

Final Report

Urban Nonpoint Source & Storm Water Construction & Targeted Runoff Management Small-scale Urban TMDL Grant Program

Form 3400-189U (03/16)

Page 1 of 3

NOTICE: This document is required under s. 281.65 & s. 281.66, Wis. Stats., and chs. NR 153, 154, and 155, Wis. Adm. Code. A final project report must be submitted as part of the final reimbursement request. Personally identifiable information contained in this form will be used for determining reimbursement eligibility in the Urban Nonpoint Source & Storm Water and Targeted Runoff Management Grant Programs and will not be used for any other purpose.

INSTRUCTIONS: Send the completed, electronic copy of this form and all attachments to the Department of Natural Resources (DNR) Region Nonpoint Source Coordinator. Please read all instructions prior to completion.

Grant Type

☒ Urban Nonpoint Source Construction ☐ TRM Small-scale Urban TMDL

Project & Location Information

Governmental Unit Name		Grant Number
Garners Creek Storm Water Utility		USC-LF03-44901-15
Project Name		
2015 Stream Bank Erosion Control Projects		
County	Watershed Name	12-Digit HUC
Outagamie	Plum & Kankapot Creeks	040302040205
Project Contact Name	Phone Number	E-mail Address
Joe Stephenson	(920) 788-7740	stephensonj@combinedlocks.org
<input checked="" type="checkbox"/> For a project with multiple site locations, an aerial photo map is attached with each site location labeled.		

Site Location - 1

Additional sites may be added to the project by clicking the [+ Loc] button.

Site Name				Nearest Receiving Waterbody			
431 Hidden Ridges Way				Garners Creek			
Quarter/Quarter	Quarter	Section	Township	Range	E / W	Latitude	Longitude
SW	SW	27	21	18	E	44.25832	-88.3195

Summary of Results - 1

Additional BMPs may be added to this site by clicking the [+] button.

Best Management Practice Installed	Surface Area (sq. ft.)	Drainage Area (Acres)	Load Reduction				Total Construction Cost
			TSS %	TSS (tons/yr)	P (lbs/yr)	N (lbs/yr)	
Shoreline Protected - NR154.04(31))	750		83	3.1			\$26,972

Site Location Attachment - 1

Check the box if the required information for the site is attached:

- ☒ Photos of pre-and post-implementation of BMP(s) ☒ Load reduction modeling documents
☒ Aerial photo map of site with BMPs labeled ☐ Water quality monitoring results/summary, if applicable

Site Information - 1

Narrative space will expand to fit.

Approximately 75 lineal feet of stream bank was restored by regrading and installing a brush mattress with rip-rap toe protection. This site needed additional restoration during 2016 to re-vegetate the access path to the project site.

Lat/long: 44.25800
-88.30952 LS

☒ DNR may use this site as a success story to meet state and federal reporting needs.

Site Location - 2

Additional sites may be added to the project by clicking the [+ Loc] button.

Site Name				Nearest Receiving Waterbody			
420 Buchanan Road				Garners Creek			
Quarter/Quarter	Quarter	Section	Township	Range	E / W	Latitude	Longitude
SE	SW	27	21	18	E	44.25941	-88.3076

Final Report

Urban Nonpoint Source & Storm Water Construction & Targeted Runoff Management Small-scale Urban TMDL Grant Program

Form 3400-189U (03/16)

Page 2 of 3

Summary of Results - 2		Additional BMPs may be added to this site by clicking the [+] button.					
Best Management Practice Installed	Surface Area (sq. ft.)	Drainage Area (Acres)	Load Reduction				Total Construction Cost
			TSS %	TSS (tons/yr)	P (lbs/yr)	N (lbs/yr)	
Shoreline Protected - NR154.04(31))	1,200		82	2.8			\$33,794

Site Location Attachment - 2

Check the box if the required information for the site is attached:

☒ Photos of pre-and post-implementation of BMP(s)
 ☒ Load reduction modeling documents
☒ Aerial photo map of site with BMPs labeled
 ☐ Water quality monitoring results/summary, if applicable

Site Information - 2

Narrative space will expand to fit.

Approximately 60 lineal feet of stream bank were restored with integrated bank treatment, including re-grading, placement of rip-rap bank protection, and native prairie restoration.

☒ DNR may use this site as a success story to meet state and federal reporting needs.

Site Location - 3		Additional sites may be added to the project by clicking the [+ Loc] button.					
Site Name 627 Glenview Ave				Nearest Receiving Waterbody Garners Creek			
Quarter/Quarter SW	Quarter NE	Section 27	Township 21	Range 18	E / W E	Latitude 44.26837	Longitude -88.29174

Summary of Results - 3		Additional BMPs may be added to this site by clicking the [+] button.					
Best Management Practice Installed	Surface Area (sq. ft.)	Drainage Area (Acres)	Load Reduction				Total Construction Cost
			TSS %	TSS (tons/yr)	P (lbs/yr)	N (lbs/yr)	
Shoreline Protected - NR154.04(31))	2,400		83	5.2			\$41,398

Site Location Attachment - 3

Check the box if the required information for the site is attached:

☒ Photos of pre-and post-implementation of BMP(s)
 ☒ Load reduction modeling documents
☒ Aerial photo map of site with BMPs labeled
 ☐ Water quality monitoring results/summary, if applicable

Site Information - 3

Narrative space will expand to fit.

