

Prairie Creek Treatment Train, Grand St. Marys, OH. Designer. The Prairie Creek Treatment Train is an engineered ecosystem which addresses water quality degradation in Grand Lake St. Marys, through removal of dissolved and particulate nutrients via a series of linked engineered, biotechnical and natural treatment systems. KCI provided concept development, 319 grant application development and administration, environmental documentation, ecological restoration design, engineering studies/design, construction oversight, and system commissioning and monitoring. Also assisted with land acquisition support and community relations.

CSO Long Term Control Plan Advanced Facility Planning for Evansville Water & Sewer Utility, St. Marys, OH. Lead Designer. Free-Water-Surface constructed wetland system basis of design/advanced facility plan to treat combined sewer overflows from the largest CSO discharge at Bee Slough which is functions as an open sewer. The treatment system includes a 198 MGD pump station with mechanical screening, degritting process units discharging to a 42 MG constructed wetland located in a USCOE ponding area. An ultraviolet disinfection system will follow the constructed wetlands.

CSO Storage Basin & Treatment Wetlands for the City of Muncie, IN. Project Manager. Basis of design report to evaluate alternatives for storage and treatment of effluent from the City's 17 CSO outfalls. Design includes a 24.6-mg storage basin located at the wastewater treatment plant (WWTP). Includes examination of pretreatment alternatives to remove floatables, large solids, grit prior to each basin. Lastly, providing design for an 8-mg treatment wetland just east of the existing WWTP.

LTCP Revisions, CSO Storage Tank & Constructed Wetlands for CSO Treatment for the City of Washington, IN. Project Manager. Project manager and chief designer for planning and design services to update and implement the LTCP to include upgrades to the 6-mgd headworks including a mechanical fine screen, an influent pump station with variable frequency drives, and a grit removal system with classifier. The project includes hydraulic analysis of the influent, review of equipment options for the screen, structural design of the influent channel, and design and cost study of the screen. The project also includes a 12-mgd pump station to convey the first flush rainfall to a CSO storage tank with a 300-mgd static screen, a 6-mgd secondary clarifier, and a constructed wetland and ultraviolet disinfection system to treat the remaining overflows up to a 10-year/one-hour storm event. Additional tasks include design of 18-, 5-, and 4-mgd pump stations. Named 2012 Top Infrastructure Project by ENR Midwest and a 2011 Top Project by Water & Wastes Digest, this project was also presented by IDEM staff as part of an internal EPA webinar on innovative CSO strategies.

TIMOTHY MORRIS

Environmental Scientist

Education:
MEM / 1991 / Water Resource Management / Duke University School of the Environment
BS / 1990 / Natural Resource Management / Moravian College

Registrations/Certifications:
Registered Wastewater Treatment Plant Operator / PA / T1212 / 1992
Rosgen Applied Fluvial Geomorphology Level I
Rosgen River Morphology and Applications Level II
MD DNR Qualified Professional to Prepare Forest Stand Delineations and Forest Conservation Plans
NASHP AHERA CEA / 1000196193
WTI CWD
Aquatic Pesticide Operator / 25341-18467

Years Experience: 28

Years with KCI: 13

Mr. Morris has been working as an environmental consultant since graduating with a Masters of Environmental Management degree from Duke University in 1991. He has worked on a variety of natural resource based planning and construction projects for both private and public sector clients. His area of expertise is in the water resource management field. Specific experience includes wetland delineation, wetland permitting, wetland mitigation design and construction management, pond and lake management, environmental construction inspection and watershed planning. Mr. Morris continues to provide design and construction expertise to KCI in developing environmental restoration/mitigation projects.

Prairie Creek Treatment Train, 319 Grant Development, Grand Lake St. Marys, Mercer County, OH. Environmental Scientist. Responsible for writing 319 grant application for the Prairie Creek Treatment Train project on Grand Lake St. Marys. Worked with the project sponsor (Mercer County Commissioners) to complete the winning grant proposal.

Regional Parks Natural Resource Assessment, Maryland-National Capital Park and Planning Commission, Montgomery County, MD. Environmental Scientist. Mr. Morris performed natural resource inventories and developed appropriate natural resource management plans for over 2,000 acres of parks operated by the Maryland-National Capital Park & Planning Commission. The project included assessment of impacts to natural resources associated with impairment of dams for three large recreational lakes. Made assessment of each dam's integrity, and offered recommendations for geotechnical investigation, and specific measures to minimize impacts to natural resources when repairing the structures.

Woodrow Wilson Bridge Replacement Environmental Mitigation, Maryland State Highway Administration, Various Locations, MD and VA. Environmental Mitigation Manager. Managed the design, construction and monitoring of more than 50 environmental mitigation sites in Virginia, Maryland and the District of Columbia. These mitigation sites were required to offset impacts associated with the construction of the $2 billion Woodrow Wilson Bridge project. Mr. Morris managed 15 full-time employees, as well as 12 contract employees, to ensure compliance with environmental permits and contractual obligations for project owners. Coordinated all contractual elements of projects, including solicitation, pre-bid meetings, contract award, inspection, invoicing, partnering meetings, and project closeout. The mitigation projects Mr. Morris managed totaled approximately $24 million.

ICC, Contract A, Gaithersburg, MD. Environmental Scientist. KCI provided water resources, environmental design and construction compliance management for this highly controversial and environmentally sensitive 7.2-mile, design-build project.

North Carolina Ecosystem Enhancement Program Full Delivery Projects, Various Locations, NC. Environmental Scientist. This project involved the development of nine full delivery projects comprising 55,000 LF of stream channel and 175 acres of wetland. KCI's services include site location, acquisition, engineering design, permitting, construction, maintenance and monitoring.

US 301 Wetland Delineation and Survey, Maryland State Highway Administration, Prince George's and Charles County, MD. Environmental Scientist. Mr. Morris managed the field sampling and survey of over 5,000 acres of wetlands and waterways associated with proposed improvements to US 301. The delineations were accomplished within a one-mile wide study area corridor that extends for approximately 14 miles around the east side of Waldorf, Maryland. The proposed alternate crossed five major stream systems and numerous tributary and wetland areas. The investigation involved delineation and survey of 49 separate wetland areas. Jurisdictional wetland determinations were conducted on each wetland system with a U.S. Army Corps of Engineers reviewer. Interagency review meetings also were conducted to determine suitability of proposed crossing locations and to determine if any reduction or avoidance of impacts was possible within the proposed study areas.

Pond Management, Baltimore County, MD. Environmental Scientist. Mr. Morris managed the dredging, permitting, and design of a private pond restoration project. Restoration included pond dredging and sediment disposal, construction of a stone wall along the perimeter of the pond, installation of piers, bottom barriers and littoral-zone river gravel treatments, and incorporation of bottom aeration. Created a short-term and long-term Pond Management Plan that included use of aquatic algaecide and herbicide treatments, perimeter pond plantings and nutrient management. This resulted in a reduction in the cover of the invasive Eurasian water milfoil from 90% to 10% and the reduction of the filamentous algae Pithophora sp, from 20% to less than 5%.

BRADLEY SHOGER

Environmental Scientist

Education:
MS / 2009 / Wildlife Ecology and Conservation / University of Florida
BS / 2003 / Environmental Management / Indiana University

Registrations/Certifications:
Professional Certificate in Watershed Management
Rosgen Level I
Rosgen Level II

Years Experience: 11

Years with KCI: 6

Mr. Shoger is a senior environmental scientist in Indianapolis. He has eleven years of professional experience in the natural resources field, specializing in stream and wetland restoration and wildlife ecology. He manages a wide variety of projects and is responsible for client coordination, stream assessments, wetland delineations, forest habitat evaluations, wildlife surveys, and preparation of technical reports. He has concurrently managed annual mitigation monitoring at more than 30 sites, including managing field staff, client coordination, site remediation and permit compliance. Mr. Shoger has successfully demonstrated that he can handle complex projects, with multiple constraints, in a timely and efficient manner.

I-70/Six Points Road Interchange Stream Relocation Project, American Consulting, Inc. Hendricks and Marion Counties, IN. Project Manager. Under an accelerated design schedule, KCI provided end-to-end stream relocation services for 2.5 miles of channel as part of a $1 billion interchange and new airport terminal that included routing five stream channels into two larger stream channels using natural channel design approaches. The project consists of stream design from hydraulic models and reference site conditions, development of as-built data, water quality monitoring, habitat monitoring, sediment and erosion control, and agency coordination. KCI performs annual monitoring including electrofishing, macroinvertebrate collection, QHEI habitat assessment, vegetation survival, pebble counts, bulk sieve analysis, and geomorphic survey. Mr. Shoger leads data collection, analysis, report preparation, and client coordination for this project.

I-69 Environmental Mitigation and Monitoring, Indiana Department of Transportation. Southwestern, IN. Project Manager. KCI is monitoring mitigation sites associated with construction of sections 1 through 4 of I-69 on new alignment through southwestern Indiana. This $6 million contract involves yearly monitoring and maintenance of wetland, stream, and forested bat habitat mitigation. Monitoring consists of yearly vegetation assessment, wetland determinations/delineations, stream geomorphology, hydrologic monitoring, and photographic documentation. KCI also provides adaptive management services by making and implementing maintenance recommendations for bringing underperforming sites into compliance with permit requirements. Mr. Shoger provides client coordination, oversees adaptive management and site maintenance, leads field data collection and analysis, and prepares annual monitoring reports for this project.

Eagle Creek Park Herpetofaunal Surveys, EcoLogic, LLC. Indianapolis, IN. Project Manager. KCI is providing biological surveying for herpetofaunal species as a sub-consultant to Eco Logic, LLC in Eagle Creek Park for the Indianapolis Department of Public Works. These surveys provide baseline species occurrence and specifically target state listed threatened and endangered species. Results from the surveys will help guide future restoration and management decisions. Mr. Shoger provides client coordination, survey design, leads field data collection, analysis, and report preparation, and holds the scientific purposes license.

Holiday Park Regenerative Stormwater Conveyance System, City of Indianapolis. Indianapolis, IN. Project Manager. KCI is providing design, permitting, and construction observation services for the first Regenerative Stormwater Conveyance System constructed in Indiana. This step-pool conveyance system will stabilize a severely eroded ravine in Holliday Park caused by two stomwater outfalls. The streambed will be raised utilizing a combination of a sand-seepage bed and boulder/cobble weirs to establish a step-pool stream system that can effectively handle the stormwater inputs and provide increased water quality and in-line storage. Mr. Shoger is the Project Manager coordinating the design and permitting with the client.

INDOT Statewide Environmental and Wetland Services On-call, Statewide, IN. Project Manager. KCI is the lead consulting firm on an INDOT statewide environmental and wetlands services oncall. KCI is providing mitigation site monitoring, permitting, NEPA, site design, remedial design, and construction observation services as part of this contract. In the first year of this 2 year, $1.5 million contract, KCI was issued 21 separate task orders. As an added service to the client, KCI is providing QAQC services reviewing mitigation site designs submitted by other consulting firms. Mr. Shoger is the Project Manager and oversees the data collection and analysis, restoration design, permitting, report preparation, and client and sub-consultant coordination.

4. A LIST AND GENERAL DESCRIPTION OF EACH RELEVANT RESERVOIR RESTORATION PROJECT

ECOSYSTEM RESTORATION SERVICES AT GRAND LAKE ST. MARYS – MERCER COUNTY, OH

KCI serves as the General Engineering Consultant for the Grand Lake St. Marys Lake Restoration Commission. Work executed under this $250,000 contract includes program management, project planning/development, community relations, environmental documentation/permitting, survey, land acquisition support, engineering studies/design, construction inspection, construction administration, construction management, design-build implementation, and system commissioning, among others.

Grand Lake St. Marys Strategic Restoration Plan: KCI developed a strategic plan to provide a framework and timeline for restoration of the lake ecosystem utilizing various projects and economic management tools to implement solutions for current and future lake improvements and revitalization. The Strategic Plan was integrated with ongoing efforts by the OEPA, ODNR and the GLSM LRC as part of a Consolidated Action Plan (CAP) in 2011 culminating in the establishment of the Critical Response Actions (CRA).

The CAP established an interrelated framework of objectives to synergistically pursue the ecologic and economic restoration of GLSM through the utilization of an Adaptive Management (AM) protocols. The overall objectives are characterized as; improve water quality of GLSM, increase wildlife/fisheries habitat, increase recreational opportunities, and establish a basis for economic revitalization of the GLSM region. The attributes which characterize the framework of the AM approach have been captured in the Conceptual Ecosystem Revitalization Model (CERM)

- *Phase I Lake Diagnostic Assessments:* Conducted diagnostic assessment of lake to define spatial and functional extent of critical functions being performed by the lake and the geomorphic forces acting upon the lake.

- *Sediment Transport Analysis*: Conducted sediment transport characteristics for eight drainages contributing to the lake: 1) collecting and analyzing bed material/pavement samples using a modified Wolman pebble count methodology, 2) collecting and analyzing sub pavement/bar bulk samples through sieve and weight field measurements, and 3) by conducting critical shear stress calculations, developed an estimate of sediment transport for each drainage.

- *Littoral Fringe Functional Assessment*: Assessment of littoral/riparian fringe of the lake conducted to determine functional value for water quality, wildlife habitat, flood tolerance and general species composition. Rankings developed to qualitatively compare zones and critical stressors which may be limiting function. This assessment determined the spatial extents of littoral/riparian features that can be restored, enhanced, ecological engineered to aid in the natural processing of phosphorus from the lake water.

- *Littoral Process Analysis*: A littoral process analysis was conducted through collection and analysis of data on wind speed, direction, duration and period of occurrence and in conjunction with lake depths to determine anticipated wave energies acting on the system. This information was extrapolated to predict critical areas of wave action on the littoral/riparian zone, loading and distribution of suspended load from the contributing drainages, and defining focus areas.

Operations and Maintenance: The Critical Response Actions (CRA) identified in the strategic plan were coordinated in an operations and maintenance plan with available funding sources as an integral part of the Adaptive Management Program. This program is implemented by an on-site lake restoration manager.

On-Site Lake Restoration Manager: KCI provides agency program management services through a full time on-site position that is responsible for day-to-day operations of the Grand Lake St. Marys Restoration Commission. Responsibilities include coordinating with the responsible/respective federal, state, and local agencies and/or persons managing Grand Lake St. Marys restoration plans and activities, representing the GLSMRC at meetings, assisting in securing funding for projects, acting as project manager for various projects to improve the lake, identifying funding sources, facilitating grant application proposal and agreements, serving on advisory committees and association boards, providing assistance in implementing the Grand Lake St. Marys Strategic Action Plan, facilitating the GLSMRC Board in development of continuing work plans (both short and long-term) by coordinating with other federal, state and local agencies, organizations, and schools, and any other responsibilities associated with the lake.

The on-site Manager assists federal, state, and local government agencies and elected officials in restoring the lake to environmentally acceptable standards through existing or new legislation, manages assigned projects including coordination of design, funding, contract development and award, construction and activation, and monitors and coordinates the operation of systems to improve the lake.

Engineering and Associated Costs to Accomplish Project: $200,000
Engineering and Construction Costs of Project: N/A
Client's Name and Phone Number: Jared Ebbing, Mercer County Commissioners, (419) 586-4209

PRAIRE CREEK TREATMENT TRAIN AT GRAND LAKE ST. MARYS – MERCER COUNTY, OH

The Prairie Creek Treatment Train (PCTT) was the initial large scale restoration system to be implemented by Grand Lake St. Marys Restoration Commission and Mercer County Commissioners. The PCTT intends to address nutrient loading into Grand Lake St. Marys (GLSM) through removal of suspended loads, and treatment of base flow and storm water discharges. The Prairie Creek watershed drains 2,310 acres of which 95 percent is in agricultural production. In-situ loading studies from adjacent drainages indicate a total phosphorus loading between 0.32 and 0.63 parts per million.

The PCTT consists of multiple Best Management Practices (BMPs) integrated by stream flows that jointly result in improvements to the quality of water discharged into Grand Lake St. Marys from the watershed. The "train" initiates with an integrated alum/chitosan dosing, followed by a constructed wetland to provide secondary treatment, then filtration through a restored wetland for tertiary refinement before entering an embayment isolated from the main lake by a berm so biological filtration and aeration can be employed in advance of discharge into GLSM. PCTT elements have been tested in the literature, and some components are already in use in GLSM (alum treatments, aeration, floating wetlands). The unique feature of the treatment train is that the elements will be used in sequence to polish water quality prior to water getting to the main body of the lake. Current technology is available to institute each treatment train element.

KCI serves as the General Engineering Consultant for the Grand Lake St. Marys Lake Restoration Commission. Work executed for the PCTT project includes; Concept development, 319 Grant Application development/administration, Project Planning/Development, Community Relations, Environmental documentation, Land acquisition support, Ecological restoration design, Engineering studies/Design, Construction Oversight, System Commissioning/ Monitoring.

