Lucerne 3A Treatment System
SRI O&M TAG Project #33 Request #2
OSM PTS ID: PA-139

Requesting Organization: Indiana County Conservation District
Requesting Organization Representative: Brooke Russick
Municipality/County: White Township, Indiana County
Dates of work performed: 8/2/19-8/7/19

Initial Request: On 3/7/2019, the Indiana County Conservation District (ICCD) requested assistance for the Lucerne 3A active treatment system. The settling pond was full of sludge and needed to be removed. The ICCD also requested recommendations on either converting to a passive system and/or expanding the size of the existing active system.

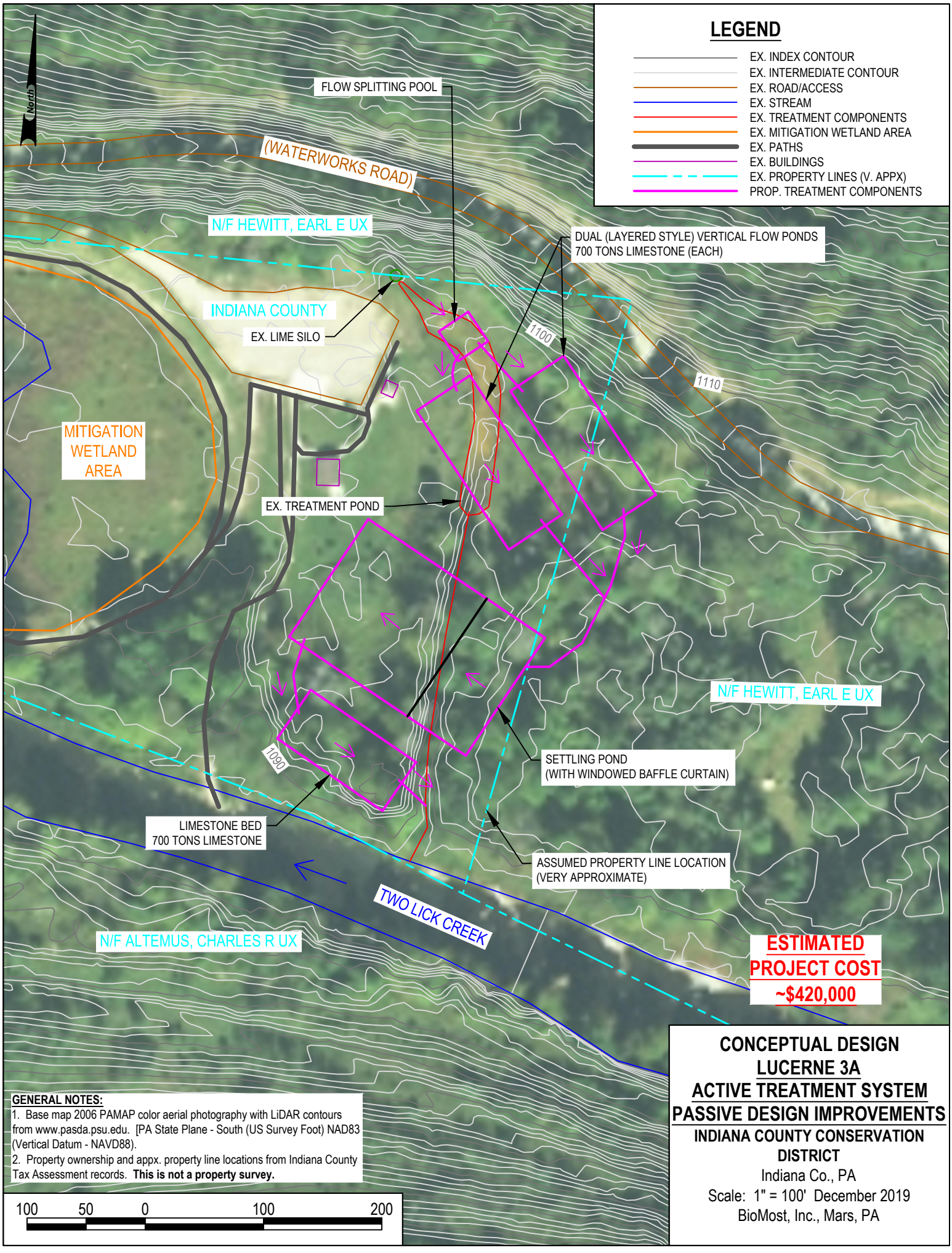
Initial Site Visit, Observations, and Identified Needs: As Stream Restoration Incorporated (SRI) and BioMost, Inc. (BMI) were familiar with the system and understood the ICCD's needs an initial site visit was not required.

