Engineering Report

Water Quality Trading Plan

Prepared For

VPP GROUP, LLC
NORWALK | WISCONSIN
I. EXECUTIVE SUMMARY

This Water Quality Trading Plan details VPP Group, LLC’s (referred to hereafter as ‘VPP’) plan to comply with their Total Phosphorus (TP) Water Quality-Based Trading Effluent Limitation (WQBEL), as specified in their Wisconsin Pollutant Discharge Elimination System (WPDES) Permit No. WI-0052931-08-0. VPP intends to work with the Monroe County Land Conservation Department (referred to hereafter as the ‘County’) to undertake a stream bank restoration project at Moore Creek to generate Phosphorus (P) credits for Water Quality Trading (WQT). The County will design improvements and bid out construction work on behalf of VPP. VPP or Monroe County will hire a contractor for the project.

II. BACKGROUND

The Moore Creek runs eastwards, and is located southwest of the VPP facility. The banks of the river are not used for any purpose at this time. Figure II-1 illustrates the location of Moore Creek relative to the VPP facility.
Under VPP’s current WPDES permit, a 6-month average TP limit of 0.075 mg/L will need to be met during the next Permit term.

VPP will, more than likely, not be able to consistently meet the TP limit with their existing facilities. The effluent data from the past 2.5-years is summarized in Table II-1. During the period of May 2015 to October 2015, the effluent TP exceeded the WQBEL for P. As such, acquiring credits to Trade to offset their P effluent discharge will allow them to achieve compliance.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Avg. Effluent P</th>
<th>Avg. Effluent TP</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2015 - October 2015</td>
<td>0.141</td>
<td>0.065</td>
</tr>
<tr>
<td>November 2015 - April 2016</td>
<td>0.073</td>
<td>0.034</td>
</tr>
<tr>
<td>May 2016 - October 2016</td>
<td>0.053</td>
<td>0.023</td>
</tr>
<tr>
<td>November 2016 - April 2017</td>
<td>0.055</td>
<td>0.026</td>
</tr>
</tbody>
</table>

VPP intends to acquire credits by reducing the soil erosion from a non-point source, which has been identified as the banks of the Moore Creek located southwest of the facility. By designing improvements to the stream bank, the reduction in soil erosion subsequently leads to less P being leached into the Creek. This reduction will generate the required credits for compliance. VPP owns the rights to the land adjacent to the Creek, south of Wilton Road, which will allow them to perform the necessary modifications to reduce soil erosion.

VPP partnered with the County for this project. Soil samples were collected on August 10, 2018 from potential degradation sites along the bend in the riverbank, located southwest of the facility. A copy of the results is included in Appendix #2. The results revealed the concentration of P in the soil, which was used to calculate the amount of P that could be saved by reducing erosion. It was determined that improving the south bank of Bank Segment #3 would be sufficient to generate the required pollutant reduction credits. Once the project is installed, it will be maintained perpetually and keep providing credits in the future.

Figure II-2 illustrates various stream segments that could be restored, with Bank Segment #3 highlighted in the yellow box.
Table II-2 shows the calculation for yearly P losses due to erosion of Bank Segment #3. This is based on the NRCS erosion calculator combined with soil P concentration.

<table>
<thead>
<tr>
<th>Bank Segment</th>
<th>Length (feet)</th>
<th>Width (feet)</th>
<th>Erosion Rate (feet/yr.)</th>
<th>Volume Loss (cu.ft./yr.)</th>
<th>Mass Loss (tons/yr.)</th>
<th>Soil P Conc. (%)</th>
<th>P Loss (lbs./yr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#3</td>
<td>300</td>
<td>6.0</td>
<td>0.50</td>
<td>900</td>
<td>49.5</td>
<td>0.03</td>
<td>29.7</td>
</tr>
<tr>
<td>Est. Soil Weight, lbs./cu.ft.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>110</td>
</tr>
<tr>
<td>Soil Texture: Gravel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The stream bank lateral recession rate was determined by the County using NRCS guidance included in Appendix #3.

