Printed on 07/12/2018

Company Name

Project Clarion County Park

Site Name CC Park Passive Treatment Syst

AMD TREAT

AMD TREAT MAIN COST FORM

Costs

Passive Treatment	A	S	
Vertical Flow Pond			$0
Anoxic Limestone Drain			$0
Anaerobic Wetlands			$0
Aerobic Wetlands	1	0	$16,006
Manganese Removal Bed			$0
Oxic Limestone Channel			$0
Limestone Bed			$0
BIO Reactor			$0
Passive Subtotal:			**$16,006**
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	2	0	$40,044
Roads			$0
Land Access			$0
Ditching			$0
Engineering Cost	1	0	$30,000
Ancillary Subtotal:			**$70,044**
Other Cost (Capital Cost)			$10,500
Total Capital Cost:			**$96,550**
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	40.00	gpm
Typical Flow	30.00	gpm
Total Iron	175.00	mg/L
Ferrous Iron	174.98	mg/L
Aluminum	0.90	mg/L
Manganese	38.00	mg/L
pH	5.40	su
Alkalinity	92.00	mg/L
TIC	0.00	mg/L

○ Calculate Net Acidity

◉ Enter Hot Acidity manually

Acidity 249.00 mg/L

Sulfate	1189.00	mg/L
Chloride	0.00	mg/L
Calcium	0.00	mg/L
Magnesium	0.00	mg/L
Sodium	0.00	mg/L
Water Temperature	20.00	C
Specific Conductivity	0.00	uS/cm
Total Dissolved Solids	0.00	mg/L
Dissolved Oxygen	0.01	mg/L
Typical Acid Loading	16.3	tons/yr

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

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COMMENTS:

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AMD TREAT

AEROBIC WETLANDS

AMDTREAT

Aerobic Wetlands Name

☐ **Opening Screen Water Parameters**

Influent Water Parameters that Affect Aerobic Wetlands

Calculated Acidity: 295.73 mg/L

Alkalinity: 92.00 mg/L

○ Calculate Net Acidity (Acid-Alkalinity)

◉ Enter Net Acidity manually

Net Acidity (Hot Acidity): 249.00 mg/L

Design Flow: 40.00 gpm

Typical Flow: 30.00 gpm

Total Iron: 175.00 mg/L

Aluminum: 0.90 mg/L

Manganese: 38.00 mg/L

pH: 5.40 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: 127 ft — 4. Top Width at Freeboard: 63 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	1.50	ft
12. Free Standing Water Depth	0.50	ft
13. Organic Matter Depth	1.00	ft
14. Organic Matter Unit Cost	32.50	$/yd3
15. Organic Matter Spreading Unit Cost	4.50	$/yd3
16. Excavation Unit Cost	14.00	$/yd3
17. Wetland Planting Unit Cost	6000	$/acre

Liner Cost

○ No Liner

◉ Clay Liner

18. Clay Liner Unit Cost: 5.00 $/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: 1300 $/acre

Aerobic Wetland Sizing Summaries

25. Length at Top of Freeboard	127.00	ft
26. Width at Top of Freeboard	63.00	ft
27. Freeboard Volume	413	yd3
28. Water Surface Area	6,897	ft2
29. Water Volume	124	yd3
30. Organic Matter Volume	229	yd3
31. Excavation Volume	354	yd3
32. Clear and Grub Area	0.2	acres
33. Liner Area	1,089	ft2
34. Retention Time	10	hrs

Aerobic Cost Summaries

35. Organic Matter Cost	8,499	$
36. Excavation Cost	4,958	$
37. Liner Cost	1,089	$
38. Clear and Grub Cost	358	$
39. Wetland Planting Cost	1,102	$
40. Total Cost	16,006	$

Record Number 1 of 1

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AMD TREAT

PONDS

AMDTREAT

Pond Name

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 100.000 ft
  - 9. Pond Width at Top of Freeboard 100.000 ft

	Run		Rise	
10. Slope Ratio of Pond Sides	3.0	:	1	
11. Freeboard Depth	2.0			ft
12. Water Depth	4.0			ft
13. Excavation Unit Cost	14.00			$/yd3
14. Total Length of Effluent / Influent Pipe	0.00			ft
15. Unit Cost of Pipe	10.00			$/ft

Liner Cost

- ○ No Liner
- ○ Clay Liner
  - 16. Clay Liner Unit Cost _____ $/yd3
  - 17. Thickness of Clay Liner _____ ft
- ◉ Synthetic Liner
  - 18. Synthetic Liner Unit Cost 5.50 $/yd2

☑ 19. Clearing and Grubbing?

- ◉ 20. Land Multiplier 1.50 ratio
- ○ 21. Clear/Grub Acres _____ acres
- 22. Clear and Grub Unit Cost 1300.00 $/acre

23. Revegetation Cost 1500.00 $/acre

24. Cost of Baffles 0 $

☐ **Opening Screen Water Parameters**

Influent Water Parameters that Affect Ponds

Calculated Acidity 295.73 mg/L

Alkalinity 92.00 mg/L

- ○ Calculate Net Acidity (Acid-Alkalinity)
- ◉ Enter Net Acidity manually

Net Acidity (Hot Acidity) 249.00 mg/L

Design Flow 40.00 gpm

Typical Flow 30.00 gpm

Total Iron 175.00 mg/L

Aluminum 0.90 mg/L

Manganese 38.00 mg/L

Record Number 1 of 2

Calculated Pond Dimensions per Pond

25. Length at Top of Freeboard	100	ft
26. Width at Top of Freeboard	100	ft
27. Freeboard Volume	1,518	yd3
28. Water Volume	862	yd3
29. Estimated Annual Sludge	0	yd3/yr
30. Volume of Sludge per Removal	0	yd3/ removal
31. Excavation Volume	0.53	acre ft
32. Excavation Volume	862	yd3
33. Clear and Grub Area	0.34	acres
34. Liner Area	1,331	yd2
35. Calculated Retention Time	72	hours

Ponds Sub-Totals per Pond

36. Excavation Cost	12,079	$
37. Pipe Cost	0	$
38. Liner Cost	7,323	$
39. Clearing and Grubbing Cost	447	$
40. Revegetation Cost	172	$
41. Baffle Cost	0	$
42. Estimated Cost	20,022	$

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ENGINEERING COST

1. Capital Cost *	66,550	$
○ 2. Per Cent of Capital Cost		%
◉ 3. Actual Engineering Cost	30,000	$
4. Total Engineering Cost	30,000	$

*** Total Capital Cost minus Engineering and Land Access Capital Cost**

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AMD TREAT

OTHER COST

Oher Cost Name

	A. Description of Item	B. Unit Cost Per Item	C. Quantity	D. Total Item Cost	E. Capital Cost Annual Cost
1.	Moving limestone from ALD to wetland, CY	15.00	200	3,000	Capital Cost / Annual Cost
2.	E&S Control, silt sock, ft	10.00	500	5,000	Capital Cost / Annual Cost
3.	Mobilization/Demobilization	2,500.00	1	2,500	Capital Cost / Annual Cost
4.		0.00	0	0	Capital Cost / Annual Cost
5.		0.00	0	0	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 10,500 $
Current Annual Cost 0 $

Total Capital Cost 10,500 $
Total Annual Cost 0 $