Engineering and Associated Costs to Accomplish Project: $100,000
Engineering and Construction Costs of Project: $500,000
Client's Name and Phone Number: Jared Ebbing, Mercer County Commissioners, (419) 586-4209

NPDES OPEN-END WATERSHED MANAGEMENT PROGRAM – HOWARD COUNTY, MD

Under this fourth consecutive contract, totaling $1.4 million, KCI assisted with various NPDES tasks, such as county-wide biological monitoring to assess watershed conditions; stream monitoring to assess the MDE design manual channel protection design criteria; preparing the annual report; delineating BMP watersheds using GIS; and estimating pollutant loads from county outfalls.

Biological Monitoring and Assessment Program: KCI completed the second round of the county-wide, five-year rotational bioassessment program with annual monitoring of 30 randomly selected sites within three primary sampling units.

The following watersheds were completed:
• 2006 - Little Patuxent River Watershed
• 2007 - Middle Patuxent River Watershed
• 2008 - Patapsco River and Tributaries Watershed
• 2009 - Rocky Gorge, Dorsey Run, Hammond Branch Watersheds

Assessment: The assessments include benthic macroinvertebrate sampling, water quality sampling, photo-documentation, physical habitat assessment, and geomorphological assessment at 30 stations. When KCI took over the program in 2006, a more complete and rigorous geomorphic component was added to enhance the program's effectiveness. A full Rosgen Level II assessment was completed with cross-sections, detailed longitudinal profile, particle size characterization, and sinuosity. All geomorphic data was entered into the

ODNR reference reach spreadsheet for analysis and delivery. GPS was used to navigate to each site and record the site locations sampled. ES&C performed the benthic macroinvertebrate taxonomic identifications.

Quality Control: All work was done following MBSS protocols with strict adherence to the Standard Operating Procedures (SOPs) in the county's QAPP. Full QA/QC measures were followed for the sample collection, sorting, and identification of macroinvertebrates, and data entry and analysis procedures. KCI compared results of individual metrics and BIBI scores for duplicate field samples and tracked sorting efficiencies to ensure that variability between sites is not affected by sampling differences.

Centennial and Wilde Lakes Watersheds Stream Monitoring: KCI conducted watershed-wide assessments of the biological community, physical habitat, water quality, and stream stability to assess the overall effectiveness of watershed restoration measures. Stream monitoring occurred annually utilizing a random site selection within several sub-watersheds and included benthic macroinvertebrate assessments at 15 sites following MBSS protocols with strict adherence to county QAPP and SOPs. ES&C performed the macroinvertebrate taxonomic identifications. The stream stability assessment included 10 cross-sectional profiles, a total of 6,000 feet of stream longitudinal profile and particle size analysis to detect changes in channel geometry, aggradation, and degradation.

Tributary to Hammond Branch Evaluation of the Maryland Stormwater Management Channel Protection Criteria: Under Howard County's NPDES permit, the county selected a developing watershed that could be monitored to assess the effectiveness of BMPs designed under the 2000 Maryland Stormwater Design Manual. The manual introduced new channel protection criteria. Therefore, the focus of the monitoring was on tracking changes in channel geometry and stability as the watershed was developing. Data collection efforts included biological, water quality, and physical monitoring throughout the study reach. KCI developed full Rosgen Level II and III surveys of the 3,500-foot channel and conducted a hydraulic characterization and an empirical stream stability assessment.

Upper Little Patuxent Watershed Management Plan: The plan, completed in September 2009, strived to meet the county's commitment to treat 10% of its impervious surface. The plan was completed in two phases. Phase I included a review and synthesis of existing data pertaining to watershed conditions, stream assessment, hydrologic studies, bioassessment data, and land use. In addition several planning studies were reviewed. Phase II characterized watershed conditions through a completed stream corridor assessment, land use and impervious analysis, pollutant loading estimates, and an evaluation of land ownership. KCI identified and prioritized structural and non-structural management strategies for restoration and preservation. An initial public meeting to introduce the study and initial findings was held in June 2008. Additional public meetings were held in 2009 to garner input on issues, problem areas, and solutions. KCI completed the development and prioritization of management strategies and detailed conceptual designs for restoring and protecting the watershed.

Engineering and Associated Costs to Accomplish Project: $1.4 million
Engineering and Construction Costs of Project: N/A
Client's Name and Phone Number: Mark Richmond, Howard County Department of Public Works Bureau of Environmental Services, (410) 313-6413

SWIFT CREEK RESERVOIR AND WATERSHED HYDROLOGIC AND WATER QUALITY DATA REPORT, MIDLOTHIAN, VA

KCI assisted Chesterfield County, Virginia in analyzing water quality, biological, flow, rainfall, and loading data collected as part of the Swift Creek Reservoir monitoring program. KCI provided an assessment of water quality data with limited comparisons to historical data collected under this program. Analyzed stream flow and water quality data and presented summary statistics of stream and reservoir water quality. An annual water budget was developed based on available input and output data. Storm volumes were determined for each sampled storm event, and phosphorus loading for nine tributaries, direct runoff areas, and atmospheric inputs were calculated in order to prepare annual phosphorus loads. The findings were presented in an annual report, which is used by the county to assist with watershed planning and management of its water resources. KCI has prepared an annual report for Chesterfield County from 2004 to 2008, each under a separate contract.

Engineering and Associated Costs to Accomplish Project: $14,000
Engineering and Construction Costs of Project: N/A
Client's Name and Phone Number: W. Weedon Cloe III, Chesterfield County, VA, (804) 706-2061

JAMES H. KERR RESERVOIR SHORELINE STABILIZATION, JAMES H. KERR RESERVOIR, NC

KCI provided full-scale planning and design services to stabilize five miles of shoreline at state park facilities on Kerr Reservoir. Services included surveying, environmental assessment, permits coordination, civil/geotechnical design, hydraulic design, coastal engineering modeling and analysis, planning, writing specifications and contract documents, contract and construction administration, and post-construction assessment. All work strictly conformed to North Carolina State Construction Manual standards. KCI completed the following tasks:

Littoral Process Evaluation: Analysis of littoral process which effect erosion rates of shorelines in the study area. KCI surveyed and plotted 71 sites on 200-scale mapping and conducted assessments to evaluate the interaction of winds, waves, currents, water level fluctuations, sediment transport, geologic factors, and other phenomena in the riparian zone of the lake. An independent geotechnical investigation was also conducted to determine subsoil properties. The product of this littoral study helped to determine causes of the existing shoreline erosion, which provided a framework to evaluate stabilization techniques.

Riparian Community Evaluation: Evaluation of stable riparian communities on the lake was conducted to determine the flooding tolerance of plants (common to the local area) to the water level variations found on the lake. The survey identified 10 stabilized shoreline areas, predominately coves, where woody vegetation is actively growing. Quantitative sampling techniques were employed to determine the distribution of plants on the shoreline in relation to elevation. An analysis of historic water level variations then indicated the tolerance of these plant communities, by species, to flooding and fluctuating water levels. Local harvest areas of the preferred species were also identified. The riparian study determined limits for use of locally available bioengineering plant materials in slope stabilization.

Individual Site Assessments: Each of the 71 sites was evaluated in the field by a team composed of ecological scientists and civil, geotechnical, and hydraulic geotechnical engineers. Information from these evaluations was recorded on checklists and combined to determine the type, extent and prioritization of the proposed stabilization measures. Bathymetry, wave energy, fluvial shear stress, and slope shear strengths were then assessed. Analysis was conducted to determine the "relative" wave energy and fluvial shear stress being imparted on each shoreline. Results of the shear stress and shear strength analyses were then compared to determine the severity of the erosion problem at each site. A stabilization technique (ranging from hardened structure to soft bioengineering) was then recommended for each site based on site characteristics and shear stress/strength analysis. Qualitative assessment measures were also incorporated to consider site access, land uses, environmental ambiance, and other non-quantifiable functions of each site. The quantified evaluation was then weighted by the qualitative analysis to recommend a specific stabilization technique.

Design Development: KCI prepared design plans that incorporated individual site plan views with cross sections, details of stabilization treatments, and quantity summaries. A separate contract document was prepared which included general and special provisions, project specifications, permit conditions, contract documents, and bid forms, in accordance with the State Construction Manual. Design plans for each site were submitted on 24" x 36" sheets showing the location and extent of proposed stabilization techniques. An engineer's estimate was also prepared for the SCO office.

Contract Administration: KCI conducted all advertising and bidding administration for the contract. Upon opening of the bids, KCI made recommendations to the Owner for award of contracts and coordinate execution between the Contractor and Owner.

Construction and Post-Construction Management: KCI provided an on-site engineer to oversee contractor operations and quality control efforts of an independent geotechnical engineering firm. Upon project completion, KCI modified construction plans to indicate "as-built" linear extents and critical elevations. To assure compliance with contract specifications, KCI scientists monitored bioengineering stabilization sites for plant survivability during the growing season following installation.

Engineering and Associated Costs to Accomplish Project: $490,000
Engineering and Construction Costs of Project: $4 million
Client's Name and Phone Number: Lance White, North Carolina Department of Parks and Recreation, (919) 707-9318

Statement of Qualifications and Proposal

for:

Lake Lemon Conservation District

Bean Blossom Creek Sediment Transport Study

Submitted to:

Lake Lemon Conservation District
7599 North Tunnel Rd.
Unionville, IN 47468

Submitted by:

Tetra Tech, Inc.
3801 Automation Way
Fort Collins, CO 80526

February 15, 2019

Section 1: Understanding of Request

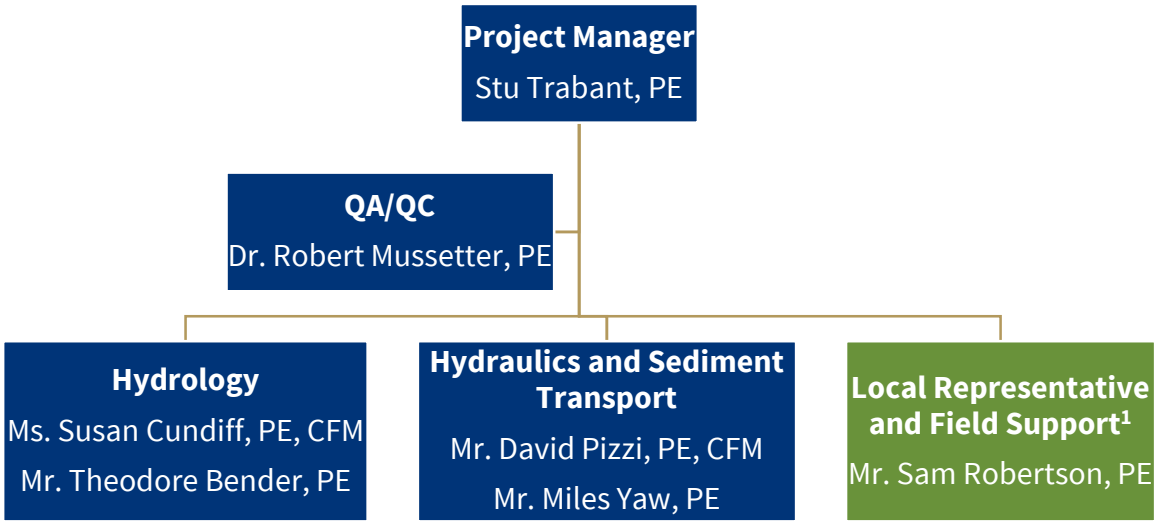
The Lake Lemon Conservation District (LLCD) has issued a request for qualifications and proposals (RFP) for the Bean Blossom Creek Sediment Transport Study. The goal of the Study is to estimate annual and per-event sediment yield to Lake Lemon and develop a sediment rating curve that will be used to maximize the design of a proposed sediment forebay structure and assess future sediment loading to the structure and consequent maintenance needs in the catchment zone.

Bean Blossom Creek is the largest tributary to Lake Lemon, draining 58.1 mi^2 of the lake's 70.2 mi^2 watershed. Concerns have arisen over sedimentation rates near Bean Blossom Creek's reservoir delta, leading to the proposal of a sediment forebay and necessitating this study to aid in designing the forebay. Between 1977 and 1981, the United States Geological Survey collected 155 suspended sediment samples at the Beanblossom gage (Gage No. 03354500, no longer active). By integrating the sediment measurements against the available stream discharge record at the same gage, total watershed sediment yield at the gaging station is estimated to be about 173 tons per square mile per year. This value is less than half that given by Hartke and Hill (1974), who suggested that the watershed sediment yield upstream from Lake Lemon was 400 tons per square mile per year. The wide range in sediment yield estimates highlights the need for developing a better understanding of the rate at which sediment is delivered to the reservoir.

A site map of the Bean Blossom Creek watershed is shown in Figure 1, including the effective FEMA floodplain model and mapped floodzones.

Section 2: Staff and Qualifications

To perform the work specified in the RFP, Tetra Tech will draw on our firm's expertise with hydrology, hydraulics, and sediment transport. The organization chart below illustrates the Project Team organization and identifies the key individuals on our project team.



[1]*Subconsultant: Shrewsberry and Associates, Inc.*

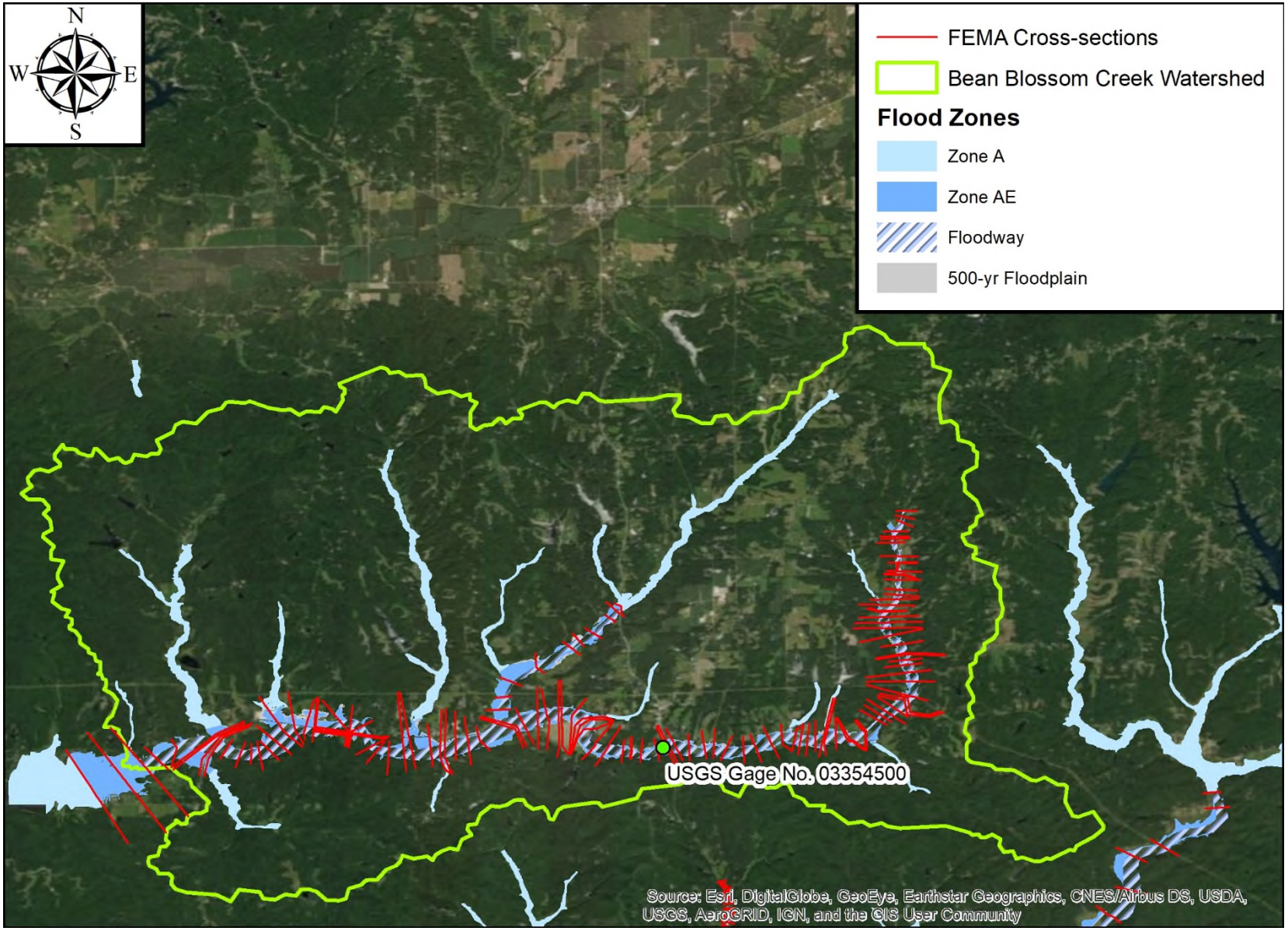


Figure 1. Location map for Bean Blossom Creek showing the watershed extents and the effective FEMA floodplain model.

