pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATERSHED RESTORATION AND
NONPOINT SOURCE MANAGEMENT

Section 319 Workplan
AMD Project Sample

Project Number:

Korb 4 AMD Discharge Design & Treatment
(design, permitting, construction)

Clear County Conservation District
Sub Grantee SAP Vendor: #000000

6395 Clear Wood Highway
Clear, PA 16830

Kelly Wills
kwills@clearcounty.org

Grant Request: $722,661

Project Location Address: 10 Orange Creek Road, Hometown, PA 12345
HUC 12: 020502010201

ATTAINS Assessment Unit ID: PA-SCR-61830793

Latitude: 41.02718917
Longitude: -78.65363028

Goal 5 - Ensure Clean and Safe Water for All Communities
Objective 5.2 – Protect and Restore Waterbodies and Watersheds

I. Context

A. Please explain how the proposed project fits within the current version of the PA Nonpoint Source Management Plan.

This project fits into several of the goals and objectives of Pennsylvania's Nonpoint Source Management Plan 2019 Update:

Goal #1: "Improve and protect the waters of the Commonwealth from nonpoint source pollution associated with acid mine drainage (AMD) and other energy resource extraction activities."

- Objective 1.3: "Provide funding and other assistance for the installation of new AMD treatment systems annually for the next five years."
- Objectives 1.6, 1.7, & 1.8: "Through load-reduction efforts with the installation of new AMD treatment systems, an additional 10,000 pounds of iron…5,000 pounds of aluminum… and 80,000 pounds of acidity will be reduced from the non-point source pollutant stream each year."

B. Explain how the proposed project supports other work in the watershed being performed under other grant programs.

Anders Creek is listed as impaired by acid mine drainage. Most of the AMD pollution in Anders Creek comes from the Little Anders Creek tributary while a smaller portion comes from the Kratzer Run tributary. In addition to this project on the Korb 4 discharge in the Little Anders Creek watershed, there are several other restoration efforts underway or completed in Anders Creek.

During 2019 and 2020, Trout United (TU), the Clear County Conservation District (CCCD), Susquehanna Commission (SC), and HE developed an update to the 2006 Anders Creek WIP. This update focused on the Little Anders Creek tributary as it is the source for the majority of AMD pollution in the entire Anders Creek watershed (see the included Location Map). This update to the WIP identified and prioritized the discharges and AML sites impairing Little Anders Creek with the top four recommendations being 1) reclamation of the PA1396 and PA1398 AML sites, 2) Treatment of the Draucker 1 discharge, 3) Treatment of the Korb 4 discharge, and 4) Treatment of the Spencer Discharge. The Bureau of Abandoned Mine Reclamation is currently working toward reclamation of the PA1396 and PA1398 AML sites (priority 1).

Elsewhere in Anders Creek, in Bilger Run (a tributary to Kratzer Run which is a tributary to Anders Creek), there are two other AMD treatment projects underway: construction of the Bilger 4.0 passive treatment system and the design of the Wildwood passive treatment system. Both are CCCD projects funded by the 319 Nonpoint Source Grant Program. Also, the SC is working with the Western PA Conservancy (WPC) to complete surface reclamation of an AML site contributing impaired water to what is known as the Waterfall Discharge in Kratzer Run. In 2008, construction of the Bilger ALD was completed by the Anders Creek Watershed Association with funding from the 319 Nonpoint Source Grant Program.

C. Please explain how the proposed project supports the implementation and completion of the Watershed Implementation Plan (WIP) in question.

As mentioned earlier, an update to the Anders Creek WIP was completed in 2020. There are four recommendations made in this update that if completed, should lessen the impacts of AMD pollution in Little Anders Creek on the mainstem of Anders Creek.

1) Reclamation of the PA1396 and PA1398 AML sites
2) Treatment of the Draucker 1 discharge
3) Treatment of the Korb 4 discharge
4) Treatment of the Spencer Discharge

We are seeking funds to treat the 3rd overall priority (2nd priority discharge requiring treatment) listed in the plan because work is already in progress on the top two priorities in the WIP. BAMR has been contacted and they are currently developing a plan for reclamation of the PA1396 and PA1398 AML

sites. The Draucker 1 discharge is located on the PA1398 AML site and treatment of this discharge will be pursued once the surface reclamation is completed.

Treatment of the discharges and reclamation of the AML sites identified above will ultimately lead to restoration of the Anders Creek watershed.