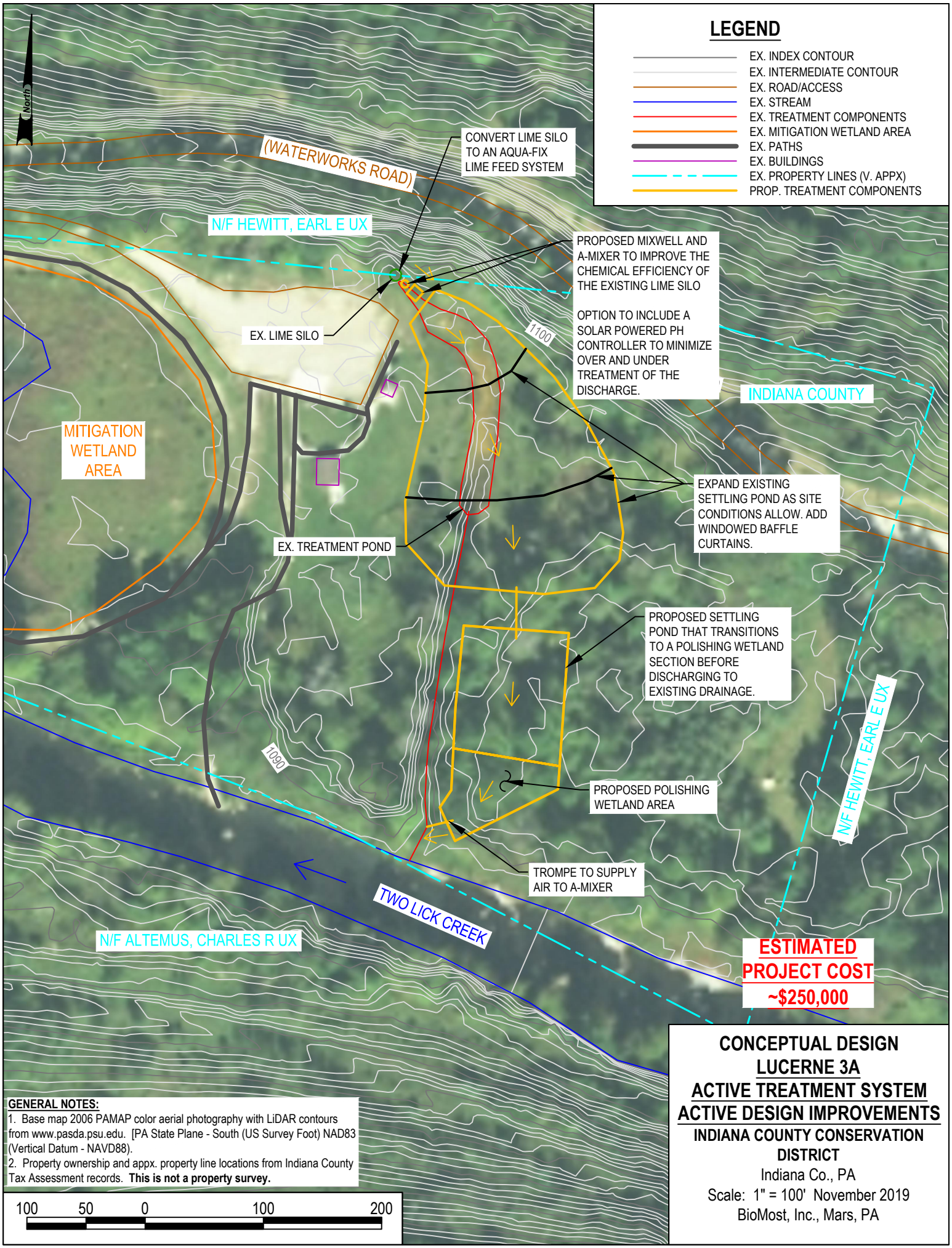
Work Completed: In August 2019, BMI mobilized to the site. Sludge from the settling pond was pumped into a previously established underground coal mine borehole. To complete this work, a new pipe was retrofitted onto a new tee to the mine borehole and a 6" pump was used. Large amounts of unreacted lime were present in the initial section of settling pond, transitioning to iron oxide solids further into the settling pond. Vegetation near and within the settling pond was cleared. In addition, a temporary benchmark was set and field survey elevation measurements were made to assist with evaluating options for improving treatment.