III. TRADE RATIO

WQT must result in an improvement in water quality. As such, the Department Of Natural Resources (DNR) established a Trade ratio that determines the number of credits that must be generated for a WQT. The Trade ratio equation is:

\[
\text{Trade Ratio} = \frac{(\text{Delivery} + \text{Downstream} + \text{Equivalency} + \text{Uncertainty} - \text{Habitat Adjustment})}{1}
\]

A discussion of each factor is considered below:

A. **Delivery Factor**

The Delivery Factor accounts for the distance between Trading partners and the impact the distance has on the transport of traded pollutant in surface waters. As both the credit generator and VPP are located in the same HUC-12 watershed, the Delivery Factor equals 0.

B. **Downstream Trading Factor**

A Downstream Trading Factor is needed when the credit generator is located downstream from the credit user’s point of standards application. Since bank is located upstream of VPP’s point of discharge, Downstream Trading Factor equals 0.

C. **Equivalency Factor**

The Equivalency Factor accounts for Trading partners discharging different forms of a pollutant. The restoration project would directly result in a reduction of P concentration into the river; thus, the Equivalency Factor equals 0.

D. **Uncertainty Factor**

The Uncertainty Factor compensates for the multiple sources of uncertainty that occur in the generation of credits by non-point sources. The County proposes to conduct a stream
bank restoration project that will contribute to aquatic habitat restoration. Looking at Table 4, Page 20, of the Guidance for Implementing Water Quality Trading in WPDES Permits published by the Wisconsin DNR, this corresponds with an Uncertainty Factor of 2.

E. **Aquatic Habitat Adjustment Factor**

By reducing soil erosion, the aquatic habitat will be improved and have increased water quality. The reach of stream that encompasses the 900 lin.ft. of eroding stream bank consists of runs that have a small 3 to 4-inch cobble bottom, and pools are primarily silt and sand. There is very little habitat within this reach due to vertical banks without vegetation, pool depth is not adequate to provide depth protection from predators and very little woody habitat is available. There are a few trees overhanging the water and one root wad that could provide some cover. Overall depth is the limiting factor on the entire reach.

This factor is accounted for in the Uncertainty Factor; thus, the Aquatic Habitat Adjustment Factor is 0.

Therefore, equating all these factors:  \[ \text{Trade Ratio} = (0 + 0 + 0 + 2 - 0):1 = 2:1 \]

F. **Credits Required**

The effluent TP for May 2015 to October 2015 was recorded as 0.065 lbs./day. To determine the credits required, the allowable discharge as stipulated by the WPDES is calculated as shown.

\[
\text{Allowable Limit} = 0.055 \text{ mgd} \times 8.34 \times 0.075 \text{ mg/L} \\
= 0.034 \text{ lbs./day}
\]

Where 8.34 is a conversion factor to convert to lbs./day.

The total amount of P required for Trading is:

\[
\text{P Required For Trading} = (0.065 - 0.034) \text{ lbs./day} \times 365 \text{ days/year} \\
= 11.3 \text{ lbs./year}
\]

Including a safety factor of 1.2, the required P for Trading is 13.5 lbs./year, rounded up to 14 lbs./year. Applying the Trade ratio, the required P credits are:

\[
\text{P Credits Required} = \text{P Required For Trading} \times \text{Trade Ratio} = 14 \text{ lbs./year} \times 2 \\
= 28 \text{ lbs./year}
\]

Referring to Table II-2, by stabilizing Stream Segment Area #3, the amount of P saved would be 29.7 lbs./year, which meets the 28 lbs./year criteria.
G. **Schedule For Stream Bank Restoration**

The project will be implemented in the fall of 2018 or early 2019.

H. **Operation & Maintenance Of The Stream Bank Restoration**

The stream bank restoration project will be maintained per the recommendations of the County. A copy of the Draft Operation & Maintenance Plan is included at the end of Appendix #4.

I. **Inspection & Reporting**

1. **Monthly Certification:**

   Each month, VPP will certify that the stream bank restoration project is operated and maintained in a manner consistent with this Water Quality Trading Plan. Such a certification may be made by including the following statement as a comment on the Monthly Discharge Monitoring Report:

   *I certify that management practices identified in the approved Water Quality Trading Plan as the source of pollutant reduction credits are installed, established and properly maintained.*

2. **Inspections:**

   a. VPP will observe the restoration project annually to confirm the practice is still in place. VPP Group will also observe the restoration project after flood events.

   b. The DNR will have the right to access and inspect the stream bank.