II. Program v. Watershed Project

(Note: This section will be completed by DEP NPS Program staff).

III. Content

A. Problem/Need Statement

Little Anders Creek is a 10.4 square mile watershed containing 15.5 stream miles, all of which are impaired by pH and metals from abandoned mine drainage as well as siltation from grazing in the riparian zone according to the 2024 Integrated Report.

The Korb 4 AMD discharge flows at an average rate of 138 gallons/min and pollutes 3.5 miles of Little Anders Creek with an average loading of 414 ppd acidity, 37 ppd iron, 32 ppd aluminum, and 8 ppd manganese. Little Anders Creek is the largest source of pollution in the Anders Creek watershed. Below Little Anders Creek, Anders Creek remains impaired for 10.2 miles until its confluence with the West Branch Susquehanna River. Approximately 50% of the contaminant loading in the Little Anders Creek watershed is diffuse, i.e. has no distinct discharge. The remainder of the pollution originates from three discharges, of which the Korb 4 is the 2nd most severe. Because the watershed contains so much background contaminant loading, it is imperative that the known discharges of AMD are fully treated. Excess alkalinity generated by the treatment systems will be important to Little Anders Creek's assimilation of untreated acidity. If the three discharges are treated and the 2 AML sites restored, Anders Creek is expected to be able to assimilate the loading from Little Anders Creek and over ten miles of stream will be restored. Treating the Korb 4 discharge is required to achieve this long-term goal.

B. Goals and Objectives

The goal of this project is to design and construct a passive treatment system utilizing vertical flow ponds to remove the AMD pollution created by the Korb 4 discharge under 90th percentile loading conditions. To meet this goal, the following tasks will need to be completed:

- QAPP Development
- Data Collection
  - Six months of pre-construction water quality, wetland delineation, and geotechnical surveys
- Finalize Design, permitting, and bidding
  - Finalize system sizing utilizing most recent data collected, secure permits, create contingency plan, develop bid documents, and bid project
- Construct treatment system and post construction monitoring
  - Secure supplies and build the system
  - Construction oversight
  - Post construction water quality monitoring for six months
- Interim and Final Grant Reporting
  - Create OM&R Plan
  - Quarterly progress and final reporting
  - Upload data through WQX web to be identified as ID CWA319 when submitted

C. Project Description

The goal of this project is to construct a passive treatment system to remediate the Korb 4 discharge. The Korb 4 discharge is recommended to be treated using vertical flow pond (VFP) technology. A VFP contains a 2-3 foot-deep layer of limestone aggregate overtopped with a 1-2 foot-deep layer of organic substrate (typically mushroom compost amended with limestone fines). Water flows vertically down through the organic substrate and limestone where it is treated by microbial and chemical reactions. VFPs are followed by constructed wetlands that provide polishing and nutrient-removal functions.

A conceptual plan for treating the Korb 4 discharge was created as part of the 2020 Little Anders Creek WIP update. Treatment of the Korb 4 discharge will take place in two VFPs arranged in parallel to the west of the discharge. A mine water collection system will be installed in the Korb 4 drift opening. Collected water will be piped, by gravity, to a flow distribution structure that splits the flow evenly between the two VFPs. The conceptual layout attempts to avoid the existing unpaved road and overhead power lines that cross the site. The two VFPs are arranged in parallel with one immediately downslope of the other, and discharge into a common constructed wetland. Effluent from the constructed wetland is directed back to the original Korb 4 discharge channel.

This project proposes to develop the conceptual plan more fully into a complete construction and permit package. The project also proposes to bid these plans to a contractor, who will then construct the treatment system.

The project's success will be measured in several ways. The treatment system's success will be measured by comparing the influent and effluent concentrations of AMD contaminants (acidity, iron, aluminum, manganese) as well as effluent alkalinity concentrations. The success of the project will also be measured by the reduction of contaminant loading within Little Anders Creek. Other environmental indicators (i.e. fish and macroinvertebrates) besides water chemistry are not expected to change within Little Anders Creek or Anders Creek with the construction of just the Korb 4 passive treatment system. Anders Creek is expected to see an improvement in biotic indicators after the implementation of the other three priority projects within the Little Anders Creek watershed described in the 2020 WIP Update. The Korb 4 treatment system is expected to neutralize 321 ppd acidity under median flow conditions. This includes acidity in Little Anders Creek that will be neutralized by the excess alkalinity generated by the treatment system.