Evaluation, Recommendations & Future Considerations: The effectiveness of the Lucerne 3A treatment system has been variable especially in terms of the neutralization of acidity. Typically, high concentrations of metal solids are being discharged to Two Lick Creek. This is largely due to the relatively small settling pond area. BMI evaluated the system and developed conceptual designs and cost estimate options for both an expanded active system and a new passive treatment system. The ICCD did not wish to operate an active system any longer and chose the passive treatment option. The proposed conceptual passive system will consist of two traditional layered vertical flow ponds followed by a settling pond and then a limestone bed. The ICCD utilized this information to successfully apply for and receive funding from Growing Greener, OSM WCAP, and the Foundation for Pennsylvania Watersheds. Design is currently in progress with the hope of construction beginning in 2023.

Photo Log

Top Left: Tee installed at borehole allowed for pumping from the system into the mine void (8/6/19).
Top Right: Chasing sludge towards the pump from the other end of the settling pond (8/7/19).
Bottom Left: Pumping sludge from the settling pond to the borehole (8/6/19).
Bottom Right: Large amounts of unreacted lime present in the first portion of the settling pond (8/7/19).


LEGEND
EX. INDEX CONTOUR
EX. INTERMEDIATE CONTOUR
EX. ROAD/ACCESS
EX. STREAM
EX. TREATMENT COMPONENTS
EX. MITIGATION WETLAND AREA
EX. PATHS
EX. BUILDINGS
EX. PROPERTY LINES (V. APPX)
PROP. TREATMENT COMPONENTS
North
FLOW SPLITTING POOL
(WATERWORKS ROAD)
N/F HEWITT, EARL E UX
DUAL (LAYERED STYLE) VERTICAL FLOW PONDS
700 TONS LIMESTONE (EACH)
INDIANA COUNTY
EX. LIME SILO
1100
1110
MITIGATION WETLAND AREA
EX. TREATMENT POND
N/F HEWITT, EARL E UX
1090
SETTLING POND
(WITH WINDOWED BAFFLE CURTAIN)
LIMESTONE BED
700 TONS LIMESTONE
ASSUMED PROPERTY LINE LOCATION
(VERY APPROXIMATE)
TWO LICK CREEK
N/F ALTEMUS, CHARLES R UX
ESTIMATED PROJECT COST ~$420,000
GENERAL NOTES:
1. Base map 2006 PAMAP color aerial photography with LiDAR contours from www.pasda.psu.edu. [PA State Plane - South (US Survey Foot) NAD83 (Vertical Datum - NAVD88).
2. Property ownership and appx. property line locations from Indiana County Tax Assessment records. This is not a property survey.
100 50 0 100 200
CONCEPTUAL DESIGN
LUCERNE 3A
ACTIVE TREATMENT SYSTEM
PASSIVE DESIGN IMPROVEMENTS
INDIANA COUNTY CONSERVATION DISTRICT
Indiana Co., PA
Scale: 1" = 100' December 2019
BioMost, Inc., Mars, PA