Key Project Team members include the following:

Project Manager and Principal Engineer: STU TRABANT, PE *Tetra Tech*

Mr. Stu Trabant, PE will be Tetra Tech's project manager. Mr. Trabant has 23 years of experience in water resources engineering, with expertise in hydrology, hydraulics, fluvial geomorphology, and erosion and sedimentation. Mr. Trabant has served as the lead designer and project manager for numerous stream and river restoration design projects and sediment transport studies, including the Root, Kinnickinnic, Carmel, Rio Grande, and Platte Rivers.

Quality Assurance and Control: ROBERT MUSSETTER, PhD, PE *Tetra Tech*

Dr. Robert Mussetter, PE is Tetra Tech's Discipline Leader for Hydraulics, Hydrology, and Sediment Transport, and will be providing technical oversight and quality assurance for the project. Dr. Mussetter has 39 years of experience in analysis and design of water resource and civil engineering projects. His primary area of expertise involves the integration of surface-water hydrology, multi-dimensional hydraulic analysis, sediment-transport modeling, and river mechanics with fluvial geomorphology to solve river stability, instream habitat, and flooding problems in both gravel- and sand-bed rivers. Dr. Mussetter is a registered professional engineer in eleven states.

Hydraulics and Sediment Transport: David Pizzi, PE, CFM *Tetra Tech*

Mr. David Pizzi, PE, CFM is a hydraulic engineer with 17 years of experience in hydraulic engineering and fluvial geomorphology. Mr. Pizzi manages and leads technical analyses for a range of engineering and planning projects dependent on hydraulics, erosion and sedimentation, fluvial geomorphology, and hydrology. He has a broad base of experience working for both private and government clients in a variety of climatic and geologic settings throughout the U.S. His primary expertise is evaluating how changes in the delivery of water and sediment from contributing watersheds impact the hydraulic, geomorphic, and ecologic conditions of rivers and reservoirs. Mr. Pizzi specializes in field reconnaissance and the application of numerical models to represent these watershed processes and associated responses to the receiving waterbodies.

Hydraulics and Sediment Transport: Miles Yaw, PE *Tetra Tech*

Mr. Miles Yaw, PE is a hydraulic engineer with six years of experience in civil and water resources engineering, with expertise in multidimensional hydraulic analysis and sediment transport modeling. Mr. Yaw has been responsible for the development, calibration, validation, and successful implementation of numerous sediment transport models, including modeling hundreds of river miles of the Missouri, Rio Grande, Susitna, San Joaquin, Cache la Poudre, and Platte Rivers. Mr. Yaw has also formally assisted the United States Army Corps of Engineers (USACE) Hydrologic Engineering Center (HEC) in the testing and development of the sediment transport routines in HEC-RAS v5.0 and later versions, with his work leading to numerous enhancements to the software.

Hydrology: Susan Cundiff, PE, CFM *Tetra Tech*

Ms. Susan Cundiff, PE, CFM is a hydraulic engineer with 12 years of experience in civil and water resources engineering. Her expertise is in hydrologic and one-, two-, and three-dimensional hydraulic modeling, fine sediment yield analysis, and floodplain management. Her experience

includes numerous hydrologic studies for peak flow and flood damage analysis, sediment transport modeling, and sediment yield studies.

Hydrology: THEODORE BENDER, PE *Tetra Tech*

Mr. Theodore Bender, PE is a hydraulic engineer with 13 years of experience in civil and water resources engineering. Mr. Bender's expertise is in multidimensional hydraulic analysis and sediment transport, hydrologic modeling, field data collection, and construction management and oversight. His experience includes watershed hydrologic modeling for peak flow hydraulic analysis and inundation mapping, as well as one-dimensional and two-dimensional hydraulic and sediment transport analysis.

Local Representative: Sam Robertson, PE, CFM *Shrewsberry*

Mr. Sam Robertson, PE, CFM is a hydraulic engineer and certified floodplain manager for Shrewsberry and Associates. Mr. Robertson has 18 years of experience in water resources engineering focusing on floodplain management and storm water projects. He helped prepare the Lake Lemon Sediment Mitigation conceptual design acting as Shrewsberry's technical lead and project manager. The Shrewsberry office in Bloomington, allows for convenient client access to the project and Sam can assist with meetings and data collection.

Section 3: Relevant Project Experience

Tetra Tech's Project Team has a wealth of experience in the development and successful implementation of hydrologic and sediment transport studies. The following are examples of recent projects where this experience was used. Of particular note are the testing and development of the sediment transport routines in HEC-RAS, which demonstrates our unparalleled knowledge and expertise in 1D sediment modeling, and the Lake Ralph Hall Geomorphic and Sedimentation Evaluation, which demonstrates prior experience in successfully completing a reservoir sedimentation study in a setting very similar to Lake Lemon. The following are abbreviated descriptions, with more detail included in the attached project description documents.

Testing and Development of HEC-RAS 5.x.x

Tetra Tech currently holds the only external contract issued for technical support and development of sediment transport routines in HEC-RAS v5.0 and later versions. Through this contract, Tetra Tech is partnering with Hydrologic Engineering Center (HEC) staff to verify algorithms for computational sediment transport capabilities, directly debug code, and develop and test enhancements in the sediment modeling routines. Our work includes verifying and revising the Exner 7 bed sorting algorithm, debugging the coupled MPM-Toffaleti transport function, and identifying and fixing errors in the mass-bed change relationship. HEC has recognized the value of our input by exercising an option to extend our contract, and we are supporting the ongoing development of sediment transport routines in version 5.1.

Geomorphic and Sedimentation Evaluation of North Sulphur River and Tributaries for the Lake Ralph Hall Water Supply Project, Texas

Tetra Tech conducted geomorphic, sediment yield, and sediment transport analyses of the North Sulphur River and its 100 mi^2 watershed upstream of the proposed Lake Ralph Hall dam site. The objective of the study was to quantify sediment delivery to the 163,000 ac-ft water supply reservoir over the 50-year economic life of the project. Additionally, we were tasked with: (1) evaluating

the downstream effects of the dam on channel stability and flow capacity, (2) assessing the potential for reducing or managing the sediment supply to the reservoir and, (3) assessing the future conditions in the North Sulphur River and its tributaries in the absence of the project. Tetra Tech conducted extensive field work that included geologic and geomorphic mapping, sediment sampling, measurements of degradation at bridges, and high-water mark determination. Hydrologic analysis of gage records and HEC-1 modeling was used to develop flood frequencies, flow durations, and flow volumes for subsequent sediment yield and transport modeling. HEC-RAS models were used for the mainstem and larger tributaries. Reach-averaged output from the HEC-RAS models and the bed material sediment gradations were used to develop both supply-limited and transport-limited estimates of annual sediment delivery to the reservoir.

Plum Creek as Mitigation for the Chatfield Reservoir Reallocation, Colorado

Tetra Tech provided support of mitigation designs for the Chatfield Reservoir Reallocation project by conducting geomorphic and sediment transport evaluations and providing recommendations for the channel design of Plum Creek. Tetra Tech performed geomorphic reconnaissance of Plum Creek and the Plum Creek Valley, and collection of bed- and bank-material samples to aid in characterizing the sediment transport capacity. The geomorphic and sediment transport characteristics of this portion of Plum Creek are extremely complex, with severe episodic deposition, avulsion, and re-entrenchment expected. To ensure a resilient channel design, Tetra Tech performed a series of sediment transport evaluations. Two-dimensional hydrodynamic fixed bed and mobile-boundary models were used to assess incipient motion, upstream sediment supply, and local sediment transport capacities for existing and project conditions.

Flood Risk Management Plan, Village of Ruidoso, New Mexico

Tetra Tech performed a hydrologic analysis and sediment transport study for the development and evaluation of a fire management plan for the Village of Ruidoso, NM. Tetra Tech developed a hydrologic model using HEC-HMS to quantify the post-fire flood and sedimentation risk potential. The project consisted of developing and calibrating a baseline hydrologic model of the watershed, simulating the model for existing (unburned) conditions and a range of forest management and post-fire alternatives, and estimating the post-fire effects on sediment yield from the watershed.

Section 4: Methods and Approach

Tetra Tech's Project Team understands that LLCD plans to address the requested work in two phases. The first phase (Tasks 1 and 2) will consist of characterizing and quantifying the sediment entering Lake Lemon through Bean Blossom Creek. As requested, Tetra Tech proposes to conduct a Sediment Yield and Transport Analysis that will provide the LLCD with a sediment rating curve and estimated sediment delivery to the lake on a per-event and annualized basis. However, since the installation of scour chains and a gaging station are not required to estimate the sediment delivery to the reservoir, Tetra Tech has not included the cost of those activities (Measurement and Verification) in this proposal. The Measurement and Verification task can be exercised at the discretion of the LLCD to verify and, if necessary, update and refine the products delivered under the Sediment Yield and Transport Analysis Phase.

The second phase (Task 3) focuses on evaluating the performance of a preliminary design with respect to sediment-transport, and will be conducted at a later time once a preliminary design has been identified. Since the approach best suited for evaluating the performance will depend largely on the findings of Tasks 1 and 2 and the type of design developed, the scope and cost associated

with Task 3 is not included in this proposal, but will be coordinated with LLCD as the project develops. This Phase will include analysis of the preliminary sediment forebay design using the annualized and per-event yields determined in the Sediment Yield and Transport Analysis Phase. It may also include the possible development of a 1-D or 2-D sediment routing model, and, if necessary, updating the sediment yield rating curve. A scope of work and cost estimate for this phase can be provided at a later date upon request of LLCD.

Based on our extensive experience with sediment transport analysis, we feel strongly that a defensible sediment rating curve for estimating sediment yield in a setting such as Bean Blossom Creek can be created through a robust sediment yield and transport analysis without having to develop a sediment routing model. We propose to develop the sediment delivery rating curve using HEC-RAS and a transport capacity-based approach that can provide a basis of design for the proposed sediment forebay and dredging maintenance. The Sediment Yield and Transport Analysis Phase will consist of two tasks:

1. **Sediment Characterization**
   a) **Field Reconnaissance and Sediment Sampling –** Tetra Tech will perform field reconnaissance of Bean Blossom Creek, including collecting up to five bed material volumetric samples at strategic locations within the reach. Due to the nature of the system and the general lack of coarse gravel or larger material delivered to the reservoir, collection of bed surface samples via Wolman pebble count will likely be unnecessary but will be performed if localized gravel deposits are found.
   b) **Development of Monitoring Plan –** It is our understanding that LLCD may want long-term monitoring of the sediment balance using stream gaging, aggradation and degradation measurements, and sediment discharge measurements. These activities can vary widely in duration and cost, and are not necessary to complete to estimate the watershed sediment yield. Tetra Tech proposes assisting LLCD in evaluating long-term monitoring needs and developing a plan and cost estimate to meet those needs. This long-term measurement program would be implemented as a subsequent phase of the project (the Measurement and Design Verification Phase).
2. **Watershed Hydrology Assessment and Modeling**
   a) **Hydrologic Model Development –** A HEC-HMS model will be developed to produce hydrographs for a range of storm events from the 2-yr through the 500-yr storm event, using existing and available watershed data, and informed by the field reconnaissance.
   b) **Hydraulic Model Development –** Tetra Tech will rely on existing available data to develop a 1D fixed bed HEC-RAS model of Bean Blossom Creek from the reservoir upstream to the Highway 135 bridge (or similarly suitable upstream boundary). We expect to be able to leverage the effective Flood Insurance Study (FIS) model (FEMA, 2016) for this effort. The hydraulic model will be used to evaluate at-a-station and reach-averaged hydraulics for Bean Blossom Creek.
   c) **Sediment Yield and Transport Analysis –** Results from the hydraulic evaluation will be used to calculate sediment transport capacity across a range of flows, up to the 500-yr peak discharge. The capacity calculation will be performed using a program such as SAMwin (Ayres, 2003) The sediment capacity results will provide a reasonable estimate of bed material delivery. However, washload is a critical component of reservoir sedimentation studies because sediment sizes that are transported in stream channels entirely in suspension will deposit in the slack reservoir water, and often constitute a large portion of

the total sediment load. The washload will be estimated using the Modified Universal Soil Loss Equation (MUSLE) and results from the HEC-HMS watershed hydrologic model. The bed material and washload results will be combined to give a rating curve of total sediment delivery to the reservoir, which will be integrated over the storm hydrographs to provide LLCD with an estimate of total sediment yield on a per-event basis.

d) **Reporting –** Results of the analysis will be provided to LLCD in the form of a short technical memorandum, after an internal QA/QC review.

The value added by developing a mobile boundary HEC-RAS sediment routing model for future project phases is in the ability to assess long-term changes to the sediment balance of Bean Blossom Creek and the effect those changes might have on sediment delivery to the reservoir. In our considerable experience with developing and successfully implementing sediment routing models, there are several technical hurdles in developing a sediment routing model for Bean Blossom Creek. For instance, there appears to currently be very little data available by which the model could be calibrated or validated, and estimating tributary supplies is subject to a large degree of uncertainty. Reducing the uncertainty and data gaps through installation, calibration, and monitoring of a stream gaging station, repeatedly surveying rangelines, and collecting periodic suspended and bedload sediment discharge measurements can be very expensive and time consuming. The lack of flow containment at larger flow events, especially near the sediment delta, can also present technical challenges with 1D sediment transport models. If desired by LLCD, development of a mobile-boundary sediment model should be considered as a task in the Measurement and Design Verification Phase.

The Measurement and Verification task represents a potential future task not covered by this cost proposal. This task may consist of monitoring and field measurement tasks to provide a means for validating the sediment transport and yield analysis. Long-term measurement actions that could be taken in the Measurement and Verification task include (1) installation and monitoring of a stream gaging station, (2) installation of scour chains or similar means of monitoring aggradation or degradation, such as survey rangelines, and (3) development and implementation of a sediment discharge sampling plan, potentially to include training LLCD staff or volunteers in proper sediment discharge sampling protocol, A scope of work and cost estimate for this phase can be provided at a later date.

Section 5: Schedule

The Project Team has prepared a tentative schedule for completion of the tasks in the Sediment Yield and Transport Analysis Phase that is presented below in terms of days after receipt of Notice to Proceed (NTP). The proposed schedule can be further discussed and refined with LLCD if needed due to currently unknown schedule drivers.

- Project kickoff meeting.....within 7 days of NTP
- Field Reconnaissance.....within 21 days of NTP
- Monitoring Plan Development.....within 35 days of NTP
- Hydrologic Modeling.....within 42 days of NTP
- Hydraulic Modeling.....within 42 days of NTP[1]
- Sediment Transport Analysis.....within 49 days of NTP

[1] Pending receipt of effective hydraulic model from FEMA, requests typically take 2-3 weeks for fulfillment. Request will be submitted upon NTP.

- Technical Memo .....within 60 days of NTP

Section 6: Compensation

A detailed cost proposal for completion of the Sediment Yield and Transport Analysis Phase is included as Attachment A. The fee for this Phase, Tetra Tech's recommended study plan and primary focus of this proposal, is $42,407 and includes $3,000 in compensation for Shrewsberry to act as our local representative and assist with field reconnaissance. To maximize the amount of work that can be completed under the proposed fee, Tetra Tech is not including a mark-up of Shrewsberry's services. Costs for the Measurement and Verification Phase can vary substantially based on LLCD's preferred monitoring methods and modeling needs, thus a fee estimate for this phase is not been included.

Section 7: References

Ayres, 2003. SAM Hydraulics Design Package for Windows v. 1.0. Developed in cooperation with the United States Army Corps of Engineers. Fort Collins, Colorado.

Federal Emergency Management Administration (FEMA), 2016. "Flood Insurance Study Brown County, Indiana and Incorporated Areas." Flood Insurance Study Number 18013CV000A.

Hartke, E. J., and Hill, J. R., 1974. "Sedimentation in Lake Lemon, Monroe County, Indiana." *Geological Survey Occasional Paper 9.* Printed by Authority of the State of Indiana. Bloomington, Indiana.