Specific tasks necessary, the responsible party, and timeline to accomplish this include:

- QAPP Development – 2026
  - Develop a project specific QAPP for sampling discharge: CCCD
- Data Collection – 2026/2027
  - Collect six rounds of samples to confirm treatment cell sizing requirements for adequate treatment of Korb 4: CCCD, HE
  - Wetland Delineation: HE
  - Geotechnical Surveys: HE
  - Sample Analysis: ABC Lab
  - Compile data collected: HE, CCCD
- Finalize Design, permitting, and bidding – 2026
  - Finalize system sizing utilizing most recent data collected: HE
  - Secure permits: HE, CCCD
  - Create contingency plan: CCCD
  - Create bid documents: HE
  - Bid project: HE, CCCD
  - Award bid contract: CCCD

- Construct treatment system and post construction monitoring – 2026/2027
    - Secure supplies: Contractor
    - Build system: Contractor
    - Construction oversight: HE, CCCD
    - Post construction water quality monitoring for six months: HE, CCCD
- Interim and Final Grant Reporting – 2025 - 2028
    - Summarize all data collected and project activities: CCCD
    - Create OM&R Plan: HE
    - Quarterly progress reporting: CCCD
    - Upload data through WQX web to be identified as ID CWA319 when submitted: CCCD
    - Submit final report: CCCD

D. Monitoring

For six months prior to the construction of the treatment system, the Korb 4 discharge and Little Anders Creek above and below the Korb 4 discharge will be sampled. After the system goes online, monitoring of influent and effluent flow and chemistry of the treatment system will occur for six months post construction. During this period, instream monitoring of Little Anders Creek will continue to measure the impact of the treatment system.

Data collected for this project will be uploaded through WQX web and identified as ID CWA319 when submitted.

E. QAPPs

A QAPP will be developed and approved by EPA before sampling begins. The QAPP will cover collection of water samples and flow. This plan will be included in the final report for the project.

F. On-Site BMPs/BMP Efficacy

The Korb 4 discharge is net acidic (252 mg/L) with elevated concentrations of aluminum (20 mg/L), iron (23 mg/L), and manganese (5.3 mg/L). The most reliable passive treatment technology for this water quality condition is accomplished with vertical flow ponds.

Predicted loading reductions for treatment of the Korb 4 discharge were calculated using AMDTreat software. Based on the average metal concentrations noted above and the average flow observed during more recent site investigations (138 gpm) the Korb 4 treatment system should realistically at a minimum remove 580 lbs/day of acidity, 37 lbs/day of iron, 32 lbs/day of aluminum, and 4 lbs/day of manganese. The final estimated load reductions, along with how the load reductions were estimated (model used) will be summarized in the final report, and DEP will upload into GRTS supplied by the subgrantee upon project completion.

G. Sub-grantees

Clear County Conservation District = CCCD
Overall project and fiscal management, pre and post construction monitoring

HE
Project engineer, sizing of treatment technology, construction oversight, assist with pre and post construction monitoring

ABC Laboratory = ABC
Water sample analysis

Contractor = to be determined by competitive bid
Treatment system construction

H. Partner Contributions

Clear County Conservation District = $9,000 In Kind Services

Our District has calculated that we spend over 12 hours/month on grant administrative tasks per grant. At a rate of $50/hour, that totals $600/month in grant administration per grant. As detailed in Section N. Project Schedule/Timeline, this project is projected to take a minimum of 30 months to complete. That would be a total of $18,000 for grant administration for this project. Our District is offering half of this as in-kind match to support the implementation of this project ($300/month x 30 months = $9,000).

I. Education/Outreach

N/A

J. Urban/MS4 Activities

N/A

K. Operation, Maintenance and Repair/Replacement Plans

An OM&R Plan will be developed for this project and be included in the final report.

Generally, minor maintenance is required after five to ten years of operation. The organic substrate will not be consumed uniformly across the VFP due to variations in flow rate through the organic substrate. As a result, the full column of organic substrate may be completely exhausted in one portion of the VFP while another portion is only partially exhausted. If inspections of the organic substrate indicate that this is the case, the organic substrate should be mixed to redistribute the viable organic substrate.