LEGEND
EX. INDEX CONTOUR
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EX. MITIGATION WETLAND AREA
EX. PATHS
EX. BUILDINGS
EX. PROPERTY LINES (V. APPX)
PROP. TREATMENT COMPONENTS
North
(WATERWORKS ROAD)
CONVERT LIME SILO TO AN AQUA-FIX LIME FEED SYSTEM
N/F HEWITT, EARL E UX
PROPOSED MIXWELL AND A-MIXER TO IMPROVE THE CHEMICAL EFFICIENCY OF THE EXISTING LIME SILO
OPTION TO INCLUDE A SOLAR POWERED PH CONTROLLER TO MINIMIZE OVER AND UNDER TREATMENT OF THE DISCHARGE.
EX. LIME SILO
1100
INDIANA COUNTY
MITIGATION WETLAND AREA
EXPAND EXISTING SETTLING POND AS SITE CONDITIONS ALLOW. ADD WINDOWED BAFFLE CURTAINS.
EX. TREATMENT POND
PROPOSED SETTLING POND THAT TRANSITIONS TO A POLISHING WETLAND SECTION BEFORE DISCHARGING TO EXISTING DRAINAGE.
1090
PROPOSED POLISHING WETLAND AREA
N/F HEWITT, EARL E UX
TROMPE TO SUPPLY AIR TO A-MIXER
TWO LICK CREEK
N/F ALTEMUS, CHARLES R UX
ESTIMATED PROJECT COST ~$250,000
GENERAL NOTES:
1. Base map 2006 PAMAP color aerial photography with LiDAR contours from www.pasda.psu.edu. [PA State Plane - South (US Survey Foot) NAD83 (Vertical Datum - NAVD88).
2. Property ownership and appx. property line locations from Indiana County Tax Assessment records. This is not a property survey.
100 50 0 100 200
CONCEPTUAL DESIGN
LUCERNE 3A
ACTIVE TREATMENT SYSTEM
ACTIVE DESIGN IMPROVEMENTS
INDIANA COUNTY CONSERVATION DISTRICT
Indiana Co., PA
Scale: 1" = 100' November 2019
BioMost, Inc., Mars, PA

Printed on **12/18/2019**

Company Name Indiana Co. Cons. Dist.
Project Waterworks PTS
Site Name Lucerne 3A

AMD TREAT

Costs AMD TREAT MAIN COST FORM

Passive Treatment	A	S	
Vertical Flow Pond	2	0	$226,863
Anoxic Limestone Drain			$0
Anaerobic Wetlands			$0
Aerobic Wetlands	1	0	$28,258
Manganese Removal Bed			$0
Oxic Limestone Channel			$0
Limestone Bed			$0
BIO Reactor			$0
Passive Subtotal:			**$255,122**
Active Treatment			
Caustic Soda			$0
Hydrated Lime			$0
Pebble Quick Lime			$0
Ammonia			$0
Oxidants			$0
Soda Ash			$0
Active Subtotal:			**$0**
Ancillary Cost			
Ponds	1	0	$5,959
Roads			$0
Land Access			$0
Ditching	1	0	$4,919
Engineering Cost			$0
Ancillary Subtotal:			**$10,878**
Other Cost (Capital Cost)			$109,000
Total Capital Cost:			**$375,000**
Annual Costs			
Sampling			$0
Labor			$0
Maintenance			$0
Pumping			$0
Chemical Cost			$0
Oxidant Chem Cost			$0
Sludge Removal			$0
Other Cost (Annual Cost)			$0
Land Access (Annual Cost)			$0
Total Annual Cost:			**$0**
Other Cost	1	0	

Water Quality

Design Flow	200.00	gpm
Typical Flow	90.00	gpm
Total Iron	24.40	mg/L
Ferrous Iron	0.00	mg/L
Aluminum	23.30	mg/L
Manganese	1.00	mg/L
pH	2.70	su
Alkalinity	0.00	mg/L
TIC	0.00	mg/L

○ Calculate Net Acidity
◉ Enter Hot Acidity manually

Acidity 306.00 mg/L

Sulfate	507.00	mg/L
Chloride	0.00	mg/L
Calcium	0.00	mg/L
Magnesium	0.00	mg/L
Sodium	0.00	mg/L
Water Temperature	0.00	C
Specific Conductivity	0.00	uS/cm
Total Dissolved Solids	0.00	mg/L
Dissolved Oxygen	0.01	mg/L
Typical Acid Loading	60.3	tons/yr

Total Annual Cost: per 1000 Gal of H2O Treated **$0.000**

Company Name Indiana Co. Cons. Dist.