3. **Annual Water Quality Trading Report:**

   When WQT is being used to demonstrate compliance with WQBEL's, VPP shall report to the DNR by January 31st of each year with the following information:

   a. The number of pollutant reduction credits (lbs./month) used each month of the previous year to demonstrate compliance;

   b. The summary of the annual inspection of the stream bank and the status of the project;

   c. Identification of non-compliance or failure to implement any terms or conditions of WPDES Permit No. WI-0052931-08-0 with respect to WQT that have not been reported in discharge monitoring reports.
4. **Reporting:**

   a. VPP shall notify the DNR within 7-days in the event that the stream bank restoration project does not generate the pollutant reduction credits as defined in the Water Quality Trading Plan.

   b. VPP shall provide the DNR written notice within 7-days of the Trade Agreement upon which the approved Water Quality Trading Plan is being amended, modified or revoked. This notification shall include the details of any amendment or modification, in addition to the justification for the change.

J. **Practice Registration Documents**

   A copy of the Draft Streambank Restoration Plan proposed by Monroe County is included in Appendix #4. Please note that VPP Group, LLC only intends to implement the restoration on Stream Bank Segment #3.

A Water Quality Trading (WQT) Agreement is in place between Crockett County Cattle, LLC and VPP Group, LLC. Crockett County Cattle, LLC and VPP Group, LLC are under the same ownership. Crockett County Cattle, LLC owns all the properties of the Owner’s facilities. This Agreement requires Operation & Maintenance (O&M) and inspections of the streambank restoration to be carried out.
Appendix #1

WATER QUALITY TRADING CHECKLIST
Form 8700
State of Wisconsin  
Department of Natural Resources  
101 South Webster Street  
Madison, WI 53707

Water Quality Trading Checklist  
Form 8700-nnn (R10/12)

---

Applicant Information

<table>
<thead>
<tr>
<th>Permittee Name</th>
<th>Permit Number</th>
<th>Facility Site Number</th>
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<td>VPP Group, LLC</td>
<td>WI- 0052931-08-0</td>
<td>Unknown</td>
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<table>
<thead>
<tr>
<th>Facility Address</th>
<th>City</th>
<th>State</th>
<th>Zip Code</th>
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<tbody>
<tr>
<td>19801 Highway 41 East</td>
<td>Norwalk</td>
<td>WI</td>
<td>54640</td>
</tr>
</tbody>
</table>

Project Contact Name(if applicable)  
Address | City | State | Zip Code |

---

Project Name

Receiving Water Name  
Moore Creek  
Parameter(s) being traded  
Total Phosphorus  
HUC 12  
040900000102

Credit Generator Information

Credit generator type (check all that apply):  
-[ ] Permitted Discharge (non-MS4)  
-[ ] Permitted MS4  
-[ ] CAFOs  
- [ ] Non-permitted urban discharge  
- [ ] Agricultural nonpoint source discharge  
- [ ] Other- Specify: Stream Bank Restoration

Are any of the credit generators in a different HUC 12 than the applicant?  
[ ] Yes; HUC 12:  
[ ] No

Are any of the credit generators downstream of the applicant?  
[ ] Yes  
[ ] No

Was a broker/exchange be used to facilitate trade?  
[ ] Yes (include description and contact information in WQT plan)  
[ ] No

Permitted Discharge Information (Traditional Municipal/Industrial Discharge, MS4, CAFO):

Are each of the point sources identified in this section are in compliance with their WDPES permit requirements?  
[ ] Yes  
[ ] No