Task	Task Description	**Project Manager** S. Trabant	**QA/QC** R. Mussetter	**Hydraulic Engineer/ Sed. Transport** D. Pizzi	**Hydrologic Engineer** S. Cundiff/T. Bender	**Hydraulic Engineer/ Sed. Transport** M. Yaw	**CAD/GIS** B. Trabant	**Subcontract Engineer** S. Robertson	**Total Labor (hrs.)**	**Total Labor Cost**	**Direct Costs**	**Total Cost**
Task 1 Sediment Characterization		**32**	**4**	**0**	**0**	**28**	**4**	**17**	**85**	**$ 12,596.00**	**$ 3,151.25**	**$ 15,747.25**
	1a - Field Reconnaissance and Sediment Sampling	24				24	4	17	69	$ 10,032.00	$ 3,114.68	$ 13,146.68
	1b - Development of Monitoring Plan	8	4			4			16	$ 2,564.00	$ 36.58	$ 2,600.58
Task 2 Watershed Hydrology Assessment and Modeling		**20**	**11**	**28**	**60**	**64**	**20**	**0**	**203**	**$ 26,196.00**	**$ 464.06**	**$ 26,660.06**
	2a - Hydrologic Model Development	4	4		52		16		76	$ 9,236.00	$ 173.74	$ 9,409.74
	2b - Hydraulic Model Development	8	2	8		24			42	$ 5,680.00	$ 96.01	$ 5,776.01
	2c - Sediment Yield and Transport Analysis	4	4	16		32			56	$ 7,564.00	$ 128.02	$ 7,692.02
	2d - Reporting	4	1	4	8	8	4		29	$ 3,716.00	$ 66.29	$ 3,782.29
		$ 8,476.00	**$ 3,000.00**	**$ 4,256.00**	**$ 7,320.00**	**$ 10,580.00**	**$ 2,160.00**	**$ 3,000.00**	**288**	**$ 38,792.00**	**$ 3,615.31**	**$ 42,407.31**

TETRA TECH

Stuart Trabant, PE

Project Manager/Senior Hydraulic Engineer

Mr. Trabant has over 20 years of experience in water resources engineering and geomorphic assessments. He has completed projects throughout the United States and internationally involving a broad range of stream types and physical environments and varying in scope from collection and analysis of field data through development and application of mathematical models to evaluate hydrologic, hydraulic and sediment-transport conditions. His primary areas of expertise are in hydraulics, hydrology, fluvial geomorphology, and erosion and sedimentation. Mr. Trabant has significant experience in performing analyses to support the planning and design phases of water-resources and sediment management projects, as well as preparation of design plans and specifications.

Mr. Trabant has served as the lead design engineer or project manager for numerous stream and river restoration design projects focused on habitat improvement, flood conveyance, recreation, flood damage recovery, and water quality. He recently instructed a course on engineering geomorphology that was conducted for the Northeast Ohio Regional Sewerage District as part of the Districts Master Planning Standards Development Program. For this project, he was also responsible for conducting the geomorphic field reconnaissance and preparing the initial set of geomorphology-based standards. He has extensive experience with the full suite of industry-standard hydrologic models, 1-D and 2-D hydraulic models and sediment transport models, as well as GIS (ArcGIS), AutoCAD and MicroStation.

EDUCATION

MS, Civil Engineering (Hydraulics), Colorado State University (1996)

BS, Civil Engineering, Colorado State University (1994)

REGISTRATION/CERTIFICATION

Professional Engineer, Civil: CO, License No. 34764 (2000); WY, License No. 15674 (2016)

PROFESSIONAL AFFILIATION

American Society of Civil Engineers, Member

YEARS OF EXPERIENCE

23 Years

YEARS WITH TETRA TECH

20 Years

OFFICE LOCATION

Fort Collins, CO

AREAS OF EXPERTISE

Hydrologic Engineering

Hydraulic Engineering

Sediment Transport Analysis

Sediment Transport Modeling

Engineering Geomorphology

Geomorphic Assessment

Stream Rehabilitation Design

PROJECT EXPERIENCE

North Sulphur River/Lake Ralph Hall Geomorphic/Sedimentation Evaluation, Upper Trinity Regional Water District, Lewisville, TX (Ongoing)

Project Engineer and Task Order Manager for a study conducted for the Upper Trinity Regional Water District to determine the sediment supply to the proposed reservoir over its 50-year project life. Responsible for hydraulic and geomorphic field data collection as well as hydrologic (HEC-1), hydraulic (HEC-RAS), sediment transport (SAM, MPM-Einstein) and watershed sediment yield (MUSLE, EGEM) analyses. Collected data on sedimentation of other reservoirs, as well as stream sediment load measurements to assess the reasonableness of the estimated yields for the Lake Ralph Hall project. Also responsible for preparation of sections of the project Section 404 permit application as well as scoping for the Project EIS/EIR.

Big Thompson River Flood Recovery Services (City of Loveland, CO, Ongoing)

Project Manager and Lead Hydraulic Engineer for two City of Loveland projects on the Big Thompson River, including the Denver Avenue Outfall Bank Stabilization Project and the Development of a Conceptual Design for Viestenz-Smith Mountain Park (VSMP). The Denver Avenue Outfall project included hydraulic modeling, alternatives analysis and design of cost-effective and integrated bank stabilization measures to project the recently reconstructed outfall that was damaged by the September 2013 flood. The VSMP project also initially included development of a hydraulic model and preparation of conceptual design plans and associated cost estimates for channel and overbank stabilization measures to mitigate future damages to park infrastructure. Mr. Trabant also served as co-designer of the final VSMP restoration

design, and was responsible for the hydrologic and hydraulic analyses, sediment-transport evaluations, and design of the channel and stream stability and infrastructure protection measures. He is currently providing construction management services for the stream restoration aspects of the project.

Stream Restoration Design for State Highway 119/Main Street South Project, Blackhawk, Colorado, 2012 (CDOT; Const. 2012)

Project Manager for the State Highway 119/Main Street South project which is a collaborative effort organized by the Colorado Department of Transportation (CDOT) to develop a multidisciplinary design for the highway corridor along the approximately 1-mile long reach of the North Clear Creek valley bottom downstream (southeast) of the City of Blackhawk, CO. His responsibilities included coordination with numerous state and federal agencies and a variety of local interest groups, hydraulic and sediment-transport modeling, and participation at public meetings. Because the reach is an EPA Superfund Site along a narrow valley corridor, the project goals were varied and involved mine-waste disposal, treatment of toxic runoff, widening of the highway, and a stream restoration design that provides vertical and lateral stability, improved fish habitat, flood protection and wetland mitigation. In addition to developing the stream restoration design and specifications, Mr. Trabant also provided construction management services during the construction phase.

Rio Grande Canalization Project Water Budget (USIBWC; 2013) and Channel Maintenance Alternative (2015) Studies, New Mexico and Texas (USIBWC, 2015)

Project Manager and Lead Hydrologic and Hydraulic Engineer for a channel maintenance alternative study for the Rio Grande Canalization Project (RGCP). Nine separate locations were evaluated, each of which experience sedimentation that affect river and canal conveyance efficiencies, canal head works operations, levee freeboard encroachment and flooding. Responsibilities for this project included field geomorphic reconnaissance, coordination of topographic and bathymetric surveys, hydrologic analysis, hydraulic and sediment-transport modeling, preparation of sediment-management alternatives, and evaluation of the alternatives under near- and long-term conditions. The two best alternatives were identified at each of the nine locations and recommendations for planning and implementation were prepared.

Kinnickinnic River Restoration Feasibility Study, Milwaukee, Wisconsin, (USACE, 2016)

Task Order Manager for a feasibility study to assess the feasibility of restoring an approximately 1-mile long reach of the Kinnickinnic River. The project reach was channelized, straightened and concrete lined in the 1960's for flood conveyance purposes. A geomorphic field inspection of the project reach and upstream reaches that are not lined with concrete was carried out to assess sediment supply and identify design constraints. Project responsibilities also included a hydrologic assessment, alternative development and conceptual designs, preparation of hydraulic modeling for existing and with-alternative conditions, sediment-transport calculations, and stakeholder and agency coordination. Participated in a value engineering study of the project and two additional separate restoration projects in adjacent watersheds.

San Clemente Dam Retrofit Study, Carmel River, Carmel, California (CalAm; 2012)

Senior Engineer and Task Order Manager for a detailed study of the potential impacts on flooding, river stability and instream habitat in an 18-mile reach of the Carmel River associated with various options for retrofitting San Clemente Dam to meet seismic safety standards. Project responsibilities included study plan development, supervision of subcontractors for topographic and bathymetric surveys and reservoir sediment sampling, collection of sediment and other physical data, hydraulic (HEC-RAS) and sediment transport (HEC-6T) modeling, and interpretation of model results. His responsibilities also included extensive coordination and communication with agencies and interest groups concerned with public safety, water supply, instream habitat and endangered species issues. The initial phases of the study were performed for the California Department of Water Resources and American Waterworks Company. He also assisted the California Coastal Commission in reviewing the recently constructed Carmel River Reroute and Dam Removal

(CRRDR) Project, which diverts the river into a tributary branch of the reservoir, thereby allowing for a significant portion of the reservoir deposits to remain in-place.

Evaluation of Sediment Sluicing Operations for Pacoima Dam Los Angeles County, CA (LACDPW; 2012)
As part of LACDPWs Sediment Management Feasibility Study, Mr. Trabant is currently performing hydraulic and sediment-transport modeling to evaluate potential sluicing operation options to evacuate accumulated sediments in Pacoima Reservoir. For this study, he carried out a geomorphic field evaluation of the reach upstream from the reservoir to evaluate the sediment supply, the reach downstream of Pacoima Dam to assess sediment-transport characteristics between the dam and the location where the sluiced sediment will ultimately deposit in Lopez Flood Control Basin, the outlet works at the dam and the reservoir itself. A sediment-transport model is currently being developed of the 1983 sluicing operation, and will be validated using pre- and post-sluicing topographic information. Once validated, this model may be used to assess the effectiveness of sluicing the existing reservoir deposits.

Root River and Kinnickinnic River Sediment Transport Planning Studies Milwaukee, WI (Milwaukee Metropolitan Sewerage District; 2008, 2010)
Project Engineer responsible for hydrologic (HSPF), hydraulic (HEC-RAS) and sediment transport modeling for the Root River and Kinnickinnic River Sediment Transport Planning Studies for the Milwaukee Metropolitan Sewerage District. Conducted a significant portion of the geomorphic data collection including mapping of sediment sources, channel erosion, man-made and natural channel controls, as well as sediment sampling. Responsible for all data reduction, quality control and integration into the project GIS database.

Sediment Augmentation Feasibility Study, Platte River, NE (Platte River Recovery Implementation Project; 2013)
Project Engineer and Task Order Manager for developing hydraulic and sediment-transport models of an approximately 28-mile reach of the Platte River to assess the feasibility of sediment augmentation program to improve habitat for ESA-listed species. Developed hydraulic and sediment-transport models using HEC-RAS v4.1 that were calibrated and verified using available information. Model development included innovative techniques to address the numerous flow- and sediment splits along the project reach. The sediment-transport model was executed over a range of short- and long-term simulations to evaluate the sediment-transport characteristics under existing conditions and modified to assess the feasibility of and provide guidelines for implementation of the sediment augmentation program.

Sediment-Transport Modeling to Evaluate Potential Impacts of San Clemente Dam Retrofit Options; California Department of Water Resources and American Waterworks; Carmel, CA (2005)
Project Engineer for a detailed study of the potential impacts on flooding, river stability and instream habitat in an 18-mile reach of the Carmel River associated with potential options for retrofitting San Clemente Dam to meet seismic safety standards. Project responsibilities included hydrologic (HEC-FFA), hydraulic (HEC-RAS) and sediment transport (HEC-6T) modeling, and interpretation of model results. Sediment-transport modeling was also performed in the existing reservoir to evaluate sediment-trapping effects associated with the various options.

Lower Deer Creek Restoration and Flood Management Feasibility Study, Deer Creek, CA (Deer Creek Watershed Conservancy; 2008) 100-SWW-T06-06.01
Project Engineer for environmental restoration and flood management for the lower 8 miles of Deer Creek. Responsible for topographic and hydrographic surveys, hydrologic analysis and modeling, HEC-RAS modeling and sediment transport modeling to support development of three alternatives for levee setbacks to reduce downstream flood risks and permit channel and floodplain reconnection for ecological enhancement purposes. Project included preliminary designs for bridge and irrigation diversion replacements, levee setbacks and relocated infrastructure.

TETRA TECH

Robert Mussetter, PhD, PE

Principal Hydraulic Engineer

Dr. Mussetter has over 30 years of experience in analysis and design for a broad range of water-resource and civil engineering projects. He is a registered professional engineer in 11 states. His primary area of technical expertise involves the integration of surface-water hydrology, multi-dimensional hydraulic analysis, sediment-transport modeling and river mechanics with fluvial geomorphology to solve river stability, instream habitat, and flooding problems in both gravel- and sand-bed rivers. His project experience has varied in scope from collection and analysis of field data to development and application of complex mathematical models and detailed design of hydraulic structures, as well as bio-hydraulic restoration of disturbed river systems. Dr. Mussetter has been responsible for a number of modifications to the HEC-6 sediment-transport model for the USACE, and developed the Mussetter-Woo transport relation for high suspended-sediment, steep, sand-bed streams. He has conducted Independent Technical Reviews (ITR) of sediment-transport studies for the USACE Sacramento, Los Angeles and Seattle Districts.

Dr. Mussetter has particular experience in evaluation of sediment transport processes in large river systems, including the quantification of local and general scour in the vicinity of natural and man-made structures. He also has considerable experience in developing measures to mitigate the potential adverse impacts to the stability and proper functioning of man-made, instream structures such as pipeline, bridges and diversion works. Dr. Mussetter has authored or co-authored several manuals and design guides relating to river stability, erosion control and surface erosion. In addition, he has been an instructor for the National Highway Institute-sponsored “Stream Stability and Scour at Highway Bridges” training course and was involved in preparation of the Federal Highway Administration documents HEC-18, “Evaluating Scour at Bridges” and HEC-20, “Stream Stability at Highway Structures.” This training course and the related documents describe the current standard of engineering practice for evaluating stream stability and scour in the riverine environment.

Dr. Mussetter has successfully managed numerous large, multi-disciplinary projects for eight USACE Districts, Bureau of Reclamation, California Department of Water Resources, Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) and numerous private clients. Much of his project experience has involved management of multi-disciplinary teams. As Project Manager for the Kinnickinnic River Sediment Transport Planning Study, Dr. Mussetter will ensure the development of a technically sound sediment-transport model, a thorough fluvial geomorphic assessment, and most importantly, application of the study results to meet the District’s planning needs in the same way he successfully managed the Root and Kinnickinnic Rivers Sediment Transport Planning Studies for the Milwaukee Metropolitan Sewerage District (MMSD).

EDUCATION

PhD, Civil Engineering, Colorado State University (1989)

MS, Civil Engineering, Colorado State University (1982)

BS, Civil Engineering, Montana State University (1976)

REGISTRATION/CERTIFICATION

Professional Engineer, Civil: CA License No. 59128 (1999)

Professional Engineer, Civil: CO License No. 20758 (1983)

Professional Engineer, Civil: AZ License No. 17918 (1984)

Professional Engineer, Civil: MT License No. 4803 (1984)

Professional Engineer, Civil: NM License No. 12603 (1994)

Professional Engineer, Civil: ID License No. 8809 (1998)

Professional Engineer, Civil: TX License No. 89604 (2002)

Professional Engineer, Civil: WI License No. 37499 (2005)

Professional Engineer, Civil: NV License No. 023278 (2014)

Professional Engineer, Civil: SD License No. 59128 (1999)

PROFESSIONAL AFFILIATION

American Society of Civil Engineer

American Water Resources Association

American Academy of Water Resources Engineers (Diplomate)

American Geophysical Union

YEARS OF EXPERIENCE

39 Years

YEARS WITH TETRA TECH

21 Years

OFFICE LOCATION

Fort Collins, CO

AREAS OF EXPERTISE

PROJECT EXPERIENCE

San Clemente Dam Retrofit Study; Granite Construction for the California American Water; Carmel River, CA (Ongoing)
Principal Engineer and Project Manager for a detailed study of the potential impacts on flooding, river stability and instream habitat in an 18-mile reach of the Carmel River associated with various options for retrofitting San Clemente Dam to meet seismic safety standards. Project responsibilities included study plan development, supervision of subcontractors for topographic and bathymetric surveys and reservoir sediment sampling, collection of sediment and other physical data, hydraulic (HEC-RAS) and sediment transport (HEC-6T) modeling, and interpretation of model results. His responsibilities also included extensive coordination and communication with agencies and interest groups concerned with public safety, water supply, instream habitat and endangered species issues. Tetra Tech is a subconsultant to Kleinfelder (Lead Designer) and is responsible for hydrologic and hydraulic analyses, and design of the stable stream channel that provides upstream and downstream passage for steelhead in the rerouted section of the Carmel River. Tetra Tech recently completed 2-dimensional hydraulic flow analyses for the proposed confluence of the reroute channel and the Carmel River at the current dam site and is coordinating with the California Division of Safety of Dams (DSOD) on the results. The modeling was performed using Bureau of Reclamation SRH-2D software for the 100- and 1,000-year frequency events, and the Probable Maximum Flood.

One-dimensional Hydraulic and Sediment-transport Modeling; Platte River, NE (Ongoing)
Project Manager and Principal Engineer to develop one-dimensional (1-D) hydraulic (HEC-RAS) and sediment-transport (HEC-6T) models of the approximately 100-mile reach of the Central Platte River between Lexington and Chapman, and of an approximately 10-mile reach of the North Platte in the vicinity of the North Platte for the Nebraska Community Foundation and the Platte River Recovery Implementation Program.

Lower Slab Creek Hydro-licensing, CA (Ongoing)
Principal Engineer and Discipline Lead for a study to conduct hydraulic and sediment- transport analysis, fish habitat analyses, evaluate boating flow releases, and develop three habitat improvement plans for the Sacramento Municipal Utility District as part a relicensing application for a new powerhouse located on the South Fork of the American River (SFAR). The proposed powerhouse and outlet works are located along the left bank and approximately 1,700 feet downstream from the Slab Creek Dam and will consist of a 5-MW turbine and Howell-Bunger valve. The proposed powerhouse will draw water from an existing adit that connects to the White Rock tunnel.