Project Waterworks PTS

Site Name Lucerne 3A

Printed on 12/18/2019

AMD TREAT
VERTICAL FLOW POND (VFP)

AMDTREAT

VFP Name: 1 of 2 in Parallel

☐ **Opening Screen Water Parameters**

SIZING METHODS Select One

1. Tons of Limestone Needed	3,720	○ VFP Based on Acidity Neutralization
2. Tons of Limestone Needed	2,594	○ VFP Based on Retention Time
3. Tons of Limestone Needed	29,405	○ VFP Based on Alkalinity Generation Rate
4. Tons of Limestone Needed	1,800	◉ VFP Based on Tons Limestone Entered
5. Tons of Limestone Needed	1,684	○ VFP Based on Dimensions

6. Retention Time ____ hours
7. Alkalinity Generation Rate ____ g/m2/day
8. Limestone Needed 1,800 tons
9. Length at Top of Freeboard ____ ft
10. Width at Top of Freeboard ____ ft

Influent Water Parameters that Affect VFP

Calculated Acidity 273.05 mg/L

Alkalinity 0.00 mg/L

○ Calculate Net Acidity (Acid-Alkalinity)

◉ Enter Net Acidity manually

Net Acidity (Hot Acidity) 306.00 mg/L

Design Flow 200.00 gpm

Typical Flow 90.00 gpm

Total Iron 24.40 mg/L

Aluminum 23.30 mg/L

Manganese 1.00 mg/L

Record Number 1 of 2

11. % Void Space of LS. Bed	45.00	%
12. System Life	15.00	years
13. Limestone Purity	90.00	%
14. Limestone Efficiency	60.00	%
15. Density of Loose Limestone	90.99	lbs/ft3
16. Limestone Unit Cost	30.00	$/ton
17. LS Placement Unit Cost	5.00	$/yd3
18. Slope of Pond Sides (Run of Slope : Rise of Slope)	2.0 : 1	
19. Freeboard Depth	2.00	ft
20. Free Standing Water Depth	1.0	ft
21. Organic Matter Depth	1.0	ft
22. Organic Matter Unit Cost	25.00	$/yd3
23. Organic Matter Spreading Unit Cost	6.00	$/yd3
24. Limestone Depth	4.5	ft
25. Excavation Unit Cost	10.00	$/yd3

Liner Cost

○ No Liner

◉ Clay Liner

11. Clay Liner Unit Cost 10.00 $/yd3

12. Thickness of Clay Liner 0.5 ft

○ Synthetic Liner

13. Synthetic Liner Unit Cost ____ $/yd2

☑ 29. Clearing and Grubbing?

◉ 30a. Land Multiplier	1.50	ratio
○ 30b. Clear/Grub Acres		acres
31. Clear and Grub Unit Cost	2500.00	$/acre
32. Nbr. of Valves	0	nbr
33. Unit Cost of Valves	1500.00	$ ea.

○ AMDTreat Piping Costs

34. Total Length of Effluent / Influent Pipe		ft
35. Pipe Install Rate		ft/hr
36. Labor Rate		$/hr
37. Segment Len. of Trunk Pipe		ft/pipe seg.
38. Trunk Pipe Cost		$/ft
39. Trunk Coupler Cost		$/coupler
40. Spur Cost		$/ft
41. Spur Coupler Cost		$/spur
42. "T" Connector Cost		$/T coupler
43. Segment Len. of Spur Pipe		ft/pipe seg.
44. Spur Pipe Spacing		ft

◉ Custom Piping Costs

	Length		Diameter		Unit Cost	
45. Pipe #1	1400.00	ft	4.0	in	5.00	$
46. Pipe #2	500.00	ft	6.0	in	10.00	$
47. Pipe #3	20.00	ft	3.0	in	4.00	$

VFP Sizing Summaries

48. Length at Top of Freeboard	161.97	ft
49. Width at Top of Freeboard	88.98	ft
50. Freeboard Volume	994	yd3
51. Water Surface Area	12,470	ft2
52. Total Water Volume	444	yd3
53. Organic Matter Volume	411	yd3
54. Limestone Surface Area	10,654	ft2
55. Limestone Volume	1,465.36	yd3
56. Excavation Volume	2,321.0	yd3
57. Clear and Grub Area	0.4	acr.
58. Liner Area	2,399.5	ft2
59. Theoretical Retention Time	11.09	hrs

VFP Cost Summaries

60. Organic Matter Cost	10,276	$
61. Limestone Cost	54,000	$
62. Limestone and Organic Matter Placement Cost	9,793	$
63. Excavation Cost	23,211	$
64. Liner Cost	2,830	$
65. Clear and Grub Cost	1,240	$
66. Valve Cost	0	$
67. Pipe Cost	12,080	$
68. Total Cost	113,431	$

Company Name Indiana Co. Cons. Dist.