Approximately 160 lineal feet of stream bank were restored with integrated bank treatment, including re-grading, placement of rip-rap bank protection, and native prairie restoration. The project also removed failing rock filled gabion baskets. The rock from the gabion baskets was salvaged and re-used as part of the project.

Lat/long: 44.26802
- 88.30169
LS

☒ DNR may use this site as a success story to meet state and federal reporting needs.

Additional Project Information

Narrative space will expand to fit.

Grantee Certification

A responsible government official (authorized signatory) must authorize and date the final report form and submit it electronically to the DNR Regional Nonpoint Source Coordinator.

I certify that, to the best of my knowledge, the project is complete and the information contained in this final report and attachments is correct and true.

Name of Authorized Government Official	Title of Authorized Government Official	Date
Joe Stephenson	Administrative Assistant	11/04/2016

For DNR Use Only

☒ Received complete reports with all attachments. ☒ Practices implemented were consistent with the grant agreement.

Comments about this project:

None.

Name of Nonpoint Source Coordinator	Date
Erin Hanson	11/21/2016

Send the Final Report and attachments to the Community Financial Assistance Grants Manager and to the Runoff Management Grants Coordinator. Keep a printed copy for the Region file.









p:\planman, w:\PROJECTS\60035\930108\00\ACAD\03 PROJECT OVERVIEW.dwg, 03 project overview, Plot Date: 6/2/2015 7:53 AM, xrefs: (x-aerial-1-930426, navigable_streams, row_co-outgagmie, 2013_01_07)



2015 STREAM BANK EROSION CONTROL PROJECTS

GARNERS CREEK STORM WATER UTILITY

PROJECT OVERVIEW & SITE ACCESS

DESIGNED	DRAWN
PTK	PTK
PROJECT NO.	
G0035-930108	
DATE	
MAY, 2014	
SHEET NO.	
03	

McMAHON

ENGINEERS ARCHITECTS

1445 McMAHON DRIVE NEENAH, WI 54956

Mailing: P.O. BOX 1025 NEENAH, WI 54957-1025

Tel: (920) 751-4200 Fax: (920) 751-4284

www.mcmgrp.com

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NO.

DATE

REVISION

THE 431 HIDDEN RIDGES COURT STREAM RESTORATION PROJECT IS GENERALLY LOCATED SOUTH OF HIDDEN RIDGES CT, NORTH OF CTH "CE", AND EAST OF CTH "N" WITHIN THE VILLAGE OF COMBINED LOCKS, OUTAGAMIE COUNTY, WISCONSIN (SW $\frac{1}{4}$ of SW $\frac{1}{4}$, SECTION 27, T21N, R18E).

CURRENTLY, GARNERS CREEK MEANDERS IN AN EASTERLY DIRECTION THROUGH THE PROJECT AREA. SIGNIFICANT STREAMBANK EROSION HAS OCCURRED ALONG AN OUTER MEANDER BEND LOCATED SOUTH OF A PEDESTRIAN BRIDGE. IF NOT CORRECTED, THE STREAMBANK EROSION WILL CONTINUE AND ADDITIONAL SEDIMENT WILL BE TRANSPORTED DOWNSTREAM. THE PROJECT INVOLVES RE-GRADING THE STREAMBANKS & INSTALLING A BRUSH MATTRESS WITH RIP-RAP TOE PROTECTION. IT IS ANTICIPATED THAT MOST OF THE WORK WILL BE COMPLETED WITH SMALL EQUIPMENT (SKID STEER, SMALL BACKHOE) OR BY HAND. MINIMAL EQUIPMENT USE ON THE BED OF GARNERS CREEK MAY BE REQUIRED IN ORDER TO CONSTRUCT THE PROJECT.

CONSTRUCTION ACTIVITIES ARE ANTICIPATED TO DISTURB APPROXIMATELY 0.08 ACRES OF PROPERTY. ACCESS TO THE SITE WILL BE GAINED FROM THE MAINTENANCE / RECREATIONAL TRAIL AS DEPICTED ON PLAN SHEET 03). THE WORK IS ANTICIPATED TO BE COMPLETED DURING THE FALL OF 2015. FOR REFERENCE, THE NRCS SOIL SURVEY MAPS INDICATE THE SITE CONTAINS UDIFLUVENTS (Uf) SOILS.

THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING SEQUENCE AND SCHEDULE OF MAJOR LAND DISTURBING ACTIVITIES:

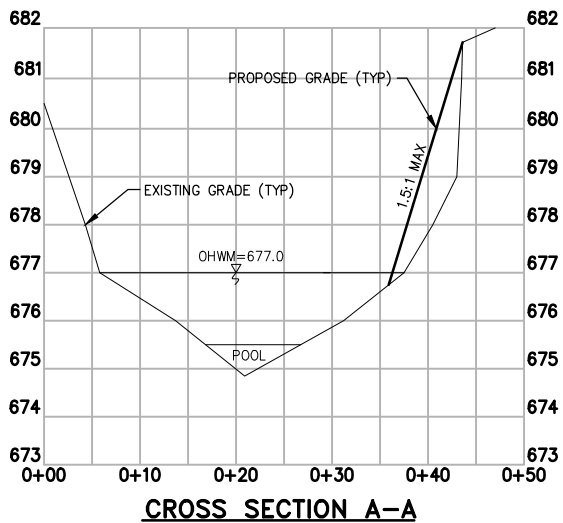
- A. POST ALL PERMITS. NOTIFY DNR, VILLAGE OF COMBINED LOCKS, GARNERS CREEK STORM WATER UTILITY AND DESIGN ENGINEER AT LEAST 5 DAYS PRIOR TO THE START OF CONSTRUCTION.
- B. INSTALL TRACKING PAD AT SITE ENTRANCE/EXIT IN LOCATION TO BE DETERMINED BY CONTRACTOR. IF TRACKING PAD DOES NOT REMOVE SEDIMENT FROM VEHICLE TIRES, THEN TIRES SHALL BE WASHED. STREET SWEEPING SHALL BE PERFORMED ON A DAILY BASIS AND/OR AS REQUIRED BY TECHNICAL STANDARDS.
- D. IF CONSTRUCTION EQUIPMENT IS REQUIRED FOR STREAMBANK RE-GRADING, EFFORT SHOULD BE MADE TO MINIMIZE THE REMOVAL OF EXISTING TREES & DISTURBANCE TO STREAMBED. THIS MAY REQUIRE CONTRACTOR TO PLACE TIMBER MATS ON STREAMBED OR WORK FROM STREAM BANK(S).
- E. CONTRACTOR IS RESPONSIBLE FOR ENSURING SURFACE DRAINAGE FROM ON & OFF SITE AREAS BE MAINTAINED THROUGH THE PROJECT SITE AT ALL TIMES DURING CONSTRUCTION. WORK IS TO BE COMPLETED DURING PERIODS OF LOW FLOWS. IF SIGNIFICANT FLOWS ARE PRESENT WITHIN THE STREAM, INSTALL TEMPORARY COFFER DAM(S) TO ISOLATE WORK AREA AND BYPASS PUMP AROUND WORK AREAS AS NECESSARY. ANY DE-WATERING COMPLETED SHALL BE IN ACCORDANCE WITH DNR TECHNICAL STANDARD 1061.
- E. ONCE WORK AREA IS ISOLATED FROM STREAM FLOWS, CONTRACTOR MAY DRIVE LOW WEIGHT BEARING EQUIPMENT ON THE STREAM BED TO PERFORM THE WORK IN CONFORMANCE WITH APPLICABLE PERMITS. EQUIPMENT MUST HAVE NO LEAKS AND SHALL UTILIZE BIODEGRADABLE NON-PETROLEUM BASED FLUIDS SUCH AS VEGETABLE OIL IF WORKING BELOW THE OHWM. REMOVE IDENTIFIED TREES AND BEGIN PROPOSED GRADING OF STREAMBANKS AS DEPICTED ON CONSTRUCTION PLANS. MINIMIZE THE AMOUNT OF SOIL EXPOSED AT ANY ONE TIME. INSTALL BRUSH MATTRESS WITH RIP-RAP TOE PROTECTION PER THE CONSTRUCTION PLANS & DETAILS.
- F. UNSUITABLE OR EXCESS EXCAVATED MATERIAL & DEBRIS IS TO BE LOADED ON TRUCKS AND HAULED TO AN OFFSITE LOCATION SELECTED BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR PERMITS AND BEST MANAGEMENT PRACTICES AT THE OFFSITE LOCATION, IF NEEDED.
- G. AS SOON AS PRACTICABLE, RESTORE ANY DISTURBED AREAS ALONG THE ACCESS ROUTE OR EQUIPMENT/LAYDOWN AREAS WITH 6" TOPSOIL (IF NECESSARY), PRAIRIE SEED & MULCH OR EROSION MAT. AREAS TO RECEIVE EROSION MAT ARE IDENTIFIED ON THE PLAN SHEET.