Platte River from Elm Creek Bridge to Implement the FSM "Proof of Concept" Management Experiment; Platte River, NE (Ongoing)
Project Manager and Principal Engineer for the development of a 2-D hydraulic and sediment-transport model for the Elm Creek Complex. Tasks have included the construction, calibration, and validation a 2-dimensional (2-D) hydraulic and sediment transport model for the approximately 4-mile Elm Creek Complex project reach between the Elm Creek Bridge and approximately two miles below the Kearney Canal Diversion Structure. The model to be developed will be the Bureau of Reclamation's SRH-2D platform, and used to design management experiments at the Elm Creek Complex, assess management experiment outcomes/ performance, and determine necessary action adjustments.

River Restoration Engineering Services for the San Joaquin River Restoration Program; California Department of Water Resources; San Joaquin River, CA (Ongoing)
Project Manager and Principal Engineer for a series of water resources, river restoration, and geomorphic analyses to support the San Joaquin River Restoration Project between Friant Dam and the confluence with the Merced River for the California Department of Water Resources (DWR) in accordance with an existing multi-jurisdictional Settlement Agreement. Project responsibilities include hydrologic analysis, geomorphic analysis, steady and unsteady one-

dimensional hydraulic modeling (HEC-RAS and HEC-2), two-dimensional (SRH-W) modeling, sediment transport modeling, restoration design for the improvement of riparian and aquatic habitat and fish passage, and development of appraisal-level design cost estimates for 150 miles of river.

Elkhorn River Integrated Feasibility Study and Environmental Assessment (2013)
Principal Engineer for the geomorphology and project oversight of feasibility study to document site visits, assess the erosion problem, evaluate alternatives, and recommend feasible alternatives to provide streambank protection to prohibit rapid erosion along the Elkhorn River induced by severe flooding induced by the runoff from a summer thunderstorm. Because the Elkhorn River is a sinuous, sand-bed river with highly erosive, silty-sandy streambanks, the flood caused significant bank erosion and lateral channel migration in many areas where the banks are not fixed by structures, such as bridges or existing bank protection.

Lower Deer Creek Restoration and Flood Management Feasibility Study; Deer Creek Watershed Conservancy; Chester, CA (2011)
Principal Engineer for environmental restoration and flood management for the lower 8 miles of Deer Creek. Responsible for topographic and hydrographic surveys, hydrologic analysis and modeling, HEC-RAS modeling and sediment transport modeling to support development of three alternatives for levee setbacks to reduce downstream flood risks and permit channel and floodplain reconnection for ecological enhancement purposes. Project included preliminary designs for bridge and irrigation diversion replacements, levee setbacks and relocated infrastructure.

FLO-2D Modeling, Rio Grande from Caballo Dam to American Dam; USACE, Albuquerque District; New Mexico and Texas (2009)
Principal Engineer and Project Manager for a study of geomorphic processes and sediment transport to assist the USACE and the IBWC to evaluate long-term river management alternatives for the 150-mile long Canalization reach of the Rio Grande from Caballo Dam to American Dam. Conducted extensive field work of the Rio Grande and tributary arroyos and developed estimates of sediment yield to the river. Responsible for channel stability analyses and evaluation of restoration potential to restore healthy riparian vegetation and improved wildlife habitat.

Upper Rio Grande Water Operations (URGWOPS) Review and EIS Technical Team; USACE, Albuquerque District; Upper Rio Grande, NM (2008)
Principal Engineer and Project Manager for various projects for the Albuquerque District of the USACE and the New Mexico Interstate Stream Commission (NMISC) for the Upper Rio Grande Water Operations Review and Environmental Impact Statement. Responsibilities included serving as NMISC's representative on the River Morphology Technical Team, completion of sediment continuity and bank erosion potential analyses, and assistance to the other technical teams in applying the results to assess the relative merits of a range of alternatives associated with the operation of the upstream reservoir system.

Sediment and Erosion Design Guide; Southern Sandoval County Arroyo Flood Control Authority; Rio Rancho, NM (2011)
Project Manager and hydraulic engineer for developing a Sediment and Erosion Design Guide for the Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA) that is intended to inform future land development within the SSCAFCA area of responsibility. Responsible for developing the suite of engineering analyses (hydrologic, hydraulic and sediment transport) that are integrated with geomorphic assessments to inform the development engineering and regulatory communities on selecting appropriate measures to deal with flooding and erosion problems while maintaining channels in as natural state as possible. Taught a 2-day short course on the Design Guide for SSCAFCA.

TETRA TECH

David Pizzi, P.E., CFM

Hydraulic Engineer/Fluvial Geomorphologist

Mr. Pizzi manages and leads technical analyses for a range of engineering and planning projects dependent on hydraulics, erosion and sedimentation, fluvial geomorphology, and hydrology. He has a broad base of experience working for both private and government clients (local, state, and federal) in a variety of climatic and geologic settings throughout the U.S., including limited international experience. His primary expertise is evaluating how changes in the delivery of water and sediment from contributing watersheds impact the hydraulic, geomorphic, and ecologic conditions of rivers and reservoirs. Mr. Pizzi specializes in field reconnaissance and the application of numerical models to represent these watershed processes and associated responses to the receiving waterbodies. He is most familiar with the following software: HEC-FFA/SSP, PeakFQ, HEC-DSS, HEC-1/HMS, HEC-ResSim, HEC-2/RAS, HEC-FDA, SAM/SAMwin, and HEC-6/6T. Additionally, he uses a variety of methods of field data collection, including hydrographic surveys, geomorphic analyses, sediment sampling (bed load, suspended load, and bed material), flow measurements, and habitat evaluations. Mr. Pizzi's typical project roles include: project management (including managing schedule, staffing, and budget), coordination and execution of field data collection; selection, setup, calibration, and validation of models; statistical hydrologic analyses; channel and reservoir routing; open channel, culvert, and bridge hydraulics; levee and floodplain analyses; estimating watershed sediment yield; scour studies; reservoir sedimentation; channel stability assessments; long-term general degradation in channels; developing plans for structural management/restoration alternatives; producing construction-cost estimates; preparation of documentation and presentations; and, client coordination.

EDUCATION

MS, Civil Engineering (hydraulics), Colorado State University (2002)

BS, Civil Engineering (water resources), University of Maryland (2000)

REGISTRATION/CERTIFICATION

Professional Engineer, NC, License No. 032064 (2006)

Professional Engineer, CO, License No. 0046807 (2012)

Professional Engineer, NM, License No. 21452 (2013)

Certified Floodplain Manager, License No. US-15-08635 (2015)

PROFESSIONAL AFFILIATION

Member of American Society of Civil Engineers (ASCE)

Member of American Geophysical Union (AGU)

Member of American Water Resources Association (AWRA)

Member of Association of State Floodplain Managers (ASFPM)

Member of Colorado Association of Stormwater and Floodplain Managers (CASFM)

YEARS OF EXPERIENCE

17 Years

YEARS WITH TETRA TECH

17 Years

OFFICE LOCATION

Fort Collins, CO

AREAS OF EXPERTISE

Hydraulics

Erosion and Sedimentation

Fluvial Geomorphology

Hydrology

PROJECT EXPERIENCE

Technical Support for Application of HEC Software; USACE, Hydrologic Engineering Center; Davis, CA (ongoing).

Mr. Pizzi was the initial project manager and lead investigator in a partnership with the USACE-IWR's HEC for testing and development of sediment transport routines in HEC-RAS. The partnership is the only contract for non-USACE support to the HEC-RAS Development Team for sediment transport capabilities in the software. Because of this contract, Mr. Pizzi led the development, testing, and application of the first large-scale (135 river miles of the mainstem and 22 river miles of tributaries) simulation using the unsteady-flow sediment routing capabilities. The HEC-RAS Development Team was so pleased with the support Tetra Tech has provided, that they exercised the first option on the contract to allow for continued partnering.

Geomorphic and Hydrologic Analyses of the Rio San Jose Watershed through the Pueblo of Acoma; USACE Albuquerque District; Cibola County, NM (2017).

Provided technical guidance and reviewed geomorphic, hydrologic, hydraulic, and sediment transport analyses as part of a larger-scale watershed assessment the USACE is conducting for the Pueblo. Participated in field reconnaissance to

observe existing geomorphic conditions of the Rio San Jose, and used observations to estimate expected future channel and floodplain conditions. Provided technical reviews of the hydrologic analyses, including (1) flood frequency analyses using PeakFQ and HEC-SSP to apply Bulletin 17B and 17C guidelines, and (2) HEC-HMS models calibrated to historical coupled observations of precipitation (NEXRAD) and runoff (USGS), and application of these models to simulate N-year runoff hydrographs from NOAA Atlas 14 point precipitation depths. Provided QC reviews of development and application of HEC-RAS (1-D and 2-D, unsteady-flow) model to identify inundation extents along the Rio San Jose through the Pueblo. Reviewed equilibrium slope analysis used to evaluate future geomorphic conditions of the Rio San Jose.

Post-Wildfire Floodplain Mapping of Whitewater Creek; USACE Albuquerque District, Catron County, NM (2016).
Provided independent technical review of hydrologic and hydraulic analyses of Whitewater Creek to assess potential flood risks following the Whitewater Baldy wildfire that burned the watershed in 2012. HEC-HMS was used to simulate pre-wildfire runoff hydrographs, and the model was calibrated using Bulletin 17B flood frequency analyses of adjacent gages, regional regression estimates, and coupled observations of rainfall (NEXRAD) and runoff (USGS gaging station). The calibrated model was used to simulate post-wildfire runoff hydrographs. A hydraulic model developed using HEC-RAS was used to simulate hydraulic conditions, specifically floodplain inundation extents and water-surface profiles, for the various peak flows. Following acceptance of these analyses, participated in a 2-day geomorphic reconnaissance of a portion of Whitewater Creek and major tributaries to assess potential post-fire sediment and debris loading, originating from both depositional features and landslides.

Hydrologic Analysis of the Rio Grande and Adjacent Tributaries through the Pueblo of San Felipe; USACE Albuquerque District; Sandoval County, NM (2015).
Carried out a technical review of hydrologic models and hydrologic analyses to develop flood frequencies and peak flow rates for several tributaries that flow across Pueblo lands into the Rio Grande. Reviewed HEC-HMS model setup (both for NEXRAD-driven precipitation and point precipitation depths derived from NOAA Atlas 14), calibration, and results for seven arroyos. Reviewed setup and results of Rational Method models for smaller, steeply sloping local drainages directly adjacent to the Pueblo Village. Reviewed flood frequency analysis of USGS gaging station measurements along the Rio Grande, including regulated mainstem flows, unregulated local flows, and combined flows. Provided technical guidance on statistical bases underpinning the combined probability analyses.

Middle Rio Grande and Tributaries Sediment Yield and Delivery Study; USACE, Albuquerque District; Middle Rio Grande, NM (2012).
Performed hydrologic, hydraulic, sediment transport, and geomorphic analyses of selected tributaries to the Middle Rio Grande to characterize sediment yield and delivery to the Rio Grande. Reviewed screening of approximately 130 tributaries to select 15 for detailed study; results from these studies were used to develop regression equations to estimate for the non-modeled tributaries sediment yield as a function of drainage area. Conducted the following components of the detailed studies: performed quality control reviews of topographic surveys and bed material samples; developed and calibrated HEC-HMS models to produce N-year flood event hydrographs; compiled and tested HEC-RAS hydraulic models of the tributary channels; calculated reach-averaged hydraulics for use in calculating bed material transport capacities for multiple transport functions; applied SAMwin and proprietary software to calculate bed material transport capacities; used the MUSLE to estimate wash loads; integrated sediment rating curves over flood hydrographs to estimate flood event bed material yields and mean annual yields; fit linear regression equations to results and calculated prediction intervals; prepared histograms to relate sediment delivery to sediment yield so delivery could be estimated from the yield estimates and uncertainty associated with the delivery estimates could be quantified. Prepared report, including figures and appendices.

TETRA TECH

Miles Yaw, PE

Staff Engineer

Mr. Yaw is a hydraulic engineer whose principal areas of expertise are river mechanics, hydraulic engineering, and sediment transport modeling. He has extensive professional experience in developing one-dimensional and two-dimensional hydraulic and sediment transport models, as well as three-dimensional hydraulic models, physical hydraulic models, and hydrologic models. His experience includes numerous fixed-boundary and mobile boundary hydraulic models, the design and physical model testing of a bottomless culvert technology, hydraulic performance analysis, data management with geographic information systems (GIS) and computer-aided design (CAD) software, and field data collection including water quality parameters, topographic and bathymetric surveying, and sediment sampling. Mr. Yaw has experience using numerous industry standard software applications, including HEC-RAS, HEC-HMS, HEC-6T, SRH2D, SMS, SAM ArcGIS, Matlab, Python, and Autodesk Civil 3D.

EDUCATION

MS, Civil Engineering, Colorado State University (2014)

BS, Civil Engineering, Washington State University (2012)

REGISTRATION/CERTIFICATION

Professional Engineer, CO (2018), License No. 54380

YEARS OF EXPERIENCE

6 Years

YEARS WITH TETRA TECH

4 Years

OFFICE LOCATION

Fort Collins, CO

AREAS OF EXPERTISE

Open Channel Hydraulics
River Mechanics
Hydraulic Engineering
Sediment Modeling
Sediment Sampling
Hydrographic Surveying
Floodplain Modeling
2D Modeling
Geomorphic Analysis

PROJECT EXPERIENCE

Testing and development of HEC-RAS 5.x.x Sediment Routines, USACE, CA (Ongoing)

Mr. Yaw is currently Tetra Tech's project manager and principal investigator on a formal contract with USACE-IWR HEC for testing and development of sediment transport routines in HEC-RAS v 5.0 and later. The testing contract is the only contract for external development support of HEC-RAS. In support of various projects, Mr. Yaw has assisted in beta testing and troubleshooting of numerous sediment transport routines in HEC-RAS 5.0 and later, including Exner 5, Exner 7, Toffaleti, Meyer-Peter and Müller, unsteady sediment transport, sediment splits at junctions, and several mid-simulation geometric editing routines. Mr. Yaw was responsible for the implementation and documentation of a Rouse number based transport limiter in the Toffaleti sediment transport function.

Rio Grande and Tributaries Numerical Sediment Routing Modeling Study; USACE; Middle Rio Grande, NM (Ongoing)

Mr. Yaw is currently the project engineer responsible for development, calibration, validation, analysis, and reporting of several one-dimensional HEC-RAS sediment routing models of the Middle Rio Grande (MRG). The purpose of the project is to evaluate the geomorphology of the MRG from Cochiti Dam to Elephant Butte Reservoir under fourteen different scenarios over 37 years, including the existing (baseline conditions), various tributary loading scenarios, and diversion dam removal scenarios. This study will provide a basis for understanding the interactions of geomorphic influences on the sediment balance of the MRG, including sediment delivery to the downstream reservoir. This study also required the collection and analysis of 133 bed material samples, including Wolman pebble counts of the armor layer, and surface and subsurface volumetric samples.

Milton-Seaman Reservoir Expansion Environmental Impact Study; City of Greeley, CO (Ongoing)

Mr. Yaw is currently the hydraulic engineer responsible for development of seven local HEC-RAS sediment routing models of the Cache la Poudre River covering small reaches of the river from the canyon mouth to the confluence with the South Platte River. The models are being used to evaluate long-term differential effects of various hydrologic alternatives resulting from the expansion of the Milton-Seaman Reservoir.

Bed Evolution Modeling of the Susitna River; Alaska Energy Authority, AK (2017)
In support of the Susitna River Geomorphology Study, Mr. Yaw was responsible for updating the Proof-of-Concept HEC-RAS sediment routing models for functionality in simulating unsteady sediment transport through split-flow reaches. The model was used for evaluating long term trends in bed evolution and sediment transport from the proposed dam site to the three-rivers confluence approximately 95 miles downstream.

Bedload and Suspended Load Sampling; California Department of Water Resources; San Joaquin River, CA (2017)
During the January 2017 flooding of the San Joaquin River near Fresno, CA, Mr. Yaw assisted in collecting measurements of suspended and bedload sediment discharge at three critical riffles immediately downstream from Friant Dam during peak flood releases. The sampling effort was based from a cataraft and required deployment of tensioned high lines across the river under challenging swiftwater conditions. Field measurement of the flood discharge was also collected by Acoustic Doppler Current Profiler (ADCP).

Ideker Farms v. United States Expert Witness Support; USDOJ, Missouri River, KS, MO, NE, IA, SD (2016)
Mr. Yaw was the hydraulic engineer responsible for the calibration, validation, and scenario simulation and analysis of the Lower Missouri River HEC-RAS sediment routing model from Gavins Point Dam to Leavenworth, KS, simulating 415 river miles. The sediment simulations evaluated the enormously complex interactions of commercial dredging, side channels, control structures, tributaries, in-river disposal of overbank sediments, bedforms, and bank erosion. Mr. Yaw also supported the geomorphic evaluation of the river, including stage and bed trends, and channel capacity.