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<thead>
<tr>
<th>Discharge Type</th>
<th>Permit Number</th>
<th>Name</th>
<th>Contact Information</th>
<th>Trade Agreement Number</th>
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<td>[ ] Traditional</td>
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<td></td>
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</tr>
<tr>
<td>[ ] MS4</td>
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</tr>
<tr>
<td>[ ] CAFO</td>
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<tr>
<td>[ ] MS4</td>
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<td>[ ] CAFO</td>
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<tr>
<td>[ ] MS4</td>
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<tr>
<td>[ ] CAFO</td>
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<td>Does plan have a narrative that describes:</td>
<td>Plan Section</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>------------------------------------------</td>
<td>--------------</td>
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<tr>
<td>a. Summary of discharge and existing treatment</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
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<tr>
<td>b. Amount of credit being generated</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Timeline for credits and agreements</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Method for quantifying credits</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Tracking and verification procedures</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Location of credit generator in proximity to receiving water and credit user</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Other: ____________________________</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<table>
<thead>
<tr>
<th>Non-Permitted Discharge Information (Non-permitted urban, agricultural, other):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>□ Urban NPS</td>
</tr>
<tr>
<td>□ Urban NPS</td>
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<tr>
<td>□ Urban NPS</td>
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<td>□ Urban NPS</td>
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<tr>
<td>□ Urban NPS</td>
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<tr>
<td>Does plan have a narrative that describes:</td>
</tr>
<tr>
<td>----------------------------------------</td>
</tr>
<tr>
<td>a. Description of existing land uses</td>
</tr>
<tr>
<td>b. Management practices used to generate credits</td>
</tr>
<tr>
<td>c. Amount of credit being generated</td>
</tr>
<tr>
<td>d. Description of applicable trade ratio per agreement/management practice</td>
</tr>
<tr>
<td>e. Timeline for credits and agreements</td>
</tr>
<tr>
<td>f. Method for quantifying credits</td>
</tr>
<tr>
<td>g. Tracking procedures</td>
</tr>
<tr>
<td>h. Conditions under which the management practices may be inspected</td>
</tr>
<tr>
<td>i. Reporting requirements should the management practice fail</td>
</tr>
<tr>
<td>j. Operation and maintenance plan for each management practice</td>
</tr>
<tr>
<td>k. Location of credit generator in proximity to receiving water and credit user</td>
</tr>
<tr>
<td>l. Practice registration documents, if available</td>
</tr>
<tr>
<td>m. History of project site(s)</td>
</tr>
<tr>
<td>n. Other:</td>
</tr>
</tbody>
</table>

The preparer and owner certify all of the following:

- I am familiar with the specifications submitted for this application, and I believe all applicable items in this checklist have been addressed.
- I have completed this document to the best of my knowledge and have not excluded pertinent information.
- I certify that the information in this document is true to the best of my knowledge.

Signature of Preparer 

Date Signed
Appendix #2

SOIL SAMPLE RESULTS
SOIL and FORAGE ANALYSIS LABORATORY
2611 Yellowstone Drive, Marshfield WI 54449
Phone 715-387-2523 ext 11

Corina Turriff
VPP Group LLC
PO Box 227
Norwalk WI 54648

Date 8/23/18
Account # 558790
Report # 4253

Soil Analysis

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>P nitric/peroxide %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.03</td>
</tr>
<tr>
<td>2</td>
<td>0.04</td>
</tr>
<tr>
<td>3</td>
<td>0.03</td>
</tr>
<tr>
<td>4</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Chad Olsen

From: Bryce Richardson <Bryce.Richardson@co.monroe.wi.us>
Sent: Wednesday, September 5, 2018 8:59 AM
To: Chad Olsen
Subject: RE: FW: Soil Total P Report 4253

Chad,

The 4 soil samples were taken on the following banks.

Bank #1  Sample #1
Bank #2  Sample #2 and #3 due to length of the bank.
Bank #3  Sample #4

All banks were very similar in height and rate of erosion so I combined the banks when calculating the soil loss on the spreadsheet.

From: Chad Olsen [mailto:COlsen@mcmgrp.com]
Sent: Monday, September 03, 2018 12:18 PM
To: Bryce Richardson
Cc: Bob Micheel; steve turriff; Paul Much; Nolan Knapp
Subject: FW: FW: Soil Total P Report 4253

Bryce,

Please see attached and email below to Bob Micheel. It looks like Bob is out till the 14th. Did you help with this project? Would you have time to talk tomorrow?