NOTES:

1. STREAMBANK SHALL BE ROUGH GRADED & TRENCH EXCAVATED PRIOR TO PLACING BRUSH MATTRESS & RIP-RAP.
2. BRUSH CUTTINGS SHALL BE 1/2" TO 1" IN DIAMETER AND RECENTLY HARVESTED. CUTTINGS SHALL CONTAIN MINIMUM 50% WILLOW, DOGWOOD OR OTHER APPROVED ADVENTITIOUSLY ROOTABLE STOCK WITH UP TO 50% DEAD MATERIAL ALLOWED. RECENTLY HARVESTED BUCKTHORN MAY BE USED IN PLACE OF DEAD MATERIAL IF DESIRED.
3. WEDGE STAKES SHALL BE DRIVEN INTO STREAMBANK PRIOR TO PLACING THE BRUSH CUTTINGS & SHALL EXTEND 8"-10" MIN.
4. BRUSH CUTTINGS SHALL BE PLACED AGAINST THE FACE OF THE STREAMBANK WITH THE BASAL (CUT) ENDS PLACES IN THE TRENCH & THE GROWING TIPS EXTENDING SLIGHTLY PAST THE TOP OF BANK. THE BRUSH CUTTINGS BRANCHES SHOULD BE RETAINED & SHOULD OVERLAP IN A SLIGHT CRISSCROSS PATTERN. BRUSH CUTTINGS SHALL BE PLACED AS TIGHTLY AS POSSIBLE TO EACH OTHER TO A MINIMUM THICKNESS OF 4".
5. STAND ON BRUSH CUTTINGS AND SECURE THEM BY TYING 3" BRAIDED MANILA ROPE IN A DIAMOND PATTERN BETWEEN THE WEDGE STAKES. AFTER TYING THE ROPE TO THE STAKES, DRIVE THE WEDGE STAKES ANOTHER 2"-4" INTO THE BANK TO FIRMLY SECURE THE BRUSH CUTTINGS TO THE BANK FACE.
6. WASH LOOSE SOIL INTO THE MATTRESS BETWEEN AND AROUND THE BRUSH CUTTINGS SO THAT THE BOTTOM HALF OF THE CUTTINGS ARE COVERED WITH 3"-4" LAYER OF SOIL.
7. BACKFILL TRENCH WITH GEOTEXTILE FABRIC AND RIP-RAP AS SPECIFIED.