Eastside Bypass Sediment Transport Modeling; California Department of Water Resources, San Joaquin River, CA (2015-2017)
Mr. Yaw was responsible for development of a mobile-boundary hydraulic model (HEC-6T) of the Eastside Bypass of the San Joaquin River near Merced, CA. The model was developed to assess the effect of the sediment balance on long term trends in channel capacity. Mr. Yaw also provided technical review and debugging assistance to the effort of converting the HEC-6T model to HEC-RAS v. 5.0. This included updating the model to include consideration of subsidence effects on the sediment transport balance and long-term channel capacity of the eastside bypass.

Platte River Recovery Implementation Program; PRRIP; Platte River, NE (2012-2016)
Mr. Yaw was responsible for geomorphic data collection, sediment sampling, and statistical data analysis of a suite of morphological and vegetative parameters. The purpose of the project is to monitor, document, and analyze trends in channel geomorphology parameters including channel shape (cross section), channel plan form, channel degradation or aggradation, grain size, and sediment loads. During the five-year duration of the project, the project required collection and analysis of 1,125 bed material and 125 bar material volumetric samples. Forty-five suspended sediment discharge samples and 54 bedload sediment discharge samples were collected and used to develop sediment discharge rating curves at five locations. Mr. Yaw was also responsible for directing numerous field geomorphic and vegetation surveys, consisting of crews of up to seven staff.

PAPERS AND PRESENTATIONS

- Sediment Routing Study and Impacts Analysis of USACE Management of the Missouri River, 1994-2004. Fourth Federal Interagency Sedimentation Conference, 2019. *Pending*.
- Middle Rio Grande and Tributaries Numerical Sediment Routing Study, Cochiti Dam to Elephant Butte Reservoir. Fourth Federal Interagency Sedimentation Conference, 2019. *Pending*.
- Design and Physical Model Testing of a Bottomless Baffled Culvert; M. Yaw and S. Aston; International Conference on Engineering and Ecohydrology for Fish Passage (June 2014)

TETRA TECH

Susan Cundiff, PE

Civil Engineer

Ms. Cundiff is experienced in the areas of field data collection, computer modeling, analysis, and design for a variety of water-resource and civil engineering projects as well as extensive experience in the development and analysis of one-dimensional hydraulic models (specifically with U.S. Army Corps of Engineers programs HEC-2, HEC-RAS and HEC-GeoRAS). Ms. Cundiff is also experienced in the areas of hydrologic analysis (HEC-Geo HMS), fine-sediment yield analysis (particularly on high-yield watersheds of the arid southwest), and sediment-transport analysis (including incipient motion and sediment continuity), and skilled in the techniques of mapping and management of data in conjunction with Geographical Information Systems (GIS; especially ArcGIS) and computer-aided drafting (CADD; specifically Bentley MicroStation and InRoads Site). Her field data collection experience includes sediment sampling, geomorphic mapping, topographic and bathymetric surveys (conventional and GPS), water-quality sampling and stream gaging (Marsh McBirney and ADCP).

EDUCATION

BS, Food, Agricultural, and Biological Engineering, Ohio State University (2005)

REGISTRATION/CERTIFICATION

Professional Engineer, Civil, CO, License No. 0045327 (2011)

Certified Floodplain Manager License No. US-17-09983 (2017)

PROFESSIONAL AFFILIATION

American Society of Civil Engineers, Member

American Association of Stormwater and Floodplain Managers, Member

Colorado Association of Stormwater and Floodplain Managers, Member

YEARS OF EXPERIENCE

12 Years

YEARS WITH TETRA TECH

12 Years

OFFICE LOCATION

Fort Collins, CO

AREAS OF EXPERTISE

Hydrologic and Sediment Transport

Hydrologic and Hydraulic Modeling

Floodplain Mapping and Management, FEMA, FIS

Water Resources

GIS

Hydrologic Analysis

Open Channel Hydraulics

1D Hydraulic Modeling

2D Hydraulic Modeling

3D Hydraulic Modeling

Hydrographic Surveying

PROJECT EXPERIENCE

Floodplain Inundation Analysis, Hawthorne Army Depot; USACE, Mobile District, NV (2018)

Staff Engineer responsible for review of HEC-HMS hydrological model development and analysis for inundation mapping of the floodplains in the army depot. The HEC-HMS model was developed to estimate runoff from the 100- and 500-yr precipitation events across the multiple contributing watershed. Inundation mapping is for planning level efforts of flood hazard mitigation and effective management of natural resources.

Rio Ruidoso Watershed Restoration; Parametrix, Ruidoso, NM (2013)

Project engineer responsible for hydrologic modeling and sediment loads using HEC-HMS, MUSLE equations and fire modeling results to determine hydrologic response from potential burn scenarios. The HEC-HMS model was developed from NOAA Atlas 14 data for the 2-, 5-, 10-, 20-, and 100-year storms. Ms. Cundiff modeled the hydrologic response of the watershed to silvicultural treatments.

Hydrologic Analysis of the August 2013 storm near Mentone, California. 2018.

Staff Engineer to perform hydrologic analysis to assess the causes of failure of a 72” pipeline that was being constructed across the Santa Ana River. Responsible for the review and execution of an HEC-HMS rainfall-runoff model to quantify the hydrographs associated with the storm that caused the failure, as well as the various recurrence interval rainstorm events that could occur during the construction window. The rainfall-runoff model was developed by delineating the watershed using HEC-GeoHMS, developing model input parameters from the available topographic, landuse and vegetation data, and applying appropriate precipitation data based on analysis of NEXRAD-based Level III grid files.

French Gulch CLOMR, Breckenridge, CO, 2016
Ms. Cundiff prepared the hydrologic and hydraulic analysis to support the CLOMR submittals to FEMA for French Gulch associated with the Lincoln Park subdivision improvements. The river modifications include channel grading, one vehicular bridge crossing, and three pedestrian bridge crossings. A hydrologic model was designed to size the retention basin in the Lincoln Park subdivision.

Solomon Project Closure Plan; Fortescue Metals Group, Western Australia (2012)
Project engineer responsible for hydrologic and hydraulic analysis of the design event for erosional stability of the breach through a tailings storage facility embankment. Ms. Cundiff was responsible for developing the peak runoff rates from the design event using the rational method, RORB and HEC-HMS. She also was responsible for sediment yield calculations and for erosional stability calculations for the embankments and waste rock dumps.

Cornet Creek Drainage Maintenance and Flood Mitigation Study, Telluride, Colorado, (2009)
Staff Engineer for development of an appropriate channel design to improve capacity without inducing further channel instability along severely encroached portions of Cornet Creek located on the alluvial fan within the Town of Telluride, Colorado. Project responsibilities included hydrologic analysis and modeling (HEC-HMS), evaluation of debris flow potential, hydraulic (HEC-RAS) modeling, sediment-transport and channel-stability analyses, design of project features that included channel dimensions, gradient, and alignment, bridge replacement, bank protection, and assistance to the Town of Telluride during the public review process. The project was performed for the Town of Telluride, Colorado.

San Joaquin River Restoration Project; California Department of Water Resources, CA (ongoing)
Staff engineer responsible for channel capacity and subsidence impact studies that are imperative to the restoration program. She also has been involved with sediment transport studies and 2D model development and design of structures necessary for fish passage related to habitat restoration.

Drainage Analysis &Civil Design Services for Fountain Creek at Hanson Trailhead, Fountain, CO, Ongoing
Project Engineer responsible for preparing the Floodplain Development Permit to be submitted to El Paso County, CO as a part of the restoration of Fountain Creek at the Hanson Trailhead. The project includes the assessment of the creek's hydrology, hydraulics, geomorphology and ecology to develop a holistic and resilient restoration design in support of the replacement of a pedestrian bridge. Project objectives include a design that is resilient to future flooding events, obtaining a zero rise in the 100-year base flood elevation, and staying within FEMA funding limits of the Public Assistance-Alternative Procedures grant.

North I-25 Express Lanes-Johnstown to Fort Collins Design/Build Project, Colorado, Ongoing
Project Engineer for a design-build project to widen a segment of Interstate 25 between Johnstown and Fort Collins, Colorado, for the Colorado Department of Transportation. Responsibilities include permitting and design support for four major drainage crossings. The project requires stakeholder coordination between private property owners, city, county, state, and FEMA representatives. Hydraulic modeling and floodplain mapping for design alternatives were developed as part of the project. Permitting responsibilities include development of numerous No-Rise Certifications and/or CLOMR applications to FEMA for the final crossing designs in conjunction with the National Flood Insurance program (NFIP).

Don Felipe Watershed Drainage Master Plan; Bohannan Houston; Albuquerque, NM (2011)
Project Engineer for a sediment-continuity and erosion setback analysis to develop a HEC-RAS model of Pajarito Arroyo to obtain the hydraulic parameters required for assessing stability of Pajarito Arroyo under existing and developed conditions, and estimate the annualized quantity of sediment delivered to the flood pool of Don Felipe Dam.

TETRA TECH

Theodore R. Bender, PE

Hydraulic Engineer

Mr. Bender joined the Tetra Tech team in Fort Collins in 2012 after working for the State of Colorado at the Colorado State University Engineering Research center. At Tetra Tech, Mr. Bender's primary areas of expertise are in one-dimensional (1-D) and two-dimensional (2-D) hydraulics, hydrology, sediment transport, field data collection, and construction oversight and management. His field data collection experience includes topographic and bathymetric surveys using RTK GPS and boat-mounted echosounders, as well as stream flow measurements. He is a whitewater rescue technician and is proficient in multiple different watercrafts and the safety required when working in the riverine environment. Mr. Bender has applied his engineering experience in support of a wide variety of projects, including flood damage assessments, hydrologic investigations, channel and diversion structure design, and culvert crossing design and scour mitigation.

Mr. Bender is a former U.S. Navy Civil Engineer Corps Officer. He has experience with government contracting as well as contingency engineering, and construction management both in the United States and abroad while serving in the United States Navy. Most recently, Mr. Bender led Tetra Tech's construction oversight services for two separate channel and floodplain restoration projects along the Little Thompson River in Northern Colorado to mitigate damages from the 2013 floods and to improve resiliency against future. These projects were sponsored by the NRCS EWP program, and required significant collaboration with Program personnel and the stakeholders. His specific experience includes:

- Hydrologic analyses: HEC-HMS modeling, EPA SWMM and CUHP analyses, flow duration and flood-frequency analyses using HEC-SSP.
- 2-D Hydraulic modeling: Development, calibration, review, and interpretation of using HEC-RAS 2-D, FLO-2-D, and SRH-2-D.
- 1-D Hydraulic modeling: Development, calibration, interpretation, and sediment-transport analyses.
- Construction oversight and management to oversee the implementation of stream rehabilitation design
- Field data collection: stream gaging, sediment sampling, and topographic and bathymetric surveying.
- Riverine aggradation and degradation analyses
- Watershed delineation and analyses using HEC-geoHMS to develop detailed watershed characteristics.
- Proficiency in numerous industry-standard software applications including ArcGIS, AutoCAD, SMS, CUHP, EPA-SWMM, Grapher, and Sketchup.

EDUCATION

MS, Civil Engineering (Hydraulics), Colorado State University (2011)

BS, Civil Engineering, University of Kansas (2005)

REGISTRATION/CERTIFICATION

Professional Engineer, Colorado

PROFESSIONAL AFFILIATION

American Society of Civil Engineers (ASCE)

Society of American Military Engineers (SAME)

YEARS OF EXPERIENCE

13 Years

YEARS WITH TETRA TECH

6 Years

OFFICE LOCATION

Fort Collins, CO

AREAS OF EXPERTISE

Hydrologic Modeling

Construction Oversight

Construction Management

Open Channel Hydraulics

Floodplain Inundation Analyses

River Mechanics

Sediment Transport

1-D Hydraulic Modeling

2-D Hydraulic Modeling

Geographical Information Systems

Hydrographic Surveying

Field Data Collection

White Water Rescue Certified

CPR Certified

PROJECT EXPERIENCE

Harvard Gulch, Denver, CO
Combined 1-D/2-D HEC-RAS Hydraulic Modeling. This project was to support the City and County of Denver, the Urban Drainage and Flood Control District, and the U.S. Army Corps of Engineers (USACE) with a Feasibility Study that included the identification of potential flood risk management alternatives such as channel improvements and detention storage in the Harvard Gulch watershed. After a field reconnaissance survey, a detailed delineation of the urban watersheds contributing flow to the Harvard Gulch was done using HECgeo-HMS. CUHP and EPA-SWMM analyses were completed to develop storm hydrographs over a range of events. These storm hydrographs were used as input to the coupled 1-D/2-D HEC-RAS hydraulic model to develop detailed flood inundation mapping of the urban area.

Hawthorne Army Depot, NV
Hydrologic modeling and 2-D HEC-RAS Hydraulic Modeling. This project was in support of the Hawthorne Army Depot's (HWAD) request for a planning level floodplain inundation analysis for their entire installation. The HWAD installation, located in a high desert valley, encompasses 147,236 acres of both mountainous and flat valley terrain with elevations that range from 3,900 feet to 11,329 feet. After a field reconnaissance site visit, a HEC-HMS model was developed to estimate runoff from the 100- and 500-yr precipitation events across the multiple contributing watershed. The flows were input into a HEC-RAS 2-D model to predict the 100- and 500-yr inundated depths across the base.

Sky Hotel Mudflow, Aspen, CO
CUHP Hydrologic analyses. This study was in support the mudflow analysis prepared for the Sky Hotel in Aspen, Colorado. The proposed project included a major renovation of the existing structure which would add additional lodging and affordable housing units. A FLO-2D mudflow model was developed to determine the impacts of the proposed development on mudflow depths at offsite properties and within the proposed development. To support the mudflow modeling, clearwater hydrographs were developed using CUHP for the 100-yr event for 12 sub-basins. NOAA Atlas 14 rainfall depths were used in conjunction with sub-basin parameters developed using GIS.

DeTilla Gulch Solar Energy Zone, Saguache County, CO
Hydrologic analyses and 2-D hydraulic modeling. Field work was done to collect topographic survey data for the Bureau of Land Management (BLM) solar energy array site located in Saguache County, Colorado. HECgeo-HMS was used to delineate watersheds upstream of 13 surveyed culverts. Developed estimates of their hydraulic capacities to compare to HEC-HMS output. Developed two HEC-RAS models, downstream of the two largest culverts, to estimate velocities and shear stresses to complete an incipient motion estimate for sampled bed material. Developed FLO-2D model with hydrologic inputs from both rainfall over the watershed as well as discharge from culverts developed using HEC-HMS to determine 100-yr inundation zone for both pre- and post-installation of solar energy array.

Neosho River, Miami, OK
Combined 1-D/2-D Hydraulic Modeling. Developed a combined 1-D/2-D HEC-RAS model of the river and floodplain of the Neosho River in the vicinity of Miami, OK. A detailed field survey was conducted to collect updated bathymetric data for the Neosho River. The data was merged into overbank LiDAR data to create an updated terrain used as the basis for the hydraulic model. The model was used to evaluating the backwater effects of the Pensacola Dam on the extent, magnitude, and duration of flooding in and around Miami, OK under a range of floods and lake levels. The model incorporated multiple 1-D reaches and 2-D areas to capture the hydraulic effects of bridges as well as overbank flooding. Results included flow depths, velocities, and inundated areas under various flood event.

SAMUEL ROBERTSON, P.E., CFM

Senior Project Manager

Sam Robertson's professional history includes work on stormwater, wastewater, and potable water related projects, performing as project manager on many of the projects listed below. His experience on stormwater and drainage improvement projects include hydraulic and hydrologic modeling analysis, stormwater and utility master plans, drainage improvements, drainage site designs, constructed wetlands, regional detention, development in floodplain reviews, and FEMA floodplain mapping. His experience on wastewater collection system projects includes large diameter relief sewers, septic tank elimination projects, SSO elimination projects, CSO consolidation projects, lift station replacements, force main design, infiltration and inflow studies.

EDUCATION

Bachelor of Science, Civil Engineering, Purdue University

Associate of Science, Civil Engineering, Vincennes University

YEARS OF EXPERIENCE

16

REGISTRATIONS

Professional Engineer
State of Indiana

AFFILIATIONS

ACEC IDNR Floodplain Committee Member

Water Environmental Federation

Indiana Floodplain and Stormwater Management Association

CERTIFICATIONS

Certified Floodplain Manager
State of Indiana

PROJECT EXPERIENCE

Indianapolis Stormwater Program Management
City of Indianapolis Department of Public Works – Indianapolis, IN

Sam acted as the senior engineer in the City's stormwater program as part of an on-call contract and performed capital program management and inputs, design management duties, drainage investigations, internal improvement project reviews, stormwater credits reviews and public outreach. Design management projects included stormwater projects incorporating green infrastructure, such as pervious pavers, rain gardens, and other best management practices.