Thank you
Chad Olsen
McMahon
(920) 751-4200

From: Chad Olsen
Sent: Monday, September 3, 2018 12:14 PM
To: 'Bob Micheel'
Cc: 'steve turriff'; Paul Much; Nolan Knapp
Subject: RE: FW: Soil Total P Report 4253

Bob,

We need to submit an updated Trading Plan to DNR for VPP this week. I am having a hard time following your calcs below. How do the four soil samples (attached) correlate with the 3 stream segments in your Plan?

Do all three segments have the same eroding bank height and lateral recession rate? Please let me know if you have time to talk on Tuesday.

Thank you
Appendix #3

NRCS STREAM BANK EROSION GUIDANCE
The average annual recession rate is the thickness of soil eroded from a bank surface (perpendicular to the face) in an average year.

Stream bank erosion sometimes presents itself as a major occurrence in a given year, whereas the same bank may not erode significantly for a period of years if no major runoff events occur. Recession rates need to be calculated as an average of years when erosion does and does not occur. Recession rate is not calculated as the erosion occurring after a single event.

Use available resources to assist in the estimation of recession rate: use past and present aerial photography, old survey records, and any other information that helps to determine the bank condition at known times in the past. When such information is lacking or insufficient, field observations and professional judgment are needed to estimate recession rates.

It is often not possible to directly measure recession rates in the field. Therefore, the following table has been included which relates recession rates to narrative descriptions of banks eroding at different rates (Table from NRCS Wisconsin guidance).

<table>
<thead>
<tr>
<th>Lateral Recession Rate (ft/yr)</th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01-0.05</td>
<td>Slight</td>
<td>Some bare bank but active erosion not readily apparent. Some rills but no vegetative overhang. No exposed tree roots.</td>
</tr>
<tr>
<td>0.06-0.2</td>
<td>Moderate</td>
<td>Bank is predominantly bare with some rills and vegetative overhang. Some exposed tree roots but no slumps or slips.</td>
</tr>
<tr>
<td>0.3-0.5</td>
<td>Severe</td>
<td>Bank is bare with rills and severe vegetative overhang. Many exposed tree roots and some fallen trees and slumps or slips. Some changes in cultural features such as fence corners missing and realignment of roads or trails. Channel cross section becomes U-shaped as opposed to V-shaped.</td>
</tr>
<tr>
<td>0.5+</td>
<td>Very Severe</td>
<td>Bank is bare with gullies and severe vegetative overhang. Many fallen trees, drains and culverts eroding out and changes in cultural features as above. Massive slips or washouts common. Channel cross section is U-shaped and stream course may be meandering.</td>
</tr>
</tbody>
</table>
CONSTRUCTION PLAN

PRACTICE: STREAMBANK PROTECTION (580); STREAM HABITAT (395); OBST RMVL (500)

LANDOWNER - CROCKETT CTY CATTLE LLC

LANDOWNER ADDRESS - 19081 ST HWY 71, NORWALK, WI 54648

LANDOWNER PHONE - 608-823-7445 COUNTY - MONROE

TOWNSHIP - RIDGEVILLE T 16 N, R 2 W, SEC. 34

FIELD OFFICE - SPARTA TELEPHONE NO. - 608-269-8975

LOCATION MAP

DIGGERS HOTLINE

Call 3 Work Days Before You Dig!
Toll Free
1-800-242-8511

Internet http://www.diggershotline.com

Utilities: Any representation made by the USDA, Natural Resources Conservation Service, or the Monroe County LCD, as to the approximate location or nonexistence of above or underground hazards does not relieve the owner of the property or the excavator that is hired to complete construction, from notifying Digger's Hotline of the pending construction. You will be liable for damages resulting from construction activities. (Call Diggers Hotline.) Ticket # ______________________

Landowner Agreement: I have reviewed and understand the construction plans and specifications and agree to complete the work accordingly. Failure to meet these plans and specifications may jeopardize any continued NRCS technical assistance or program cost sharing applied for. I understand that it is my responsibility to secure all necessary permits and licenses, and to complete the work in accordance with all local, state, and federal laws. Modification of these construction plans or specifications must be approved by the NRCS before installation. I assume all responsibility for negotiations and contract agreements with the construction contractors.