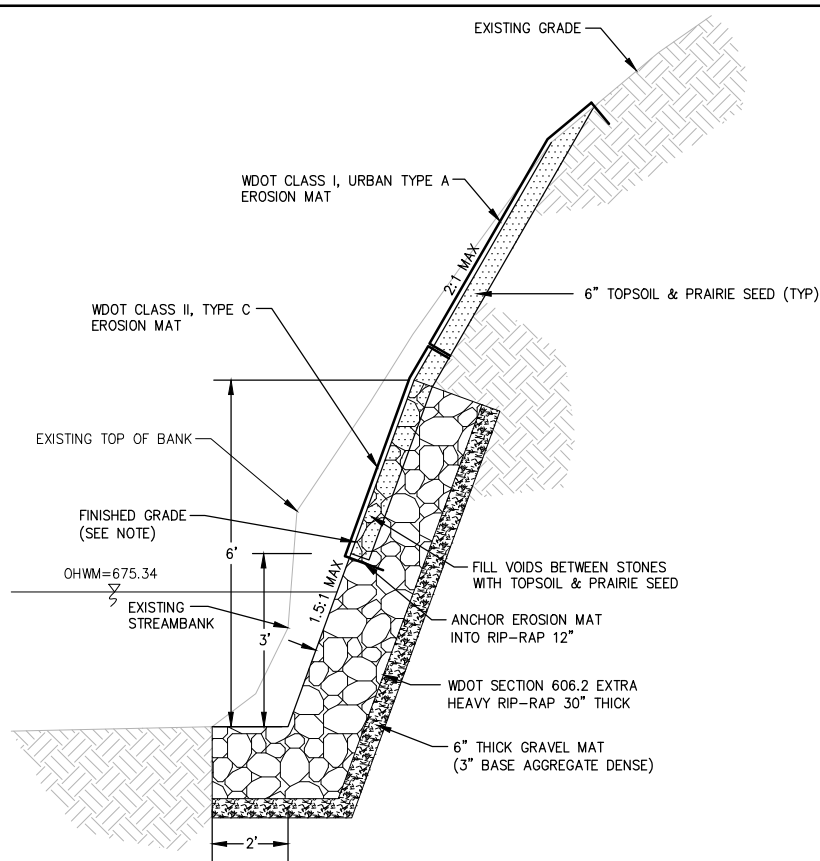
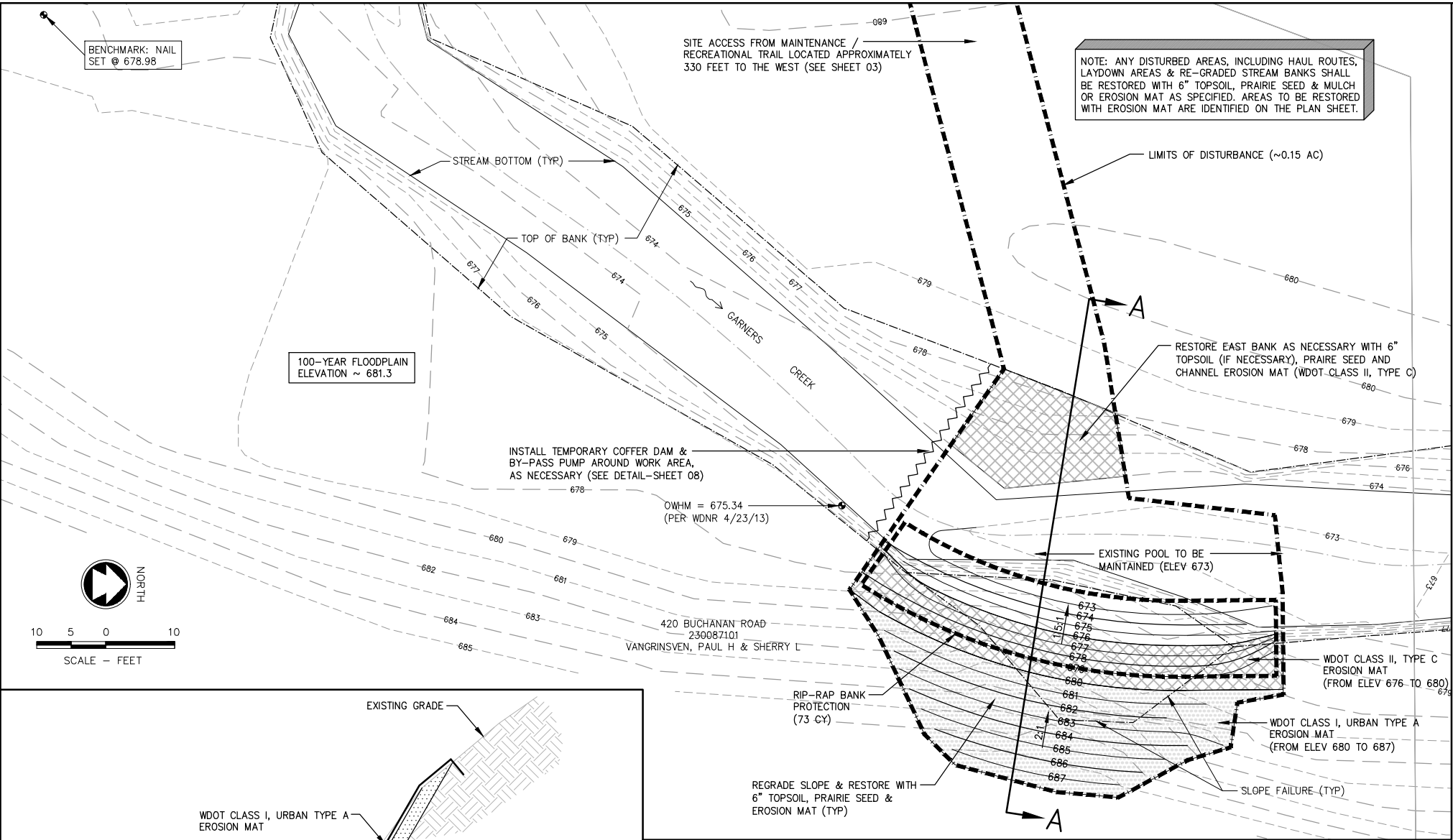
BRUSH MATTRESS DETAIL



NOTE:
THE UTILITIES SHOWN IN PLAN AND PROFILE ARE INDICATED IN ACCORDANCE WITH AVAILABLE RECORDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING EXACT LOCATIONS AND ELEVATIONS OF ALL UTILITIES FROM THE OWNERS OF THE RESPECTIVE UTILITIES. ALL UTILITIES SHALL BE NOTIFIED 72 HRS. PRIOR TO EXCAVATION.

NOTE:
PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY PROPOSED
SITE GRADES BY FIELD CHECKING TWO (2) BENCHMARKS AND A
MINIMUM OF ONE (1) SITE FEATURE AS SHOWN ON THESE PLANS. THE
CONTRACTOR SHALL IMMEDIATELY NOTIFY MCMAHON OF ANY VERTICAL
DISCREPANCY.

p:\eman, W:\PROJECTS\60035\930108\00\ACAD\05 420 BUCHANAN ROAD.dwg, 05 420 buchanan road, Plot Date: 6/2/2015 7:53 AM, xrefs: (x--shading garners, x--existing garners, x--proposed garners)



- NOTES:
1. FINISHED GRADE SHALL MATCH GRADING PLAN. RIP-RAP SHALL BE FLUSH OR SLIGHTLY SET BELOW THE FINISHED GRADE ALONG RESTORED &/OR ADJACENT STREAM BANK.
 2. STREAM BANK / BED SHALL BE OVER-EXCAVATED TO ENSURE RIP-RAP IS "KEYED-IN" AS DEPICTED IN THE DETAIL.
 3. CONTRACTOR SHALL COMPACT RIP-RAP TO ENSURE IT IS FIRMLY BED WITHIN THE EXCAVATED TRENCH.