Project Waterworks PTS

Site Name Lucerne 3A

Printed on 12/18/2019

AMD TREAT
VERTICAL FLOW POND (VFP)

VFP Name: 2 of 2 in Parallel

☐ **Opening Screen Water Parameters**

SIZING METHODS Select One

1. Tons of Limestone Needed	3,720	○ VFP Based on Acidity Neutralization
2. Tons of Limestone Needed	2,594	○ VFP Based on Retention Time
3. Tons of Limestone Needed	29,405	○ VFP Based on Alkalinity Generation Rate
4. Tons of Limestone Needed	1,800	◉ VFP Based on Tons Limestone Entered
5. Tons of Limestone Needed	1,684	○ VFP Based on Dimensions

6. Retention Time ____ hours
7. Alkalinity Generation Rate ____ g/m2/day
8. Limestone Needed 1,800 tons
9. Length at Top of Freeboard ____ ft
10. Width at Top of Freeboard ____ ft

Influent Water Parameters that Affect VFP

Calculated Acidity 273.05 mg/L

Alkalinity 0.00 mg/L

○ Calculate Net Acidity (Acid-Alkalinity)

◉ Enter Net Acidity manually

Net Acidity (Hot Acidity) 306.00 mg/L

Design Flow 200.00 gpm

Typical Flow 90.00 gpm

Total Iron 24.40 mg/L

Aluminum 23.30 mg/L

Manganese 1.00 mg/L

Record Number 2 of 2

11. % Void Space of LS. Bed	45.00	%
12. System Life		years
13. Limestone Purity	90.00	%
14. Limestone Efficiency		%
15. Density of Loose Limestone	90.99	lbs/ft3
16. Limestone Unit Cost	30.00	$/ton
17. LS Placement Unit Cost	5.00	$/yd3
18. Slope of Pond Sides (Run of Slope : Rise of Slope)	2.0 : 1	
19. Freeboard Depth	2.00	ft
20. Free Standing Water Depth	1.0	ft
21. Organic Matter Depth	1.0	ft
22. Organic Matter Unit Cost	25.00	$/yd3
23. Organic Matter Spreading Unit Cost	6.00	$/yd3
24. Limestone Depth	4.5	ft
25. Excavation Unit Cost	10.00	$/yd3

Liner Cost

○ No Liner

◉ Clay Liner

11. Clay Liner Unit Cost 10.00 $/yd3

12. Thickness of Clay Liner 0.5 ft

○ Synthetic Liner

13. Synthetic Liner Unit Cost ____ $/yd2

☑ 29. Clearing and Grubbing?

◉ 30a. Land Multiplier	1.50	ratio
○ 30b. Clear/Grub Acres		acres
31. Clear and Grub Unit Cost	2500.00	$/acre
32. Nbr. of Valves	0	nbr
33. Unit Cost of Valves	1500.00	$ ea.

○ AMDTreat Piping Costs

34. Total Length of Effluent / Influent Pipe		ft
35. Pipe Install Rate		ft/hr
36. Labor Rate		$/hr
37. Segment Len. of Trunk Pipe		ft/pipe seg.
38. Trunk Pipe Cost		$/ft
39. Trunk Coupler Cost		$/coupler
40. Spur Cost		$/ft
41. Spur Coupler Cost		$/spur
42. "T" Connector Cost		$/T coupler
43. Segment Len. of Spur Pipe		ft/pipe seg.
44. Spur Pipe Spacing		ft

◉ Custom Piping Costs

	Length		Diameter		Unit Cost	
45. Pipe #1	1400.00	ft	4.0	in	5.00	$
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57. Clear and Grub Area	0.4	acr.
58. Liner Area	2,399.5	ft2
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65. Clear and Grub Cost	1,240	$
66. Valve Cost	0	$
67. Pipe Cost	12,080	$
68. Total Cost	113,431	$

Printed on 12/18/2019

Company Name Indiana Co. Cons. Dist.