Estimated Quantities and Cost Estimate: Quantities are estimated to the nearest lines and grades of in-place materials shown on the construction plan unless otherwise stated. Truck yardage, loose fill, shrinkage, etc., must be calculated and compensated for by the contractor preparing a bid or constructing the project. Agency cost estimates are based on costs of similar projects and cost of materials at the time of the estimate. Costs do not reflect spikes in material or fuel costs. NRCS highly recommends you, as the owner of the project, obtain multiple bids for a comparison to the agency cost estimate.

Signed: ___________________________ Date: ___________________________

Designed by: Christina Mulder Date: 8/13/18

Checked by: Bryce Richardson Date: 8/13/18

Approved by: Bryce Richardson Date: 8/13/18

The installed practices comply with applicable NRCS technical standards and specifications. The "redlined" construction plans (as-built drawings) reflect changes made during construction.

Construction Approved by: ___________________________ Date: ___________________________

Job Approval Class 580-I

Sheet 1 of 8
## ESTIMATED QUANTITIES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>SHEET NUMBER</th>
<th>WI. CONSTRUCTION SPEC. OR JOB SHEET NUMBER</th>
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<tr>
<td>OBSTRUCTION REMOVAL</td>
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<td>1</td>
<td>3_4</td>
<td>WI SPEC. 2</td>
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<tr>
<td>ROCK RIPRAP D50=8&quot;</td>
<td>LN FT</td>
<td>900</td>
<td>3-5</td>
<td>WI SPEC. 1, 2, 9</td>
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<td>1</td>
<td>3_4,10</td>
<td>WI SPEC. 9</td>
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<td>SEED/MULCH</td>
<td>AC</td>
<td>0.5</td>
<td>3_4,7,8</td>
<td>WI-710</td>
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Quantities are estimated to the neat lines and grades of in-place materials shown on the construction plan unless otherwise stated. Truck yardage, loose fill, shrinkage, etc., must be calculated and compensated for by the contractor preparing a bid or constructing the project.
CONSTRUCTION NOTES

1. A preconstruction meeting shall be scheduled with Monroe County LCD personal, the contractor, and the landowner prior to construction start-up. Contractor shall notify the Sparta LCD Field Office (608-269-8975) at least one week prior to the start of construction.

2. Contact County Planning and Zoning Department and Local Township for possible permits. Landowner must receive the DNR and all other required permits prior to start of construction.

3. **Contact Diggers Hotline at least 3 days prior to start of construction. (800) 242-8511 (811) or DiggersHotline.com.** Notification of affected utility companies is the responsibility of the contractor.

4. All estimated quantities are based on neat lines and grades unless otherwise stated. Technician will stake the project prior to construction.

5. Trees and other debris located along streambanks will be removed as directed by technician throughout length of project area. Trees and debris will be disposed of in an area agreed upon by the landowner and technician and then hauled off site or safely burned.

6. Rock riprap must be from a tested and approved quarry. Contractor must provide the technician with the proposed rock source quarry name prior to the start of construction to verify its approval.

7. Key in upstream and downstream ends of the rip rap. Provide smooth transition from bank slope face to rock face.

8. Technician must be on site during placement of in-stream log habitat.

9. Any remaining spoil from shaping streambanks will be spread evenly on adjacent land in a manner that allows water to drain freely. **Spoil shall not enter a wetland depression.**

10. All disturbed areas will be mulched and seeded according to seeding plan.

11. LCD personal will be on site regularly to ensure proper construction is being completed.

12. Contractor will be responsible for correcting problems which occur as the result of not following proper construction procedures.
Plan Map

Customer(s): CROCKETT CTY CATTLE LLC
Legal Description: T18N, R2W, SEC 34
Township: RIDGEVILLE

Legend
- roads_MonroeCo
- Monroe Sections
- Rock Riprap

Bank | Riprap
-----|-------
1    | 200'  
2    | 400'  
3    | 300'  
Total| 900'  

Date: 8/9/18
Horiz. dimension "X" of Rock
Thickness = 10.2

EXISTING GROUND LINE

TOPSOIL

OHWM ELEV. VARIES

AVERAGE H = \( \frac{2}{3} \) FT.

ROCK THICKNESS \( \frac{2}{4} \) FT.