Cool Creek / Wilson Recreational Wetland
Hamilton County Drainage Board – Hamilton County, IN

Sam managed and performed work tasks on this project, which included the design of the constructed wetland which stemmed from a floodplain property evaluation study for the Hamilton County Drainage Board. The property was donated to the Hamilton County Drainage Board by a developer that had no use for the property given it is located in the floodplain of Cool Creek. Sam analyzed various alternative uses in its preliminary evaluation and recommended the recreational wetland area. The study led to final design and construction of the project. The wetland area and regional detention will increase floodplain storage, habitat, water quality, and serve as a recreational and education area for the public.

Hinkle Creek Watershed Master Plan
Hamilton County Drainage Board – Hamilton County, IN

Sam was the lead project engineer and managed many of the work tasks for the Hinkle Creek Watershed Master Plan. The Hinkle Creek watershed is a 21 square mile watershed in northern Hamilton County that drains to a large recreational reservoir, Morse Reservoir. The master plan included summarizing existing data, public meetings, water quality, hydrologic and hydraulic computer modeling, and floodplain delineation. FEMA flood hazard mapping was updated as part of the project. The watershed master plan documented the existing watershed health, problems, and future stormwater planning recommendations.

Stormwater Master Plan Update
City of Decatur – Decatur, IL

Sam was the Lead Project Engineer and Manager for this project, which updated the Stormwater Master Plan (SMP) for the city and evaluated revenue sources for Stormwater funding. Forty-six (46) drainage problems throughout the city were identified, categorized, and prioritized which totaled an estimated $57 million in capital improvements to alleviate the drainage problems. A funding supplement report which documented the need for a Stormwater utility and provided potential sources of funding was created. Estimates were made for Stormwater revenue based on a variety of different approaches including the selected approach equivalent residential units or ERUs.

Abbreviated Resume

TETRA TECH
Surface Water Group

Geomorphic and Sedimentation Evaluation of North Sulphur River and Tributaries for the Lake Ralph Hall Water Supply Project, Texas

PROJECT OWNER	POINT OF CONTACT NAME	POINT OF CONTACT TELEPHONE NUMBER
Upper Trinity Regional Water District	Mr. Larry Patterson, PE, Upper Trinity Regional Water District Mr. John Levitt, PE, Chiang, Patel & Yerby, Inc.	972-219-1228 817-994-0582

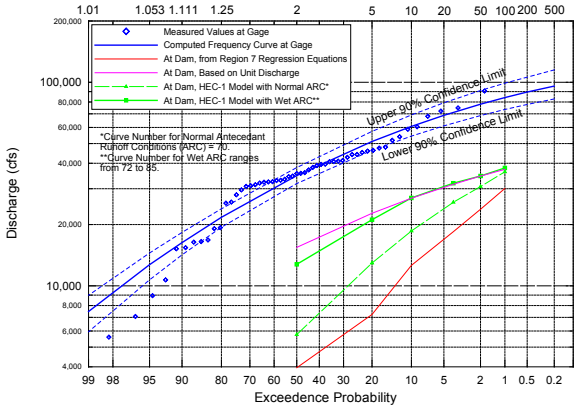
DISCRIPTION OF PROJECT

Tetra Tech (formerly Mussetter Engineering, Inc., Tt-MEI) was retained by the Upper Trinity Regional Water District (UTRWD) under a subcontract with Chiang, Patel & Yerby, Inc. (CPY) to conduct geomorphic, sediment yield and sediment transport analyses of the North Sulphur River and its 100-square-mile watershed upstream of the proposed Lake Ralph Hall dam site. The objective of the Tt-MEI study was to quantify sediment delivery to the 163,000 ac-ft water supply reservoir over the 50-year economic life of the project. Additionally, Tt-MEI was tasked with: (1) evaluating the downstream effects of the dam on channel stability and flow capacity, (2) assessing the potential for reducing or managing the upstream sediment supply to the reservoir and, (3) assessing the future conditions in the North Sulphur River and its tributaries upstream of the dam site in the absence of the project. The North Sulphur River was channelized in the 1920s with a width of about 30 feet and a depth of about 10 feet, and currently the channel at the proposed dam site is about 300 feet wide and 40 feet deep, is incised into the underlying shale bedrock, and it contains in excess of the 100-year flood peak in-bank.

RELEVANCE TO THIS PROJECT

- Geomorphic Analysis and Data Collection
- Hydrologic Modeling and Analysis (FFA, HEC-1)
- HEC-RAS Hydraulic Modeling
- Sediment Transport Modeling
- Watershed Sediment Yield Analysis (MUSLE, EGEM)
- Microstation
- GIS and CADD

Tt-MEI conducted extensive field work that included geologic and geomorphic mapping, sediment sampling, measurements of degradation at bridges and high-water mark determination. Based on the geomorphic analyses, a modified version of the Incised Channel Evolution Model was developed for the North Sulphur River and tributaries (NSRCEM) to explain the geomorphic evolution of the deeply incised, but bedrock controlled channel, and to identify in-channel and channel margin processes and sediment sources. Bed-material supply is controlled by slaking rates of the exposed shale in the bed and banks and not hydraulic processes, and the bed material is transformed from gravel size to silts and clays during transport. Hydrologic analysis of gage records (FFA) and HEC-1 modeling was used to develop flood frequencies, flow durations, and flow volumes for subsequent sediment yield and transport modeling. HEC-RAS models were developed from 2-foot contour interval mapping of the channels and watershed for the mainstem and larger tributaries. Reach-averaged output from the HEC-RAS models and the bed material sediment gradations that were adjusted for slaking rates in the downstream direction with a specifically-developed algorithm were used to develop both supply-limited and transport-limited estimates of annual sediment delivery to the reservoir using the Meyer-Peter Müller-Einstein formulations. Computation of both supply-limited and transport limited estimates bracketed the range of potential sediment yields, even though the geomorphic analysis indicated that the channel was supply limited. Gross sediment yields were developed for the individual subbasins for sheet and rill erosion and ephemeral gully erosion with the MUSLE formulation and the Ephemeral Gully Erosion Model, respectively. Appropriate sediment delivery ratios were applied to the gross erosion rates to compute the watershed sediment yield, which was primarily wash load because of the clay-rich nature of the watershed soils.



The most conservative estimate of annual sediment yield to the reservoir was 104,000 t/yr (51-ac-ft/yr), which represents a loss of reservoir capacity of about 1.6 percent over the 50-year project life. Under worst-case conditions, the annual sediment yield is estimated to be 150,000 t/yr (74 ac-ft/yr) which would result in a loss of reservoir capacity of about 2.3 percent. Comparison of the sediment yield estimates with estimates from other sources including reservoir surveys, stream gage sediment measurements and watershed estimates indicated that the Tt-MEI estimates were conservatively high.

Because of the watershed soils and the break down of the shale, 80 percent of the sediment yield is silt and clay sized that is transported as wash load that has no morphological significance, and therefore, the project will have very little impact on the bedrock-controlled channel downstream of the dam.

Geomorphology, Sediment Transport, and Design Support for the Restoration of Plum Creek as Mitigation for the Chatfield Reservoir Reallocation Project, Denver, Colorado

PROJECT OWNER	POINT OF CONTACT NAME	POINT OF CONTACT TELEPHONE NUMBER
Chatfield Reservoir Mitigation Company	Tim Feehan, General Manager	1-855-387-4660

DISCRIPTION OF PROJECT

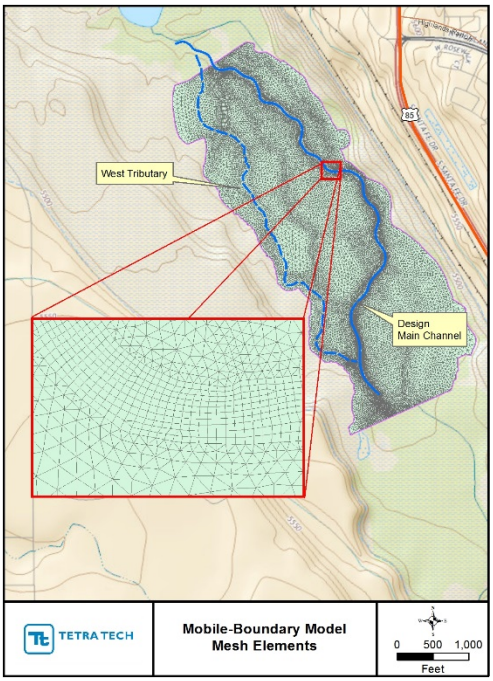
Tetra Tech Inc. was retained as a subconsultant to Muller Engineering to provide support of mitigation designs for the Chatfield Reservoir Reallocation Project by conducting geomorphic and sediment transport evaluations, and providing recommendations for the channel design of Plum Creek. The reallocation project proposes to use a portion of the reservoir's storage volume that has been converted from a flood control use to that of a water supply. The increased water storage would allow the normal pool level to rise, which would impact floodplain vegetation. A portion of the environmental mitigation plan was to restore portions of Plum Creek within Chatfield State Park.

KEY PROJECT ELEMENTS

- Hydrologic Analysis
- Geomorphic Mapping and Analysis
- Hydraulic Modeling (HEC-RAS, SRH-2D)
- Sediment Sampling and Analysis
- Sediment Transport Modeling and Analysis (SRH-2Dv3)
- Scour Analysis
- Bank Stability Analysis and Design

To address the identified tasks, Tetra Tech conducted a geomorphic reconnaissance of Plum Creek and the Plum Creek Valley, and collected bed- and bank-material samples to aid in characterizing the sediment transport capacity. Based on the field reconnaissance and review of previous investigations, Tetra Tech concluded that the portion of Plum Creek within the study area currently behaves as a valley floor alluvial fan. Upstream sediment supplies are high due to upstream erosion, and the downstream end of Plum Creek is controlled by the backwater conditions of Chatfield Reservoir.

The geomorphic and sediment transport characteristics of this portion of Plum Creek are extremely complex, with severe episodic deposition, avulsion, and re-entrenchment expected. To ensure a resilient channel design, Tetra Tech performed a series of sediment transport evaluations. Two-dimensional hydrodynamic fixed bed and mobile-boundary models (SRH-2D) were used to assess incipient motion, upstream sediment supply, and local sediment transport capacities for existing and project conditions.



Tetra Tech's assessment identified that the key aspect of the channel restoration design from a geomorphic standpoint was to address the currently low sediment supply causing incision in the lower portion of the project reach by reconnecting the upstream sediment supply (currently depositing immediately upstream of the project reach) to the channel system. It was recommended that the channel should be designed to have a sediment-transport capacity slightly greater than the existing supply to be able to convey potential future upstream supply.

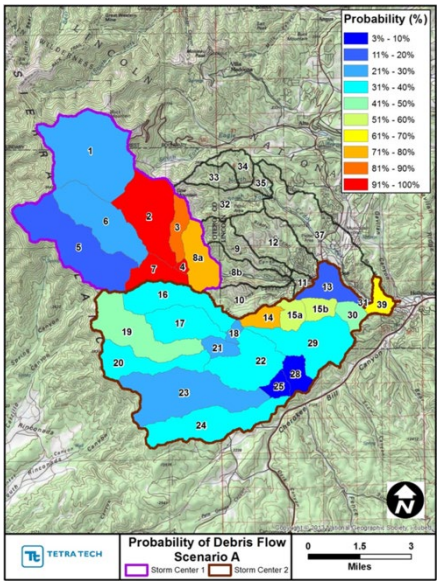
Based on the geomorphic and sediment-transport evaluations, a channel stabilization plan was developed. The channel was designed with a capacity adequate to convey upstream sediment supplies to the extent possible, while also maintaining a shallow water table to better support a wide riparian corridor, and grade control to prevent severe incision should a low upstream sediment supply condition occur.

Flood Risk Management Plan, Village of Ruidoso New Mexico (2013)

PROJECT OWNER	POINT OF CONTACT NAME	POINT OF CONTACT TELEPHONE NUMBER
Parametrix for the Village of Ruidoso, New Mexico	Kevin Halsey	360-694-5020

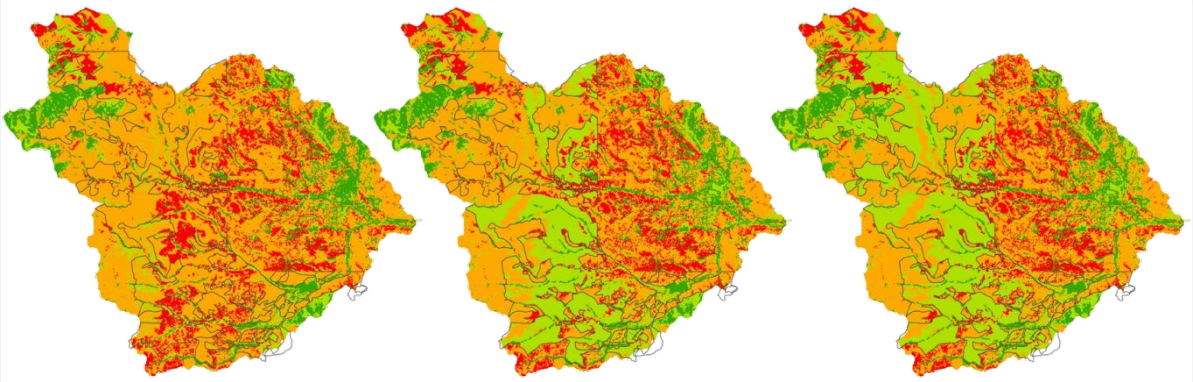
BRIEF DISCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (*include scope, size, and cost*)

Tetra Tech, as a subcontractor to Parametrix, performed a hydrologic analysis and sediment transport study to assist the prime contractor and stake holders in the development and evaluation of a fire management plan for the Village of Ruidoso under a Restoration Strategies and Payment for Ecosystems Grant. Tetra Tech's specific role in this study was to develop a hydrologic model using the USACE HEC-HMS software to quantify the post-fire flood and sedimentation risk potential. Project purpose was to assist the prime contractor (Parametrix), GeoSystems Analysis, and the project stakeholders in identifying management actions to limit the flood and sedimentation risk associated with future fires to develop a fire management plan for the Village of Ruidoso under a Restoration Strategies and Payment for Ecosystems Grant. Work consisted of:



1. A baseline hydrologic model of the watershed upstream from the Village was developed using the HEC-HMS software (USACE, 2010a) with the available topographic, watershed land use, soils and climatological data.
2. The model was executed for existing (unburned) conditions, and the model results were compared with measured hydrographs during the July 2008 storm and other large events for which adequate data were available. Adjustments were made to the input parameters, as necessary, to achieve acceptable agreement.
3. The baseline model input data were modified to reflect the effects of the management alternatives and a range of post-fire watershed conditions to estimate potential post-fire hydrographs.
4. The potential effects of the fires on sediment yield/debris loading to various parts of the watershed were estimated using the Modified Universal Soil Loss Equation (MUSLE) for the predicted hydrographs from the HEC-HMS models and for sediment bulking relationships for post-fire conditions from the literature.
5. Presentation and discussion of results with stakeholders, funding agencies, and public. Stakeholders included:
    a. Village of Ruidoso
    b. U.S. Forest Service
    c. Mescalero Apache Tribe
    d. Bureau of Indian Affairs

Results from the analysis show that if no forestry management (Scenario A) is executed, a 2-year storm after a post burn condition would result in a 23-year storm under existing conditions. If the forestry management is applied to both inside and outside the reserve area (Scenario C), then 2- and 5-year storms would result in the equivalent of 9- and 41-year existing conditions peak discharges. The analysis of the debris flow potential indicates that 26 percent of the upper watershed has a high overall debris flow hazard ranking under a post-fire result with no forestry management (Scenario A), but the high hazard drops to 5 percent for Scenario C in the upper portion of the watershed.