RIP-RAP BANK PROTECTION DETAIL

NOTE:
PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY PROPOSED SITE GRADES BY FIELD CHECKING TWO (2) BENCHMARKS AND A MINIMUM OF ONE (1) SITE FEATURE AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY MCMAHON OF ANY VERTICAL DISCREPANCY.

NOTE:
THE UTILITIES SHOWN IN PLAN AND PROFILE ARE INDICATED IN ACCORDANCE WITH AVAILABLE RECORDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING EXACT LOCATIONS AND ELEVATIONS OF ALL UTILITIES FROM THE OWNERS OF THE RESPECTIVE UTILITIES. ALL UTILITIES SHALL BE NOTIFIED 72 HRS. PRIOR TO EXCAVATION.

PROJECT DESCRIPTION:

THE 420 BUCHANAN STREAM RESTORATION PROJECT IS GENERALLY LOCATED SOUTH OF ROGER STREET, NORTH OF BROOKVIEW PLACE, AND WEST OF PARK STREET WITHIN THE VILLAGE OF COMBINED LOCKS, OUTAGAMIE COUNTY, WISCONSIN (GOV LOT 3, SECTION 25, T21N, R18E).

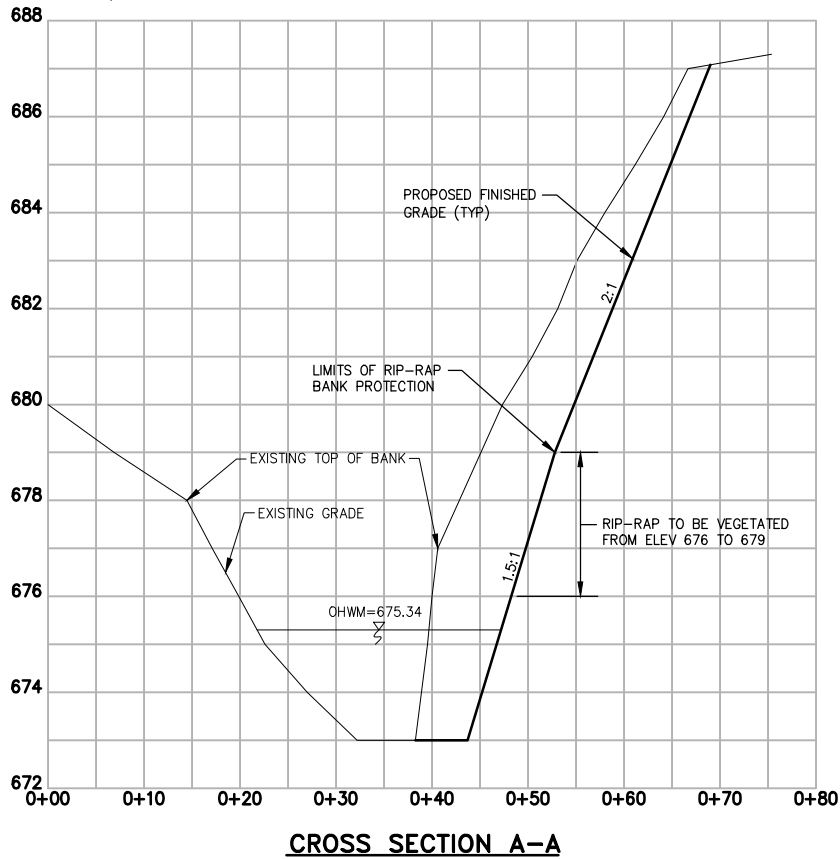
CURRENTLY, GARNERS CREEK MEANDERS IN A NORTHERLY DIRECTION THROUGH THE PROJECT AREA. THE STREAM BANK ALONG AN OUTER MEANDER BEND HAS EXPERIENCED SIGNIFICANT EROSION WHICH HAS CAUSED SLOUGHING OF THE UPSLOPE HILLSIDE. IF NOT CORRECTED, THE SLOPE FAILURE WILL CONTINUE TO EXPAND IN SIZE, CAUSING ADDITIONAL SEDIMENT TO BE TRANSPORTED DOWNSTREAM. IN ORDER TO REPAIR THE STREAM BANK EROSION AND SLOPE FAILURE, THE PROJECT INVOLVES THE RE-GRADED THE STREAM BANKS & INSTALLING RIP-RAP BANK PROTECTION. THE UPSLOPE HILLSIDE WILL ALSO BE RE-GRADED AND STABILIZED WITH NATIVE VEGETATION. IT IS ANTICIPATED THAT MOST OF THE WORK WILL BE COMPLETED WITH SMALL/MEDIUM SIZE EARTHMOVING EQUIPMENT (FRONT END LOADER, MEDIUM BACKHOE, SKID STEER).