BANK SLOPE LINE

ANTICIPATED BOTTOM SCOUR

2 FT. MIN.

TYPICAL CROSS SECTION

### GRADATION OF ROCK

<table>
<thead>
<tr>
<th>PERCENT PASSING BY WEIGHT</th>
<th>SIZE (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>16</td>
</tr>
<tr>
<td>60-85</td>
<td>12</td>
</tr>
<tr>
<td>25-50</td>
<td>8</td>
</tr>
<tr>
<td>5-20</td>
<td>4</td>
</tr>
<tr>
<td>0-5</td>
<td>2</td>
</tr>
</tbody>
</table>

### QUANTITY ESTIMATE*

- BANK SLOPING FOR RIPRAPH 900 LIN. FT.
- BANK SLOPING (SEEDING ONLY) 833 LIN. FT.
- ROCK FOR RIPRAPH (WI CONST. SPEC. 9) 0.5 ACRES
- SEEDING *ESTIMATED TO THE NEAT LINES AND GRADE

### NOTES:
1. DOUBLE THE ROCK THICKNESS FOR A DISTANCE OF 4 FEET AT THE UPSTREAM AND DOWNSTREAM ENDS OF THE RIPRAPH. BLEND THE ROCK SURFACE TO MATCH THE EXISTING STABLE BANK SURFACE.
2. SPREAD TOPSOIL TO WITHIN 1' OF STREAM EDGE. TRACK ALL TOPSOIL PERPENDICULAR TO STREAM TO REDUCE EROSION.

---

THIS STANDARDIZED DESIGN MUST BE ADAPTED TO THE SPECIFIC SITE.

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STREAMBANK PROTECTION NO FILTER OR GEOFABRIC (PARTIAL BANK HEIGHT)

CLIENT: Crockett, City Cathe

COUNTY: Monroe

NRCS
Natural Resources Conservation Service
United States Department of Agriculture
*CARE SHALL BE TAKEN DURING PLACEMENT TO AVOID STREAM BANK EROSION ON OPPOSITE BANK.

*ROOTS/LIMBS SHALL BE TRIMMED SO AS TO BE BELOW THE ORDINARY HIGH WATER MARK.
SEEDING DATES

<table>
<thead>
<tr>
<th>TIME PERIOD</th>
<th>DATES</th>
<th>TYPE OF SEEDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>April 15</td>
<td>Permanent</td>
</tr>
<tr>
<td>Summer</td>
<td>June 2</td>
<td>Temporary *</td>
</tr>
<tr>
<td>Late Summer</td>
<td>August 1</td>
<td>Permanent</td>
</tr>
<tr>
<td>Fall</td>
<td>August 22</td>
<td>Temporary *</td>
</tr>
<tr>
<td>Late Fall</td>
<td>November 1</td>
<td>Dormant</td>
</tr>
<tr>
<td>Winter</td>
<td>Snow Cover</td>
<td>Not Allowed</td>
</tr>
</tbody>
</table>

MATERIALS

If no soil test is available, apply a minimum of 150 pounds of 20-10-10 fertilizer per acre. This is equivalent to 30 pounds nitrogen (N), 15 pounds phosphate (P2O5), and 15 pounds potash (K2O) per acre. Apply two tons of 80-89 lime or equivalent.

* Seed a temporary cover crop of Winter Wheat at __120__ # /ac (__2__ bu/ac)

A permanent seeding shall be completed during the next acceptable time period following a temporary seeding.

MINIMUM PURE LIVE SEED (PLS) ¹ RATE PER ACRE AND TOTAL POUNDS OF SEED NEEDED

<table>
<thead>
<tr>
<th>SEEDING MIX (DESIGN)</th>
<th>LOCATION</th>
<th>DISTURBED</th>
<th>SEEDING MIX (AS-BUILT)</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECIES</td>
<td>RATE</td>
<td>POUNDS</td>
<td>SPECIES</td>
<td>RATE</td>
</tr>
<tr>
<td>Kentucky Bluegrass</td>
<td>3.3</td>
<td>1.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creeping Red Fescue</td>
<td>4.4</td>
<td>2.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perennial Ryegrass</td>
<td>11.0</td>
<td>5.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winter Wheat</td>
<td>120.0</td>
<td>60.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ PLS lbs. = (total % Germination / 100 * % Purity / 100) * Net Weight (lbs.)