Major maintenance will likely be required after ten to 15 years of operation. Before the organic substrate is completely exhausted, new compost should be added. Prior to adding new organic substrate, the existing organic substrate should be mixed. The amount of organic substrate required will depend on the amount of room in the VFP that is available to accept additional material. If permeability problems are encountered with the existing organic substrate even after it has been mixed it may require removal and disposal.

L. Competitive Bid

Project sponsors will abide by the Commonwealth of Pennsylvania's Procurement Code. The CCCD and HE maintain a list of contractors with a good history of AMD treatment system construction. These companies will be invited to bid on system construction. A mandatory bid meeting will be held to ensure all bidders are clear on the project tasks and requirements. Shortly after the bid meeting, sealed bids will need to be delivered to the CCCD office by a given date and time and all bids will be opened at the same time following the bid deadline. After careful review of the bid amounts, the bid will be awarded to the lowest responsible bidder.

M. Contingency Plan (AMD only)

A contingency plan will be developed before construction commences.

N. Project Deliverables

Project deliverables will be included with the final report, and DEP will upload into GRTS supplied by the subgrantee upon project completion.

- QAPP Approved by EPA
- Pre-construction water quality data
- Wetland Delineation
- Site Survey
- Final Design
- Permits

- Bid Documents
- Contingency Plan
- Treatment system construction
- Post construction water quality data
- OM&R Plan
- Interim progress reports
- Final report

O. Project Schedule/Timeline

Project Start Date: October 1, 2025 Project End Date: June 30, 2028

Tasks	Start and Completion Dates
• QAPP Development o Develop a project specific QAPP for sampling discharge: CCCD	April – July 2026
• Data Collection o Collect six rounds of samples to confirm treatment cell sizing requirements for adequate treatment of Korb 4: CCCD, HE o Wetland Delineation: HE o Geotechnical Surveys: HE o Sample Analysis: ABC o Compile data collected: HE, CCCD	July 2026 – January 2027
• Finalize Design, permitting, and bidding o Finalize system sizing utilizing most recent data collected: HE o Secure permits: HE, CCCD o Create contingency plan: CCCD o Create bid documents: HE o Bid project: HE, CCCD o Award bid contract: CCCD	January – July 2027
• Construct treatment system and post construction monitoring o Secure supplies: Contractor o Build system: Contractor o Construction oversight: HE, CCCD o Post construction water quality monitoring for six months: HE, CCCD	July 2027 – May 2028
• Interim and Final Grant Reporting o Summarize all data collected and project activities: CCCD o Create OM&R Plan: HE o Quarterly progress reporting: CCCD o Upload data through WQX web to be identified as ID CWA319 when submitted: CCCD o Submit final report: CCCD	October 2025 – June 2028

P. Budget Summary

Please note that since this project is larger than $250,000, the district will comply with the federal Buy America, Build America Act.

Task 1: QAPP Development

Item	Task	Responsible Partner	Grant Request	Match	Total
Salary	Develop QAPP	CCCD	$1,000	$0	$1,000
Administration	Grant Admin	CCCD	$900	$900	$1,800
Travel					
Equipment and Supplies					
Contractual	Design				
	Permitting				
	Construction Management				
Construction	Materials				
	Labor				
	Earthwork				
Other					
Total			$1,900	$900	$2,800

Task 2: Pre-Construction Data Collection

Item	Task	Responsible Partner	Grant Request	Match	Total
Salary	Sampling, Mgmt	CCCD	$750	$0	$750
Administration	Grant Admin	CCCD	$1,800	$1,800	$3,600
Travel	CDWS Travel	CCCD	$62	$0	$62
Equipment and Supplies					
Contractual	Sampling	HE	$3,000	$0	$3,000
	Sampling Analysis	ABC Lab	$1,080	$0	$1,080
	Surveys and Data Compilation	HE	$20,000		$20,000
Construction	Materials				
	Labor				
	Earthwork				
Other					
Total			$26,692	$1,800	$28,492

Task 3: Finalize Design, Permitting, and Bidding

Item	Task	Responsible Partner	Grant Request	Match	Total
Salary	Bidding Process, Help w/ Permitting	CCCD	$1,500	$0	$1,500
Administration	Grant Admin	CCCD	$1,800	$1,800	$3,600
Travel	CDWS Travel	CCCD	$20	$0	$20
Equipment and Supplies					
Contractual	Finalize Design, Create Construction Plans	HE	$27,500	$0	$27,500
	Permitting	HE	$20,000	$0	$20,000
	Bid Process	HE	$8,000	$0	$8,000
Construction	Materials				
	Labor				
	Earthwork				
Other	Permit Fees	CCCD/HE	$5,000	$0	$5,000
Total			$63,820	$1,800	$65,620