CONSTRUCTION ACTIVITIES ARE ANTICIPATED TO DISTURB APPROXIMATELY 0.15 ACRES OF PROPERTY. WORK IS TO BE COMPLETED DURING PERIODS OF LOW FLOWS. ACCESS TO THE SITE WILL BE GAINED FROM THE MAINTENANCE / RECREATIONAL TRAIL LOCATED APPROXIMATELY 330 FEET WEST OF THE PROJECT AREA. ACCESS TO THE SITE FROM THE MAINTENANCE TRAIL WILL BE LOCATED WITHIN A MAPPED FORESTED WETLAND. AS SUCH, THE WORK SHALL BE COMPLETED DURING LATE FALL / EARLY WINTER WHEN THE GROUND IS FROZEN OR DRY ENOUGH TO ACCESS THE SITE WITHOUT RUTTING THE GROUND. IN ADDITION, ANY WETLAND VEGETATION PRESENT WITHIN THE ACCESS PATH SHOULD BE DORMANT BY LATE FALL / EARLY WINTER. FOR REFERENCE, THE NRCS SOIL SURVEY MAPS INDICATE THE SITE CONTAINS UDFLUVENTS (Uf) & KEWAUNEE (KKE3) SOILS.

SEQUENCE OF CONSTRUCTION:

THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING SEQUENCE AND SCHEDULE OF MAJOR LAND DISTURBING ACTIVITIES:

- A. POST ALL PERMITS. NOTIFY DNR, VILLAGE OF COMBINED LOCKS, GARNERS CREEK STORM WATER UTILITY AND DESIGN ENGINEER AT LEAST 5 DAYS PRIOR TO THE START OF CONSTRUCTION.
- B. INSTALL TRACKING PAD AT SITE ENTRANCE/EXIT IN LOCATION TO BE DETERMINED BY CONTRACTOR. IF TRACKING PAD DOES NOT REMOVE SEDIMENT FROM VEHICLE TIRES, THEN TIRES SHALL BE WASHED. STREET SWEEPING SHALL BE PERFORMED ON A DAILY BASIS AND/OR AS REQUIRED BY TECHNICAL STANDARDS.
- D. CONTRACTOR IS RESPONSIBLE FOR ENSURING SURFACE DRAINAGE FROM ON & OFF SITE AREAS BE MAINTAINED THROUGH THE PROJECT SITE AT ALL TIMES DURING CONSTRUCTION. AS SUCH, WORK SHALL BE COMPLETED DURING PERIODS OF LOW FLOWS. INSTALL TEMPORARY COFFER DAM(S) TO ISOLATE WORK AREA AND BYPASS PUMP AROUND WORK AREAS AS NECESSARY.
- E. ONCE WORK AREA IS ISOLATED FROM STREAM FLOWS, CONTRACTOR MAY DRIVE LOW WEIGHT BEARING EQUIPMENT ON THE STREAM BED TO PERFORM THE WORK IN CONFORMANCE WITH APPLICABLE PERMITS. EQUIPMENT MUST HAVE NO LEAKS AND SHALL UTILIZE BIODEGRADABLE NON-PETROLEUM BASED FLUIDS SUCH AS VEGETABLE OIL IF WORKING BELOW THE OHWM. BEGIN PROPOSED GRADING OF STREAMBANKS AS DEPICTED ON CONSTRUCTION PLANS. MINIMIZE THE AMOUNT OF SOIL EXPOSED AT ANY ONE TIME. INSTALL RIP-RAP BANK PROTECTION PER THE CONSTRUCTION PLANS & DETAILS. AS SOON AS PRACTICABLE, RESTORE DISTURBED AREAS WITH 6" TOPSOIL, SEED AND EROSION MAT OR MULCH. AREAS TO RECEIVE EROSION MAT ARE DEPICTED ON THE CONSTRUCTION PLANS.
- F. UNSUITABLE OR EXCESS EXCAVATED MATERIAL & DEBRIS IS TO BE LOADED ON TRUCKS AND HAULED TO AN OFFSITE LOCATION SELECTED BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR PERMITS AND BEST MANAGEMENT PRACTICES AT THE OFFSITE LOCATION, IF NEEDED.
- G. AS SOON AS PRACTICABLE, RESTORE THE DISTURBED AREAS ALONG THE ACCESS ROUTE OR EQUIPMENT/LAYDOWN AREAS WITH 6" TOPSOIL, PRAIRIE SEED AND MULCH.



2015 STREAM BANK EROSION CONTROL PROJECTS GARNERS CREEK STORM WATER UTILITY 420 BUCHANAN ROAD

DESIGNED PTK	DRAWN PTK
PROJECT NO. G0035-930108	
DATE MAY, 2014	
SHEET NO.	