Soil Burn Severity Scenario A | Soil Burn Severity Scenario B | Soil Burn Severity Scenario C

Percent of Watershed

	A	B	C
Treatment Stands	13	12	12
No Burn/Scorched	9	24	31
Low	61	50	43
Moderate	17	14	13
High			

TETRA TECH

TITLE AND LOCATION (*City and State*)	YEAR COMPLETED	
San Clemente Dam Seismic Retrofit Study, River Modeling **San Clemente Dam Seismic Retrofit Study, Reservoir Modeling**	PROFESSIONAL SERVICES 2002-2008	CONSTRUCTION (*if applicable*)

PROJECT OWNER'S INFORMATION

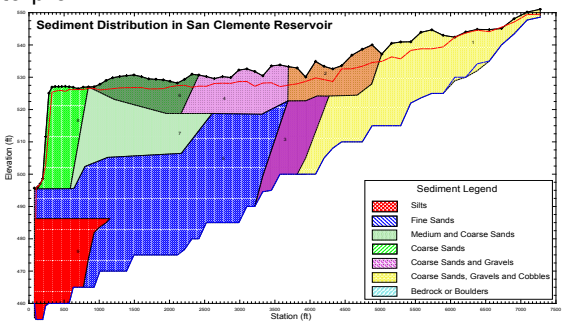
a. PROJECT OWNER	b. POINT OF CONTACT NAME	c. POINT OF CONTACT TELEPHONE NUMBER
CA Dept. of Water Resources **American Water Works Company**	Kevin Faulkenberry John Kilpatrick	916-653-5791 856-346-8200

BRIEF DESCRIPTION OF PROJECT

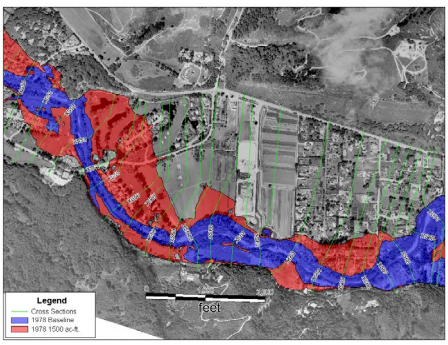
Tetra Tech, Inc. (formerly Mussetter Engineering, Inc.) (Tt-MEI) performed detailed modeling of potential dam removal/retrofit alternatives for San Clemente Dam, including flood hazard studies of the Carmel River in the approximately 18-mile reach between the dam and coast. The reservoir behind the dam is nearly filled with sediment, and release of this sediment may cause aggradation in the downstream valley, which in turn may increase the flooding potential. The purpose of the studies was to quantify the entrainment of sediment from the existing reservoir deposits under a variety of dam removal scenarios that ranged from buttressing the existing dam and providing a sluice gate to provide a suitable channel across the reservoir deposits for fish passage to complete removal of the dam. The complete dam removal scenarios included phased notching of the dam to control downstream sediment releases, excavation and removal of the deposits to the approximate pre-dam topography, and the alternative that is currently being implemented that involves isolating the bulk of the reservoir deposits in Carmel River arm of the reservoir, removing the deposits in the San Clement Creek arm and then rerouting the river into San Clemente Creek, significantly limiting the amount of sediment that could potentially be moved into the downstream river. HEC-6T modeling was performed to quantify sediment movement from the reservoir and through the downstream river, and the results were then used to assess potential geomorphic and flood capacity impact of the altered sediment load.

RELEVANCE OF THIS PROJECT

- Statistical Analysis of Gage Records
- Flood Impacts
- Sediment-Transport Modeling
- Computer Modeling (HEC-6T)
- Hydraulics
- Fluvial Geomorphology
- Environmental Restoration
- Environmental Impacts
- Reservoir Routing
- GIS CADD
- Field Data Collection



The results of the studies were used to assist the stakeholders and regulatory agencies in selecting a preferred alternative for retrofitting the dam to meet safety standards. Tt-MEI was responsible for all aspects of the analysis, including coordination of topographic mapping of the approximately 18-mile study reach, field data collection of sediment samples in both the river and reservoir, hydrologic analysis of gage records, development of hydraulic and sediment-transport models of the reservoir and river, and evaluation of the hydraulic and geomorphic implications of the model results. As part of this work, Tt-MEI worked with **Kleinfelder** to perform a subsurface investigation to characterize the existing sediment deposits.



In developing the HEC-6T model for the project, Tt-MEI worked closely with the original author of HEC6 and HEC6T to modify the computer code to more realistically simulate erosion of the delta and the river's response to high sediment loads. Tt-MEI also developed algorithms for extracting important information from the model in an efficient manner to facilitate evaluation of the results. These modifications were successfully implemented and significantly improve the utility of the model for evaluating dam removal impacts. Tt-MEI also coordinated closely with technical representatives from a variety of regulatory agencies and stakeholders, including the California Department of Water Resources, National Marine Fisheries Service, California Department of Fish and Game, U.S. Fish & Wildlife Service, Monterey Peninsula Water Management District, Monterey County Flood Control, and American Water Works Service Company. Flooding impacts associated with the project were critical to the investigation, as there are currently about 1,400 residential structures that could potentially be affected by increased water-surface elevations. Flood boundary and flood depth maps were prepared for each scenario to assist in evaluating these impacts. The study reach also contains important Steelhead and Red-legged Frog habitat, and the model results were used to evaluate potential impacts to this habitat.

Professional Fee: CDWR: $388,000
Am. Water: $508,000

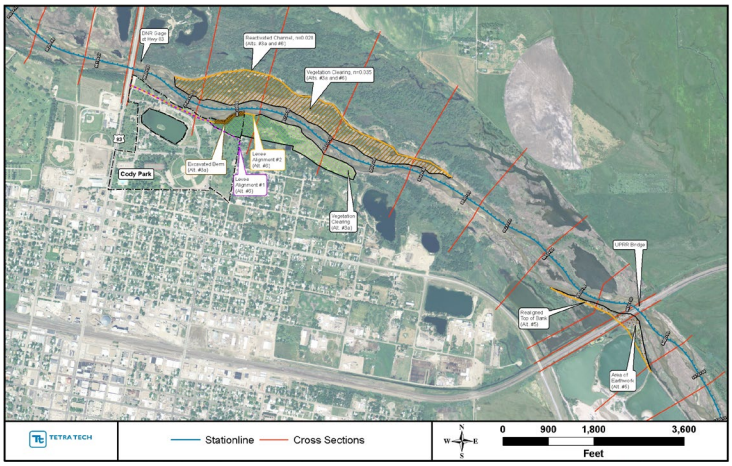
1-D Hydraulic and Sediment-transport Modeling, Platte River, Nebraska

PROJECT OWNER	POINT OF CONTACT NAME	POINT OF CONTACT TELEPHONE NUMBER
Nebraska Community Foundation and Platte River Recovery Implementation Program, Kearney, NE	Justin Brei	308-237-5728

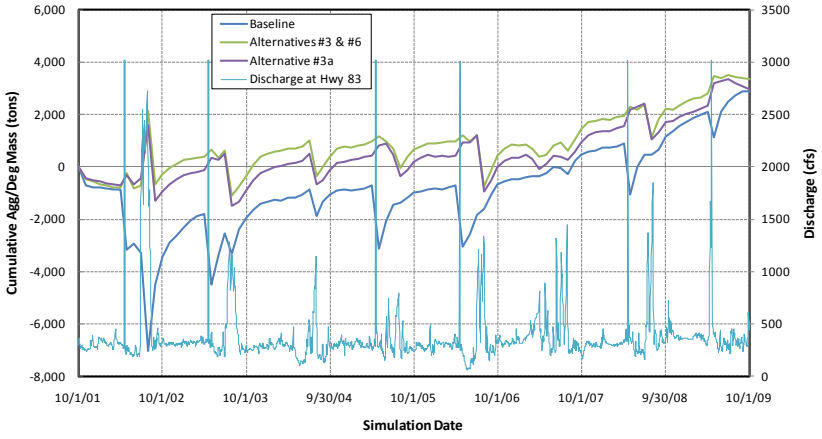
Tetra Tech, as a subconsultant to HDR, Inc., was retained by the Nebraska Community Foundation and Platte River Recovery Implementation Program (Program) to develop one-dimensional (1-D) hydraulic (HEC-RAS) and sediment-transport (HEC-6T) models of the approximately 100-mile reach of the Central Platte River between Lexington (RM 255) and Chapman (RM156), and of an approximately 10-mile reach of the North Platte in the vicinity of the North Platte. The project reaches include a braided channel system that is typified by a complex network of split flow channels. HEC-GeoRAS, in conjunction with ArcGIS, was used to develop the steady-state hydraulic models, the geometry of which was obtained from LiDAR based mapping, cross-sectional surveys and longitudinal (thalweg) surveys. The steady-state models were calibrated, to the extent practical, using gage data and surveyed water-surface elevation information. The steady-state models were converted to unsteady models to evaluate the attenuation and translation of flood hydrographs. The geometry of the steady state model served as the basis for the sediment-transport model, which also included bed material information collected by the Program at a large number of monitoring sites along the project reach. The sediment-transport model was calibrated by comparing measured aggradation/degradation trends that occurred between WY1989 and WY2002 with the results from a 12.5-year simulation of the flows that occurred during this period.

RELEVANCE OF THIS PROJECT

- Hydraulic Modeling (HEC-RAS)
- Sediment-transport Modeling
- Steady State and Unsteady Flow Modeling
- Sedimentation and Flooding Issues
- Alternative Development and Evaluation



As part of this study, Tetra Tech also evaluated a range of alternatives to improve the flood carrying capacity of the North Platte River through the City of North Platte, where the capacity has been reduced over recent decades for a variety of reasons. Of specific interest was an area identified as the “choke point”, where a series of alternate and mid-channel bars vegetated with invasive Phragmites causes significant backwater and flooding during periods of high flow. A range of hydraulic improvement and sediment management options were identified and evaluated using a version of the HEC-6T model that was converted to a HEC-RAS mobile boundary sediment-transport model for this phase of the study. The options were ranked based on the relative effectiveness at achieving a variety of specific goals, and recommendations were prepared to identify the option with the lowest cost/benefit ratio. Tetra Tech was retained directly by the Program to assist them in the evaluation of a proposed berm (the “State Channel” berm) along the floodplain of the North Platte River as part of the permitting process. Most recently, Tetra Tech updated and applied the HEC-RAS sediment-transport model to evaluate the effects of breaching the berm along the mainstem that separates the north and south channels around Jeffries Island. The results from this modeling indicate the effects would be limited to the reactivated channel below the berm and over about 0.5 miles of the main channel upstream from the berm.



Channel Maintenance Alternatives and Sediment-transport Studies for the Rio Grande Canalization Project

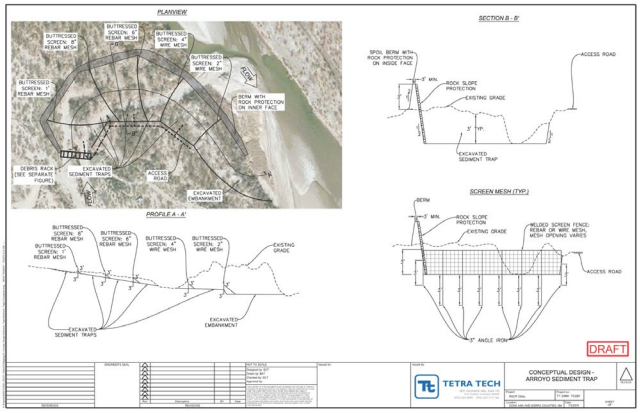
PROJECT OWNER	POINT OF CONTACT NAME	POINT OF CONTACT TELEPHONE NUMBER
International Boundary and Water Commission, US Section	Derrick O'Hara (see addl info below)	(915) 832-4795

DISCRIPTION OF PROJECT

RELEVANCE TO THIS PROJECT

- Fluvial Geomorphology
- Topographic and Bathymetric Surveys
- Hydraulic Modeling
- Sediment-transport Modeling
- Sediment Management Alternative Development
- Alternative Analysis and Scoring
- Levee Freeboard Analysis

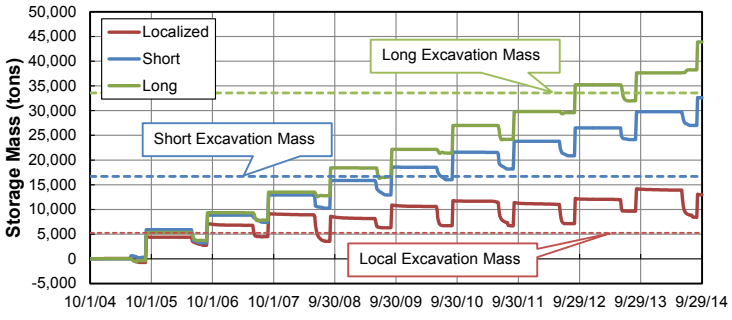
The United States Section of the International Boundary and Water Commission (USIBWC) Rio Grande Canalization Project (RGCP) is a narrow river corridor that extends 105.4 miles from Percha Dam in Sierra County, New Mexico, to American Dam in El Paso, Texas. Of the many challenges that the USIBWC faces in operating the RGCP, ongoing sediment delivery from the tributary arroyos has historically been among the most significant. Sediment deposition on the alluvial fans can result in sediment plugs, island formation, and aggradation that prevents draining of irrigation return flow that could result in increased water-surface elevations and associated impacts to levee freeboard and flood conditions. The sedimentation may also be affecting the delivery of water to U.S. stakeholders and Mexico due to reductions in channel and drain return efficiencies.



USIBWC retained Tetra Tech to perform a channel maintenance alternatives (CMAs) and sediment-transport study to specifically address issues associated with sedimentation along the RGCP. The study focused on nine representative problem locations where the sedimentation issues are negatively impacting irrigation practices and levee freeboard. A number of tasks were carried out as part of this assessment of CMAs for the RGCP that included:

- A detailed field assessment of the problem locations to assess the existing hydraulic conditions and geomorphic setting of the project reaches and to perform sediment sampling to characterize the size distribution of the bed material.
- Topographic and bathymetric cross-section surveys for purposes of updating the existing hydraulic model of the RGCP that included monumented endpoints for future monitoring purposes.

- Preparation of five CMAs at each of the problem locations that included three sediment-removal alternatives and two non-sediment-removal alternatives. Conceptual level designs for each of the alternatives were developed.
- Steady-state hydraulic (HEC-RAS) modeling of the overall RGCP under existing conditions and at the localized problem locations under existing and with-CMA conditions. The localized hydraulic modeling was used to assess the short-term impacts of the CMAs.
- Sediment-transport (HEC-RAS) modeling of the problem locations under existing and with-CMA conditions to assess the expected benefits and consequences associated with the alternatives.
- Preparation of cost estimates for each of the alternatives, including construction costs and O&M costs.



- A scoring system of the benefits (reductions to levee freeboard encroachments, groundwater levels, etc.) and consequences (increased bank erosion potential, habitat restoration consequences, etc.) associated with the alternatives was prepared to provide a basis of comparison. Results from the hydraulic and sediment-transport modeling were used along with the cost estimates as input to the benefit-cost/consequence analysis that served as a basis for ranking the alternatives to identify the two best CMAs at each location.

Lake Lemon Conservancy District

Board Meeting Agenda Item

Presenter	**Mary Jane Bro**wn, Vice-Chairman
Action Requested	**Approval**
Item/Subject	**Scope of Services** - Mark Boillotat
Dollar Amount	$600.00
Meeting Date	**February 28, 2019**
Summary	**Mark Boillotat will provided fundraising research tot he LLCD for three categories of potential investors; Foundations, Corporations, Individual Prospects**
Staff Recommendation	**Approval of Mark Boillotat Scope of Services**

Mark D. Boillotat
742 Ridge Road
Greenwood, IN 46142
603-276-0133 ~ mdboillotat@gmail.com

Date: February 17, 2019

To: Mary Jane Brown

From: Mark D. Boillotat

RE: Scope of Project – Lake Lemon Conservancy District (LLCD)

Fundraising research will be provided to the LLCD in three areas

1. **Foundations:**

   - Research will identify foundations that are primarily focusing on environmental causes *(this data has already been provided to LLCD to review)*

   - Research will also provide data to support LLCD in approaching foundations with data to determine ask amounts and information to approach foundations>

2. **Corporations in the greater LLCD and Bloomington:**

   - Research will identify corporations that might be good prospects for the LLCD to approach

   - Research will provide data to support LLCD in approaching corporations with data to determine ask amounts and any additional information>

3. **Individual Prospects:**

   - LLCD will provide prospects to Mark (Researcher) to evaluate if they would be a good prospect for LLCD to approach for a gift.

Cost:

- My fee is $100 an hour. I will not charge more than $200 for each project and will be mindful to keep my cost low.

- There will never be a charge for phone call or email questions.

Lake Lemon Conservancy District

Director Oath of Office

I do solemnly swear that I shall, to the best of my ability, strive to accomplish the purposes for which the district is established and to properly operate and maintain its works of improvement.

February 28, 2019
Date

Michael Blackwell
Sub Area VII

7599 North Tunnel Road, Unionville, IN 47468
Phone 812/334-0233 • Fax 812/335-0038

Lake Lemon Conservancy District

Annual Meeting

City of Bloomington Utilities Building

February 28th, 2019 6:00 PM

Name	Lake Address	District	Email Address
Todd Fisher	5963 Northshore Dr		
Rex Taylor	6179 N Shore Dr	6	rex.taylor@gmail.com
Mark Barkley	Next to Southern Yankee	Town/RA	mbarkley@realco.com
SURYA GAILETTA	8920 Southshore	5	suragail@gmail.com
Susie Elliott	8120 Lakewood Dr	6	suzyabean@aol.com
Tim Ruh	6011 South Shore	7	
SCOTT ADAMSON	4154 WALKER LANE	7	
Sandy Lee	4204 Channel Road	7	lee-sandrea@comcast.net
Gidget Roth	6011 Southshore Dr	7	
Malcolm McClure		6	
F. Van Aernam		7	
		6	
		7	

7599 North Tunnel Road, Unionville, IN 47468
Phone 812/334-0233 • Fax 812/335-0038