Project Waterworks PTS

Site Name Lucerne 3A

AMD TREAT

AEROBIC WETLANDS

Aerobic Wetlands Name: Wetland

☐ **Opening Screen Water Parameters**

Influent Water Parameters that Affect Aerobic Wetlands

Calculated Acidity: 117.56 mg/L

Alkalinity: 0.00 mg/L

○ Calculate Net Acidity (Acid-Alkalinity)

◉ Enter Net Acidity manually

Net Acidity (Hot Acidity): 125.00 mg/L

Design Flow: 300.00 gpm

Typical Flow: 90.00 gpm

Total Iron: 8.04 mg/L

Aluminum: 23.30 mg/L

Manganese: 1.08 mg/L

pH: 3.13 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: 200 ft — 4. Top Width at Freeboard: 120 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: °C

	Length		Width
9. Length to Width Ratio		:	

	Run of Slope		Rise of Slope
10. Slope of Wetland Sides	2.0	:	1.000

11. Freeboard Depth	4.00	ft
12. Free Standing Water Depth	0.50	ft
13. Organic Matter Depth	0.50	ft
14. Organic Matter Unit Cost	25.00	$/yd3
15. Organic Matter Spreading Unit Cost	6.00	$/yd3
16. Excavation Unit Cost	10.00	$/yd3
17. Wetland Planting Unit Cost	5000	$/acre

Liner Cost

○ No Liner

◉ Clay Liner

18. Clay Liner Unit Cost: 10.00 $/yd3

19. Thickness of Clay Liner: 0.50 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	200.00	ft
26. Width at Top of Freeboard	120.00	ft
27. Freeboard Volume	3,188	yd3
28. Water Surface Area	19,136	ft2
29. Water Volume	349	yd3
30. Organic Matter Volume	338	yd3
31. Excavation Volume	687	yd3
32. Clear and Grub Area	0.8	acres
33. Liner Area	3,033	ft2
34. Retention Time	3	hrs

Aerobic Cost Summaries

35. Organic Matter Cost	10,495	$
36. Excavation Cost	6,876	$
37. Liner Cost	6,066	$
38. Clear and Grub Cost	2,066	$
39. Wetland Planting Cost	2,755	$

40. Total Cost: 28,258 $

Record Number 1 of 1

Company Name Indiana Co. Cons. Dist.

Project Waterworks PTS

Site Name Lucerne 3A

Printed on 12/18/2019

AMD TREAT

PONDS

Pond Name: Flow Splitting Pool

☐ **Opening Screen Water Parameters**

Influent Water Parameters that Affect Ponds

Calculated Acidity: 296.66 mg/L

Alkalinity: 0.00 mg/L

○ Calculate Net Acidity (Acid-Alkalinity)

◉ Enter Net Acidity manually

Net Acidity (Hot Acidity): 306.00 mg/L

Design Flow: 200.00 gpm

Typical Flow: 90.00 gpm

Total Iron: 21.20 mg/L

Aluminum: 20.60 mg/L

Manganese: 1.00 mg/L

Record Number 1 of 1

Pond Design Based On:

○ Retention Time

1. Desired Retention Time: hours

☐

3. Sludge Removal Frequency: times/year

☐ 4. Titration?

5. Sludge Rate: gal sludge/ gal H2O

6. Percent Solids: %

7.Sludge Density: lbs./gal

◉ Pond Size

8. Pond Length at Top of Freeboard: 30.000 ft

9. Pond Width at Top of Freeboard: 30.000 ft

	Run		Rise
10. Slope Ratio of Pond Sides	2.0	:	1

11. Freeboard Depth: 2.0 ft

12. Water Depth: 4.0 ft

13. Excavation Unit Cost: 10.00 $/yd3

14. Total Length of Effluent / Influent Pipe: 200.00 ft

15. Unit Cost of Pipe: 25.00 $/ft

Liner Cost

○ No Liner

◉ Clay Liner

16. Clay Liner Unit Cost: 5.00 $/yd3

17. Thickness of Clay Liner: 1.0 ft

○ Synthetic Liner

18. Synthetic Liner Unit Cost: $/yd2

☑ 19. Clearing and Grubbing?