05

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EXISTING CONDITION - SEDIMENT LOADINGS

NRCS Streambank Erosion Estimator Direct Volume Method										
Location	Eroding Bank Length (ft)	Vertical Height of Bank (ft)	Horizontal Length of Bank (ft)	Eroding Bank Height ¹ (ft)	Area of Eroding Streambank (ft ²)	Lateral Recession Rate ² (ft/yr)	Estimated Volume Eroded Annually (ft ³)	Soil Texture	Volume - Weight Conversion (lbs/ft ³)	Estimated Soil Loss (tons/yr)
431 Hidden Ridges Way	75	4.9	1.8	5.2	390	0.30	117.0	Clay	65	3.8
420 Buchanan Rd	60	5.5	1.9	5.8	346	0.30	103.9	Clay	65	3.4
627 Glenview Ave	160	3.8	1.4	4.0	648	0.30	194.4	Clay	65	6.3
Total Estimated Annual Streambank Erosion Soil Loss (Tons):										9.7
⁴ Total Estimated Annual Streambank Erosion TP Loss (lbs):										11.6

PROPOSED CONDITION - SEDIMENT LOADINGS

NRCS Streambank Erosion Estimator Direct Volume Method										
Location	Eroding Bank Length (ft)	Vertical Height of Bank (ft)	Horizontal Length of Bank (ft)	Eroding Bank Height ¹ (ft)	Area of Eroding Streambank (ft ²)	Lateral Recession Rate ² (ft/yr)	Estimated Volume Eroded Annually (ft ³)	Soil Texture	Volume - Weight Conversion (lbs/ft ³)	Estimated Soil Loss (tons/yr)
431 Hidden Ridges Way	75	4.9	2.4	5.5	409	0.05	20.4	Clay	65	0.7
420 Buchanan Rd	60	5.5	2.7	6.1	366	0.05	18.3	Clay	65	0.6
627 Glenview Ave	160	3.8	1.9	4.2	680	0.05	34.0	Clay	65	1.1
Total Estimated Annual Streambank Erosion Soil Loss (Tons):										1.7
⁴ Total Estimated Annual Streambank Erosion TP Loss (lbs):										2.0

Results	
Total TSS Reduction (tons/yr)	Total TSS Reduction (%)
3.1	82.5%
2.8	82.4%
5.2	82.5%

¹ User to input the vertical height and horizontal length based on topographic survey

² User to select appropriate Lateral Recession Rate using Table 1

³ User to select appropriate Volume - Weight Conversion using Table 2

⁴ Assumed 1.2 lbs TP / ton of soil loss (Franklin & Marshall College, Sediment & Nutrient Loads form Stream Corridor Erosion along Breached Millponds)

Table 1

Lateral Recession Rate (ft/yr)	Category	Description
0.01 - 0.05	Slight	Some bare bank but active erosion not readily apparent. Some rills but no vegetative overhang. No exposed tree roots.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang. Some exposed tree roots but no slumps or slips
0.3 - 0.5	Severe	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.
0.5+	Very Severe	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.

Table 2

Soil Texture	Volume-Weight (pcf)
Clay	60-70
Silt	75-90
Sand	90-110
Gravel	110-120
Loam	80-100
Sandy Loam	90-110
Gravelly Loam	110-120

Total Reduction of Soil Loss (Tons): 8.0
Total Reduction of Soil Loss (%): 82.5%

Total Reduction of TP Loss (lbs): 9.6
Total Reduction of TP Loss (%): 82.5%

MAINTENANCE STRATEGY

For The 2015 STREAM BANK EROSION CONTROL PROJECTS

Prepared For The GARNERS CREEK STORM WATER UTILITY

November 4, 2016
McM. No. G0035-930108

The following maintenance strategy was developed for the 2015 Stream Bank Erosion Control project sites (431 Hidden Ridges Way, 420 Buchanan Rd & 627 Glenview Ave) as required as part of the UNPS&SW Construction Grant received through the Wisconsin DNR. The maintenance strategy will describe how often each project site will be inspected and how to address repairs if necessary.

Each project site will be inspected on an annual basis or after a severe flooding event. The annual inspections are anticipated to occur in the spring after the winter thaw. As part of those inspections, each site will also be reviewed for maintenance or erosion issues. Riparian property owners may also request an inspection, particularly if they feel some maintenance is required.

In the future, erosion issues may develop along the stream banks that will require repair. Typically, erosion problems develop before a dense mat of vegetation is established or after an area is temporarily disturbed. Rill erosion may occur on moderate to steep slopes. If rill erosion occurs, the damaged area should be repaired with topsoil, seed, fertilizer and erosion mat as specified in the construction plan set and/or specifications manual. If minor bank erosion occurs, the damaged area should be repaired with topsoil, seed, fertilizer and erosion mat as specified in the construction plan set and/or specifications manual. If severe bank erosion is observed, the damaged area should be repaired with rip-rap as specified in the construction plan set and/or specifications manual. It should be noted that the local DNR Water Management Specialist should be contacted if additional rip-rap bank protection is needed along the stream bank to verify the project permits will allow for the placement of such material. Permit amendments may be required depending on the scope of the repair work.