Task 4: Construction Treatment System and Post Construction Monitoring

Item	Task	Responsible Partner	Grant Request	Match	Total
Salary	Construction Oversight Help, Post Constr. Monitoring	CCCD	$1,500	$0	$1,500
Administration	Grant Admin	CCCD	$3,000	$3,000	$3,000
Travel	CDWS Travel	CCCD	$208	$0	$208
Equipment and Supplies					
Contractual	Construction Oversight	HE	$20,000	$0	$20,000
	Post Construction Sampling	HE	$3,000	$0	$3,000
	Sample Analysis	ABC	$1,890	$0	$1,890
Construction	Materials	Contractor	$10,000	$0	$10,000
	Labor	Contractor	$15,000	$0	$15,000
	Earthwork	Contractor	$559,651	$0	$559,651
Other	Permit Fees				
Total			$614,249	$1,800	$617,249

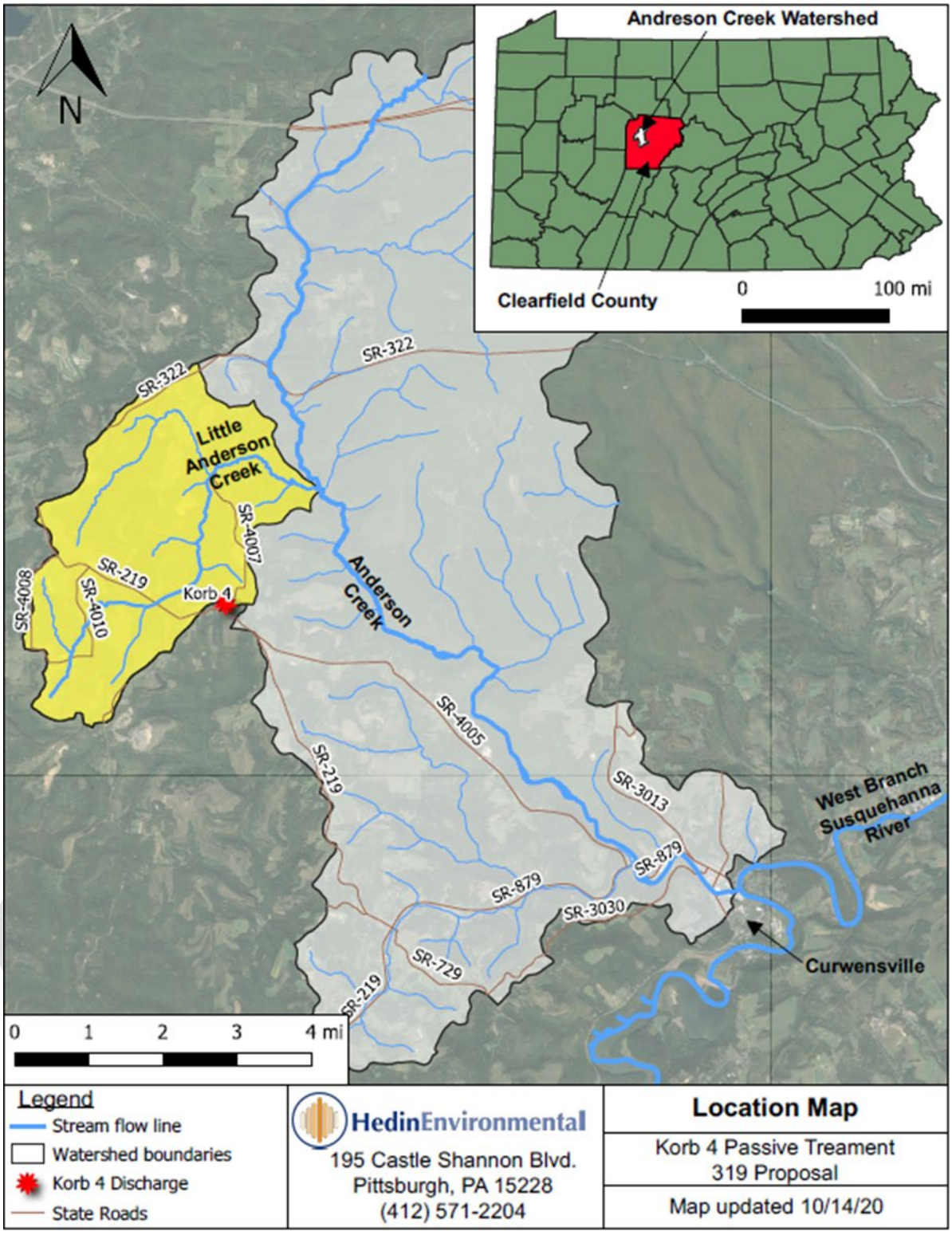
Task 5: Interim and Final Grant Reporting