◉ 20. Land Multiplier: 1.50 ratio

○ 21. Clear/Grub Acres: acres

22. Clear and Grub Unit Cost: 2500.00 $/acre

23. Revegetation Cost: 2200.00 $/acre

24. Cost of Baffles: 0 $

Calculated Pond Dimensions per Pond

25. Length at Top of Freeboard	30	ft
26. Width at Top of Freeboard	30	ft
27. Freeboard Volume	82	yd3
28. Water Volume	32	yd3
29. Estimated Annual Sludge	0	yd3/yr
30. Volume of Sludge per Removal	0	yd3/ removal
31. Excavation Volume	0.01	acre ft
32. Excavation Volume	32	yd3
33. Clear and Grub Area	0.03	acres
34. Liner Area	167	yd2
35. Calculated Retention Time	0	hours

Ponds Sub-Totals per Pond

36. Excavation Cost	679	$
37. Pipe Cost	5,000	$
38. Liner Cost	178	$
39. Clearing and Grubbing Cost	77	$
40. Revegetation Cost	22	$
41. Baffle Cost	0	$

42. Estimated Cost: 5,959 $

Company Name Indiana Co. Cons. Dist.

Project Waterworks PTS

Site Name Lucerne 3A

Printed on **12/18/2019**

AMD TREAT

DITCHING

Ditching Name: Conveyance Channel

1. Ditch Length Rock	120	ft
2. Ditch Length Grass	0	ft
3. Bottom Width of Ditch	3.0	ft
4. Ditch Depth	3.00	ft
5. Geo Textile Unit Cost	3.00	$/yd2
6. Length of Geo Textile	120	ft
7. Slope Ratio of Ditch Sides	Run 2.00 : Rise 1.00	
☐ 8. Surveying?		
9. Survey Rate		acres/day
10. Survey Unit Cost		$/day
☑ 11. Clearing and Grubbing?		
12. Clear and Grub Cost	2500.00	$/acre

Record Number 1 of 1

13. Ditch Depth of Rock	1.00	ft
14. Cost of Ditch Surface Rock	30.00	$/yd3
15. Cost to Place Rock	10.00	$/yd3
16. Excavation Unit Cost	10.00	$/yd3
17. Length of Silt Fence	0.00	ft
18. Unit Cost of Silt Fence	1.15	$/ft
19. Revegetation Unit Cost	2200.00	$/acre

Ditching Sub-Totals

20. Excavation Cost	1,200	$
21. Survey Cost	0	$
22. Clear and Grub Cost	124	$
23. Aggregate Cost	2,918	$
24. Filter Fabric Cost	657	$
25. Silt Fence Cost	0	$
26. Revegetation Cost	20	$
27. Total Cost	4,919	$

Printed on 12/18/2019

Company Name Indiana Co. Cons. Dist.

Project Waterworks PTS

Site Name Lucerne 3A

AMD TREAT

OTHER COST

Oher Cost Name Construction Costs

	A. Description of Item	B. Unit Cost Per Item	C. Quantity	D. Total Item Cost	E. Capital Cost Annual Cost
1.	Mob/Demob (JOB)	17,000.00	1	17,000	Capital Cost / Annual Cost
2.	Reveg (AC)	2,200.00	5	11,000	Capital Cost / Annual Cost
3.	E&S (JOB)	13,000.00	1	13,000	Capital Cost / Annual Cost
4.	Haul excess dirt offsite (CY)	10.00	6000	60,000	Capital Cost / Annual Cost
5.	Riprap spillways (T)	40.00	200	8,000	Capital Cost / Annual Cost
6.		0.00	0	0	Capital Cost / Annual Cost
7.		0.00	0	0	Capital Cost / Annual Cost
8.		0.00	0	0	Capital Cost / Annual Cost
9.		0.00	0	0	Capital Cost / Annual Cost
10.		0.00	0	0	Capital Cost / Annual Cost
11.		0.00	0	0	Capital Cost / Annual Cost
12.		0.00	0	0	Capital Cost / Annual Cost
13.		0.00	0	0	Capital Cost / Annual Cost
14.		0.00	0	0	Capital Cost / Annual Cost
15.		0.00	0	0	Capital Cost / Annual Cost

Record Number
1 of 1

Curent Capital Cost 109,000 $
Current Annual Cost 0 $

Total Capital Cost 109,000 $
Total Annual Cost 0 $