** Companion Crop

Additional native seeds may be required by permitting agencies. These additions are allowed.

Seed mixture shall meet all requirements of the WI weed laws.

Species identified as restricted or prohibited by law shall not be planted.

Certified seed shall be used, and the seeding rates will be based on pure live seed.

For dormant seedings, increase the seeds per square foot by 15%.

SEEDBED PREPARATION

Seedbed preparation shall immediately follow construction activities.

Prepare a fine, firm seedbed to a minimum depth of three inches. A seedbed is considered firm when a footprint penetrates 1/4 to 1/2 inch deep.
SEEDING
Inoculate legumes with the specific inoculum for the species in accordance with the manufacturer’s recommendations. When using a hydroteeder, five times the recommended rate of inoculant shall be added to the hydroteeder. Inoculant shall not be mixed with liquid fertilizer.

Seed may be broadcast or drilled as appropriate to the site.
Seed, fertilize, and lime as soon as possible after construction.
Seeding perpendicular to direction of flow is required to limit erosion.

Seed grasses and legumes no more than 1/4 inch deep.

Consider seeding at a lower rate and making 2 passes to ensure more uniform distribution.

TEMPORARY SEEDING OPTIONS
Select one of the following species for temporary cover if:
1) The required seeds or plant stock are not available or
the normal permanent seeding period for the species has passed
   Forage Sorghum - 1/2 bushel per acre (May 15-July 15)
   Sorghum - Sudangrass Hybrid - 1 bushel per acre (May 15-July 15)
   Sudangrass - 1 bushel per acre (May 15-July 15)
   Winter Wheat - 2 bushels per acre (Aug 1-Oct 1)
   Winter Cereal Rye - 2 bushels per acre (Aug 1-Oct 15)
   Oats - 2 bushels per acre (Apr 1-Sept 1)
   Annual Ryegrass - 20 Pounds per acre (Apr 1-Sept 1)

2) Triazine herbicide carryover will not allow establishment of permanent cover immediately.
   Forage Sorghum - 1/2 Bushel per acre (May 15-July 15)
   Sorghum - Sudangrass Hybrid - 1 Bushel per acre (May 15-July 15)
   Sudangrass - 1 Bushel per acre (May 15-July 15)

DORMANT SEEDING
Seed is broadcast and incorporated, no-tilled, or drilled into the seedbed.
Seedbed preparations and conditions are similar to conventional seeding.

MULCHING
Mulching shall be done immediately after seedbed preparation and seeding.
Mulch shall be applied immediately after final grading for areas seeded at a later date.
Mulch material shall be relatively free of disease, pesticides, chemicals, noxious weed seeds, and other pests and pathogens.

Spread straw and hay mulch uniformly and at the rate of 1.5-2.0 tons per acre (60-70 bales). This application results in a layer of 6 to 7 stems, 1 to 2 inches thick, and provides a minimum 70% ground cover. Some soil surface can be seen after the application. Crimping (disking), wood cellulose fiber, tackifiers, netting, pinning, or other acceptable methods of anchoring will be used if needed to hold the mulch in place.

If other mulch materials are used, the rate of application shall meet the manufacturer’s recommendations.
I agree to the following for the next 20 years.

1. Check the riprap, habitat structures, plantings, at least once each year and immediately after severe floods. Rock removed or displaced shall be replaced as needed. Repair work shall take place during periods of low stream flow.

2. Logs, trees, driftwood, and other debris lodged in or near the riprap shall be removed.

3. Check for sloughing, erosion, or damage to vegetative cover. Damaged areas shall be graded, shaped, and re-vegetated as soon as possible.

4. Immediately repair any vandalism, vehicle or livestock damage.

5. Livestock will be managed in the stream corridor to maintain vegetative cover and prevent erosion.

6. Eliminate all burrowing rodents and repair damage caused by them.

Cooperator's signature: ___________________________ Date: ___________

I have discussed the maintenance guidelines with the above cooperator.

Conservationist's signature: ___________________________ Date: ___________