Item	Task	Responsible Partner	Grant Request	Match	Total
Salary	Reporting	CCCD	$1,500	$0	$1,500
Administration	Grant Admin	CCCD	$1,500	$1,500	$3,000
Travel					
Equipment and Supplies					
Contractual	Design				
	Permitting				
	OM&R Technical Reports	HE	$13,000	$0	$13,000
Construction	Materials				
	Labor				
	Earthwork				
Other					
Total			$16,000	$1,500	$17,500

*No 319 funding will be used to supplement or cover any CCCD staff salary (e.g. Watershed Specialist) already paid for by the CD Allocation Program, Growing Greener Watershed Specialists match project, or any other funding sources.

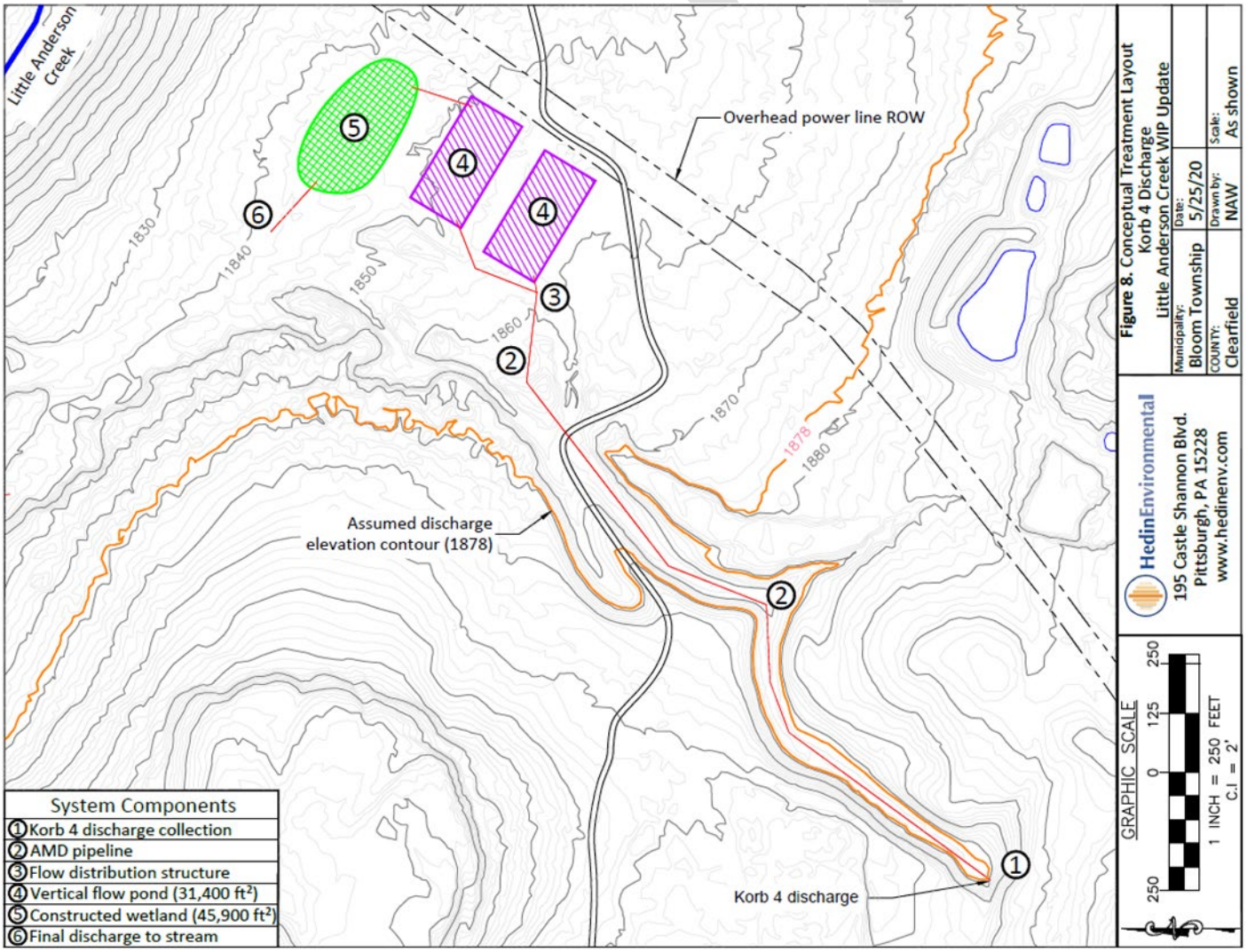
Q. Maps and Photos

1. Location Map



2. Aerial Photo

3. Site Map



4. Photos – Attached (20 Korb 4 Weir and 20 Korb 4 Dis-charge)

R. Landowner

Jane Green of 123 Main Street, Hometown, PA 12345 is the landowner. She has signed a Letter of Commitment for this grant application.

S. AMDTreat – Aerobic Wetlands Form

Printed on 06/03/2020

Company Name

Project Little Anderson Creek

Site Name Korb4

AMD TREAT

AEROBIC WETLANDS

AMDTREAT

Aerobic Wetlands Name

☐ **Opening Screen Water Parameters**

Influent Water Parameters that Affect Aerobic Wetlands

Calculated Acidity	261.86	mg/L
Alkalinity	110.00	mg/L
◉ Calculate Net Acidity (Acid-Alkalinity)		
○ Enter Net Acidity manually		
Net Acidity (Hot Acidity)	151.86	mg/L
Design Flow	170.00	gpm
Typical Flow	89.00	gpm
Total Iron	23.00	mg/L
Aluminum	20.00	mg/L
Manganese	5.30	mg/L
pH	7.50	su

SIZING METHODS Select One

○ Aerobic Wetland Based on Metal Removal Rates	1. Iron Removal Rate		g/m2/day	2. Mn Removal Rate	g/m2/day
◉ Aerobic Wetland Based on Dimensions	3. Top Length at Freeboard	370	ft	4. Top Width at Freeboard	139 ft
○ Aerobic Wetland Based on Iron Oxidation Kinetics	5. Rate Constant		moles/sec	6. Effluent Fe Concentration	mg/l
	7. Dissolved Oxygen		mg/l	8. H2O Temperature	^{o}C

	Length		Width
9. Length to Width Ratio		:	
	Run of Slope		Rise of Slope
10. Slope of Wetland Sides	3.0	:	1.000
11. Freeboard Depth	2.00	ft	
12. Free Standing Water Depth	0.50	ft	
13. Organic Matter Depth	1.00	ft	
14. Organic Matter Unit Cost	20.00	$/yd3	
15. Organic Matter Spreading Unit Cost	4.50	$/yd3	
16. Excavation Unit Cost	5.50	$/yd3	
17. Wetland Planting Unit Cost	3700	$/acre	

Liner Cost

◉ No Liner		
○ Clay Liner		
18. Clay Liner Unit Cost		$/yd3
19. Thickness of Clay Liner		ft
○ Synthetic Liner		
20. Synthetic Liner Unit Cost		$/yd2

☑ 21. Clearing and Grubbing?

◉ 22. Land Multiplier	1.5	ratio
○ 23. Clear/Grub Acres		acres
24. Clear and Grub Unit Cost	2500	$/acre

Aerobic Wetland Sizing Summaries

25. Length at Top of Freeboard	370.00	ft
26. Width at Top of Freeboard	139.00	ft
27. Freeboard Volume	3,586	yd3
28. Water Surface Area	45,466	ft2
29. Water Volume	828	yd3
30. Organic Matter Volume	1,577	yd3
31. Excavation Volume	2,406	yd3
32. Clear and Grub Area	1.7	acres
33. Liner Area	0	ft2
34. Retention Time	16	hrs

Aerobic Cost Summaries

35. Organic Matter Cost	38,651	$
36. Excavation Cost	13,234	$
37. Liner Cost	0	$
38. Clear and Grub Cost	4,428	$
39. Wetland Planting Cost	4,368	$
40. Total Cost	60,681	$

Record Number 1 of 1